FLOOD INSURANCE STUDY

SIERRA COUNTY, CALIFORNIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
LOYALTON, CITY OF	060361
SIERRA COUNTY (UNINCORPORATED AREAS)	060630

PRELIMINARY

AUG 19 2015

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
06091CV000B

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

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

Initial Countywide FIS Effective Date: September 1, 1988

Revised Countywide FIS Effective Date(s): June 8, 1998
February 2, 2012

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FLOOD INSURANCE STUDY
SIERRA COUNTY, CALIFORNIA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and Flood Insurance Rate Maps (FIRMs) in the geographic area of Sierra County, California, including the City of Loyalton and the unincorporated areas of Sierra County (hereinafter referred to collectively as Sierra County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Sierra County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

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

The June 8, 1998 Countywide FIS report was prepared to include all jurisdictions within Sierra County in a Countywide FIS. The authority and acknowledgments for the original and are shown below:

The basic hydrologic analyses for the June 8, 1998 Countywide study were preformed by the U.S. Army Corps of Engineers (USACE), San Francisco District, for use in a reconnaissance study for flood control on Smithneck Creek under Section 205 of the Continuing Authorities Program (Reference 1). The analyses were reviewed by the USACE, Sacramento District, and expanded to include an area upstream of the City of Loyalton. The hydraulic analyses were prepared by the USACE, Sacramento District (the study contractor) for the Federal Emergency Management Agency (FEMA), under Interagency Agreement No. EMW-94-E-4432, Project Order No. 8, of the Limited Map Maintenance Program (LMMP). This LMMP project was completed in November 1995.

For this countywide study, MAP IX-Mainland was contracted by FEMA, under contract number EMF-2003-CO-0047, to revise the 1998 Sierra Countywide FIS and DFIRM. This work was completed in June 2009. Awareness Floodplain Mapping, completed by the California Department of Water Resources

(CADWR) in 2008, was incorporated by MAP IX-Mainland into the 2009 Sierra Countywide FIS and DFIRM.

Reaches of the Downie River from its mouth upstream to the mouth of Pauley Creek, and the North Yuba River from Goodyears Bar upstream to just above the mouth of Slate Castle Creek were studied in January 1975. This countywide revision incorporates the results of the study performed by the U.S. Army Corps of Engineers (USACE) Sacramento District for Sierra County (Reference 2).

For this revision, BakerAECOM was contracted in 2009; contract number HSFEHQ-09-D-0368, Task Order HSFE09-09-J-0001, to perform a Physical Map Revision (PMR). This PMR will incorporate a California Department of Water Resources (DWR) issued Task Order No. 104 (TO 104) under Contract 4600007989, Subtask 8, to Wood Rodgers, Inc. to perform detailed analysis for portions of the Downie River, Goodyears Creek and the North Yuba River (Reference 13).

Base map information shown on the FIRMs was provided in digital format by the United States Department of Agriculture's (USDA) National Agriculture Imagery Program (NAIP). This information was photogrammectrically compiled at a scale of 1":24,000' from aerial photography dated 2005.

The projection used in the preparation of the FIRMs was Universal Transverse Mercator (UTM) Zone 10. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zone used in the production of FIRMs for adjacent jurisdictions may result in slight positional differenced in map features across jurisdiction boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

Consultation Coordination Officer's (CCO) meetings may be held for each jurisdiction in this Countywide FIS. An initial CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to review the results of the study.

For the June 8, 1998 Countywide FIS, an initial CCO meeting was held on August 25, 1994, and attended by representatives of FEMA and Sierra County. The study contractor met separately with local representatives and FEMA in September 1994. Coordination with local agencies and residents produced hydrologic and hydraulic data and a variety of information pertaining to the community.

An intermediate CCO meeting was held on June 20, 1996, to present the preliminary results of the study to the City of Loyalton and the County. The meeting was attended by representatives of FEMA, Sierra County, and the study contractor.

The results of the study were reviewed at the final CCO meeting held on May 14, 1997, and attended by representatives of FEMA and Sierra County. All problems raised at that meeting have been addressed in this study.

For the February 2, 2012, countywide FIS, an initial CCO meeting was held on December 6, 2006 and was attended by representatives of FEMA, the communities, and the study contractor. The final CCO meeting was held on November 20, 2008, and was attended by representatives of FEMA, the communities, and the study contractor.

For this revision, the final CCO meeting was held on TBD. The meeting was attended by representatives of FEMA Region IX, Sierra County, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Sierra County, California.

All or portions of the flooding sources listed in Table 1, "Flooding Sources Studied by Detailed Methods," were studied by detailed methods. Limits of detailed study area indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

Table 1 – Flooding Sources Studied by Detailed Methods

Downie River	North Yuba River
Goodyears Creek	Smithneck Creek

All or portions of numerous flooding sources in the county were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the communities.

The Countywide FIS dated February 2, 2012, incorporates the determination of Letter of Map Revision (LOMR) case number 99-09-835P, dated November 30, 1999, for the unincorporated areas of Sierra County.

For this PMR, the following LOMRs were superseded by the new study information: 12-09-0242P, 12-09-0381P, and 12-09-0382P.

2.2 Community Description

The City of Loyalton is located in the northeastern portion of Sierra County and is the only incorporated community in the County. The City is serviced by State Highway 49 and is located approximately 30 miles northwest of the City of Reno, Nevada, and approximately 145 miles east-northeast of the City of Sacramento.

Sierra County was incorporated on April 16, 1852. The County seat is located in Downieville, approximately 40 miles west of the City of Loyalton. The City of Loyalton was incorporated on September 21, 1901. The City of Loyalton comprises mainly residential structures with a few small businesses and public facilities. A sawmill owned and operated by Sierra Pacific Industries is located adjacent to and upstream of the City of Loyalton. It is the major commercial/industrial activity in the study area. There is a large subdivision known as Sierra Brooks located approximately 2 miles southeast of the City of Loyalton. Approximately 75 homes are in the subdivision.

The community, with an average elevation of approximately 4,944 feet North American Vertical Datum (NAVD88), is situated in Sierra Valley and is subject to flooding primarily from general rain storms.

In 2008, the estimated population of Sierra County was 3,263 (Reference 3).

2.3 Principal Flood Problems

The study area has a long history of flooding. The most recent significant flooding occurred in 1955, 1963, 1986, and 1995. In the upper 2 miles of the detailed study area, the floodplain uniformly parallels Smithneck Creek in a steep "U"-shaped valley and floods a portion of the Sierra Brooks subdivision. The most significant flooding of this subdivision occurs along the west side. In 1986, a berm failure allowed flood waters from Smithneck Creek to flow down old channels toward the junction of West Sierra Brooks and Long Horn Drives. After that flood, the Natural Resources Conservation Service (NRCS) rebuilt the west bank of Smithneck Creek to repair the berm failure.

As Smithneck Creek approaches the City of Loyalton from the southeast, the channel slope diminishes and flood waters spread across the broad floodplain in the vicinity of the City of Loyalton. Flows divide east and west around the lumber mill, then rejoin at the southeast edge of the City's residential development. Overbank flooding is most significant upstream of the State Highway 49 bridge. The channel capacity through the City upstream of State Highway 49 is diminished due to a flattening channel slope, dense alders growing in the channel, a narrowing of the channel, and decreased depth of the channel. Northwest and downstream of the City of Loyalton, the flood waters spread into a broad agricultural area.

Suzy Creek, a small drainage to the east, exceeds the State Highway 49 culvert capacity and flows into Loyalton at the east City limits.

In addition the USACE 1975 study (Reference 2) provides more information on historical floods prior to 1975 along the North Yuba and Downieville Rivers.

2.4 Flood Protection Measures

No major flood-control structures exist within the County. There is a low-level berm along both sides of Smithneck Creek in the vicinity of the Sierra Brooks subdivision, which provides some protection. The berm, however, does not meet

the protection guidelines stated in FEMA Procedure Memorandum No. 43 - Guidelines for Identifying Provisionally Accredited Levees issued on March 16, 2007. The berm along Smithneck Creek does not show compliance with 44 CFR Section 65.10 to provide protection against the 1-percent-annual-chance flood.

3.0 ENGINEERING METHODS

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

3.1 Hydrologic Analyses

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

Information on the methods used to determine Peak Discharge Frequency relationships for streams studied by detailed methods is shown below.

June 8, 1998 Countywide Analyses

The hydrologic analysis for Smithneck Creek was based in part on a report originally developed by the USACE, Sacramento District, in July 1992 (Reference 4). That study was expanded to include additional flow from snowmelt on Bear Valley Creek and a concurrent hydrograph was developed for Suzy Creek.

Because of the limited stream-gage record on Smithneck Creek near the City of Loyalton, peak discharge-versus-frequency relationships were determined by applying rainfall of a given frequency to derive unit hydrographs using the USACE HEC-1 computer program (Reference 5).

Unit hydrographs were synthetically developed for four subbasins of Smithneck Creek using the Middle Fork Feather River S-Curve hydrograph.

The S-Curve hydrograph and lag relationship data were developed by the USACE, Sacramento District (Reference 6).

The 1-percent-annual-chance flood hydrographs for the local drainages east and west of the City of Loyalton and for Suzy Creek above the City of Loyalton were computed using the HEC-1 computer program.

Peak discharge-drainage area relationships for Sierra County area shown in Table 2, "Summary of Discharges."

2010 Countywide Analyses

In 2008, the California Department of Water Resources (CADWR) completed Awareness Floodplain Mapping studies for all California counties. The intent of the project was to identify flood hazard areas for all regions for mapped under FEMA's NFIP. The awareness maps identify the 1-percent-annual-chance flood hazard areas using approximate assessment procedures. These floodplains are shown as flood prone areas without specific depths and other flood hazard data (Reference 7).

The Awareness Floodplain Maps are not FEMA regulatory floodplain maps; however, at the request of the community FEMA included the data on the county's maps.

The 1975 USACE study of Downie River and North Yuba River determined peak flows from statistical analysis of available streamflow (gage) and precipitation records (supplemented by streamflow and precipitation data from adjacent basins having hydrological, metrological and runoff characteristics similar to those of the study area). The peak flows derived take into account basin runoff characteristics, ground saturation conditions and losses from surface pondage. Frequency analyses for the North Yuba River were based on stream gage records of rainflood flows, available precipitation records and computed peak floodflows.

Table 2 – Summary of Discharges

Flooding Source and Location	Drainage Area (sq mi)	Peak Discharges (cfs) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
DOWNIE RIVER					
At Jersey Flat Bridge	26.0	[1]	[1]	[1]	[1]
Upstream of confluence with North Yuba River	46.6	[1]	[1]	14,367	[1]
Downstream of confluence with North Yuba River	72.6	[1]	[1]	19,549	[1]
GOODYEARS CREEK					
At confluence with North Yuba River	12.9	[1]	[1]	6,032	[1]
NORTH YUBA RIVER					
Upstream of confluence with Downie River	141.4	[1]	[1]	30,808	[1]
Downstream of confluence with Downie River	217.6	[1]	[1]	40,819	[1]
At River Mile 9.29	230.6	[1]	[1]	41,748	[1]
NORTH YUBA RIVER NEAR DOWNIEVILLE					
Below confluence with Downie River	217.6	[1]	[1]	40,819	[1]
Above confluence with Downie River	141.4	[1]	[1]	30,808	[1]
NORTH YUBA RIVER NEAR GOODYEARS BAR					
Below confluence of Goodyears Creek	243.5	[1]	[1]	44,567	[1]
SMITHNECK CREEK					
At City of Loyalton	61.3	[1]	[1]	3,530	[1]
Below Badenaugh Canyon Creek	31.4	[1]	[1]	1,760	[1]

[1]*Data not available*

3.2 Hydraulic Analyses

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

The hydraulic analysis for this revision was 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.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

June 8, 1998 Countywide Analyses

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USACE HEC-2 step-backwater computer program (Reference 8). Starting water-surface elevations for Smithneck Creek were determined using the slope-area method. Flood hydrographs were routed down Smithneck Creek using the USACE, Sacramento District, X-RATE computer program (Reference 9). Shallow flooding areas along Smithneck Creek were determined by normal-depth computations and engineering judgment.

Cross sections for the backwater analysis were located at close intervals upstream and downstream from bridges and culverts and other hydraulically significant features in order to establish the backwater effect of such structures in areas presently urbanized or potentially subject to development. Additional cross sections were located at other representative locations in the study area.

The cross sections used in this analysis were developed initially for the reconnaissance study from 1989 channel topography with 4-foot contour intervals. Orthophoto maps of the study area at a scale of 1”:4,800’ were prepared for this study (Reference 10). The cross sections were then modified to reflect current conditions.

Channel and overbank roughness factors (Manning’s “n” values) used in the hydraulic computations were determined by engineering judgment and based on field observations of the streams and floodplain areas. Values for the channel and overbank areas were 0.020 to 0.015 and 0.100, respectively.

2010 Countywide Analyses

In 2008, the California Department of Water Resources (CADWR) completed Awareness Floodplain Mapping studies for all California counties. The intent of the project was to identify flood hazard areas for all regions for mapped under FEMA’s NFIP. The awareness maps identify the 1-percent-annual-chance flood hazard areas using approximate assessment procedures. These floodplains are shown as flood prone areas without specific depths and other flood hazard data (Reference 7).

The Awareness Floodplain Maps are not FEMA regulatory floodplain maps; however, at the request of the community FEMA included the data on the county’s maps.

The 1975 study of Downie River and North Yuba River was performed by the USACE, Sacramento District and was based on California Department of

Transportation (Caltrans) contour maps developed from aerial photographs dated 1965 and 1966. Stream profiles and cross sections were developed from the contour maps and supplemented with field observations during the course of the study. Structural dimensions on bridges were furnished by Caltrans, or obtained by measurement in the field (Reference 2).

2010 Levee Hazard Analysis

On August 22, 2005, FEMA issued Procedure Memorandum No. 34 - Interim Guidance for Studies Including Levees. The purpose of the memorandum was to help clarify the responsibility of community officials or other parties seeking recognition of a levee by providing information identified during a study/mapping project. Often, documentation regarding levee design, accreditation, and the impacts on flood hazard mapping is outdated or missing altogether. To remedy this, Procedure Memorandum No. 34 provides interim guidance on procedures to minimize delays in near-term studies/mapping projects, to help our mapping partners properly assess how to handle levee mapping issues.

While the 44 CFR Section 65.10 documentation is being compiled, the release of more up-to-date FIRM panels for other parts of a community or county may be delayed. To minimize the impact of the levee recognition and certification process, FEMA issued Procedure Memorandum No. 43 - Guidelines for Identifying Provisionally Accredited Levees on March 16, 2007. These guidelines will allow issuance of preliminary and effective versions of FIRMs while the levee owners or communities are compiling the full documentation required to show compliance with 44 CFR Section 65.10. The guidelines also explain that preliminary FIRMs can be issued while providing the communities and levee owners with a specified timeframe to correct any maintenance deficiencies associated with a levee and to show compliance with 44 CFR Section 65.10.

It was determined that no protecting levees exist within Sierra County.

3.3 Vertical Datum

All FISs and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FISs and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in base flood elevations across the corporate limits between the communities.

As noted above, the elevations shown in the FIS report and on the FIRM for Sierra County are referenced to NAVD88. Ground, structure, and flood elevations

may be compared and/or referenced to NGVD29 by applying a standard conversion factor.

The conversion from NGVD29 to NAVD88 ranged between +3.00 feet and +3.74 feet for this county. Accordingly, due to the statistically significant range in conversion factors, an average conversion factor could not be established for the entire community. The elevations shown in the FIS report and on the FIRM were, therefore, converted to NAVD88 using a stream-by-stream approach. In this method, an average conversion was established for each flooding source and applied accordingly. The conversion factor for each flooding source in the community may be found in Table 3, "Vertical Datum Conversions," as well as on the FIRM.

The Base Flood Elevations shown on the FIRM represent whole-foot rounded values. For example, a Base Flood Elevation of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in this FIS to NGVD29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and supporting data tables in the FIS report.

For additional information regarding conversion between the NGVD and NAVD, 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

Table 3 – Vertical Datum Conversions

Stream Name	Has FDT Y/N	Has Profile Y/N	Conversion Factor (ft)
Downie River	N	Y	+3.05
North Yuba River	N	Y	+3.00
Smithneck Creek	N	Y	+3.74

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-percent, 2-percent, 1-percent, and 0.2-percent-annual-chance flood elevations; delineations of the 1-percent and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and in components of the FIS, including Flood Profiles. Users should reference the data presented in the FIS as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 1-percent and 0.2-percent-annual-chance floodplains have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps.

The 1-percent and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AO), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

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

Approximate 1-percent-annual-chance floodplain boundaries in the study area were taken directly from the previous FIRM for Sierra County, California and Incorporated Areas (Reference 11) or from CADWR awareness maps (Reference 7).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any

adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

Floodways were computed for the Downie River, Goodyears Creek, and portions of the North Yuba River. Much of the study area contained divided floodplains or shallow flooding for which a floodway would not be applicable.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage and heightens potential flood hazards by further increasing velocities.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplains will not cause more than a 1.0-foot increase in the BFE at any point within the county.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, “Floodway Schematic.” Cross sections for stream floodways studied in detail are presented on Table 4, “Floodway Data Table.”

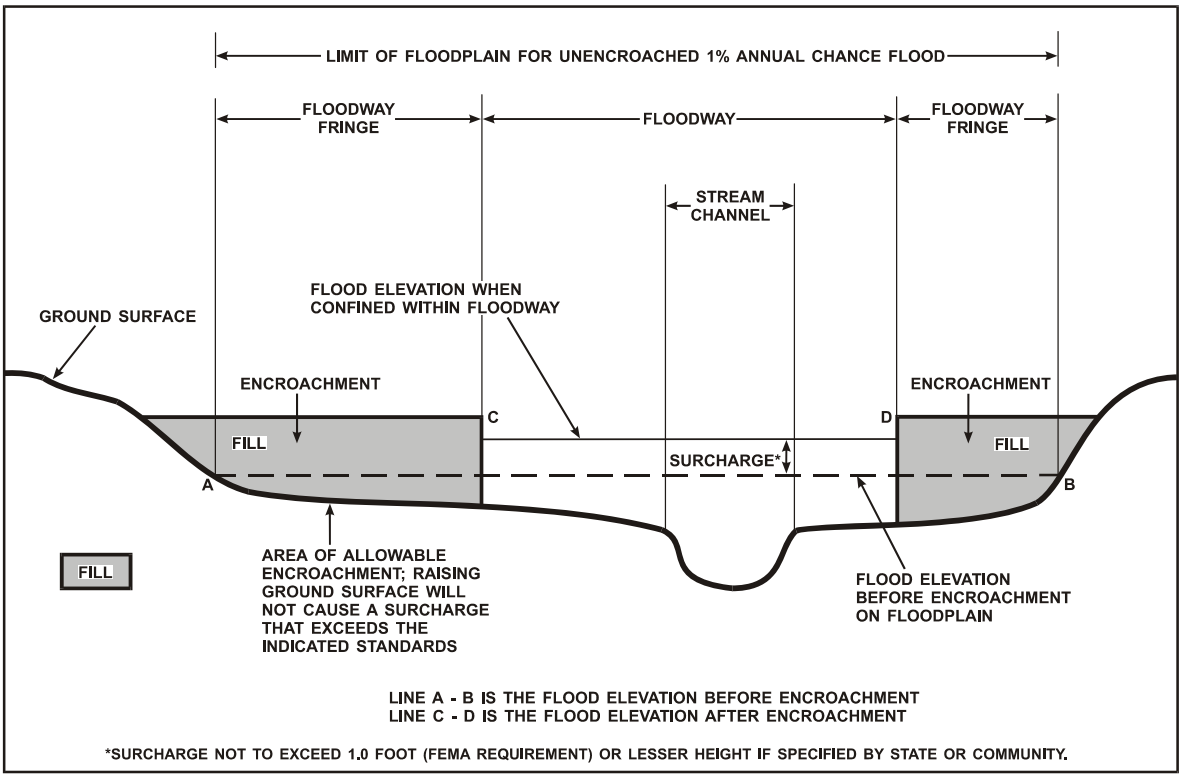


Figure 1 – Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DOWNIE RIVER								
A	140	201	2,662	7.3	2,900.8[2]	2,900.8[2]	2,900.8	0.0
B	251	116	1,654	11.8	2,900.8[2]	2,900.8[2]	2,900.9	0.1
C	289	134	1,862	10.5	2,901.6	2,901.6	2,901.9	0.3
D	1,238	99	1,526	12.8	2,905.9	2,905.9	2,906.7	0.8
E	1,867	68	1,005	19.5	2,909.8	2,909.8	2,910.6	0.8
F	1,888	73	1,258	15.5	2,913.7	2,913.7	2,914.0	0.3
G	2,301	104	1,777	11.0	2,916.9	2,916.9	2,917.7	0.8
H	3,323	86	1,422	13.7	2,923.5	2,923.5	2,924.5	1.0
I	4,527	87	1,613	12.1	2,936.4	2,936.4	2,936.4	0.0
J	4,592	90	1,373	14.6	2,936.7	2,936.7	2,936.7	0.0
K	5,043	82	1,028	19	2,941.1	2,941.1	2,941.1	0.0
L	6,910	87	1,054	18.6	2,963.3	2,963.3	2,963.3	0.0
M	7,468	84	1,059	18.5	2,970.8	2,970.8	2,970.8	0.0
N	8,102	105	1,301	15.0	2,980.9	2,980.9	2,980.9	0.0
O	8,695	101	1,312	11.0	2,987.1	2,987.1	2,987.1	0.0

[1]Stream distance in feet above confluence with North Yuba River near Downieville
[2]Includes backwater from North Yuba River near Downieville

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

DOWNIE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
GOODYEARS CREEK								
A	188	109	521	11.6	2,644.1[2]	2,644.1[2]	2,644.3	0.2
B	308	63	545	11.1	2,646.0	2,646.0	2,646.0	0.0
C	420	105	656	9.2	2,648.6	2,648.6	2,648.6	0.0
D	556	70	464	13.0	2,649.8	2,649.8	2,649.8	0.0
E	1,637	70	460	13.1	2,674.6	2,674.6	2,674.6	0.0
F	1,765	57	481	12.5	2,676.5	2,676.5	2,677.2	0.7
G	1,829	76	743	8.1	2,680.5	2,680.5	2,681.2	0.7
H	2,325	58	425	14.2	2,687.1	2,687.1	2,687.9	0.8
I	2,842	48	390	15.5	2,704.2	2,704.2	2,704.7	0.5
J	3,514	41	376	16.1	2,719.3	2,719.3	2,720.2	0.9
K	4,028	50	384	15.7	2,736.5	2,736.5	2,737.1	0.6
L	4,538	37	354	17.1	2,751.6	2,751.6	2,752.3	0.7
M	5,432	40	358	16.8	2,769.9	2,769.9	2,770.3	0.4

[1]Stream distance in feet above confluence with North Yuba River
[2]Flooding source includes backwater from North Yuba River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

GOODYEARS CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH YUBA RIVER NEAR DOWNIEVILLE								
Z	64,772	126	1,974	20.7	2,848.5	2,848.5	2,848.9	0.4
AA	66,923	242	3,565	11.5	2,870.7	2,870.7	2,871.2	0.5
AB	67,411	156	2,030	20.1	2,875.6	2,875.6	2,875.7	0.1
AC	67,609	121	1,902	21.5	2,878.2	2,878.2	2,878.2	0.0
AD	67,982	214	3,734	10.9	2,885.8	2,885.8	2,886.5	0.7
AE	69,326	146	2,964	13.8	2,895.1	2,895.1	2,895.4	0.3
AF	69,357	139	3,615	11.3	2,899.8	2,899.8	2,900.7	0.9
AG	70,132	100	1,732	17.8	2,901.1	2,901.1	2,902.1	1.0
AH	70,383	100	1,431	21.5	2,903.5	2,903.5	2,903.5	0.0
AI	71,171	157	2,101	14.7	2,918.7	2,918.7	2,918.7	0.0
AJ	71,302	139	1,664	18.5	2,919.0	2,919.0	2,919.0	0.0
AK	71,624	148	1,746	17.6	2,925.5	2,925.5	2,925.5	0.0
AL	71,992	153	2,533	12.2	2,931.9	2,931.9	2,931.9	0.0
AM	73,580	140	1,923	16.0	2,943.5	2,943.5	2,943.5	0.0
AN	73,953	171	1,776	17.4	2,948.2	2,948.2	2,948.2	0.0
AO	75,104	159	2,796	11.0	2,972.4	2,972.4	2,973.0	0.6
AP	75,228	123	2,036	15.1	2,973.6	2,973.6	2,974.4	0.8

[1]Stream distance in feet above Highway 49 Crossing at North Yuba River

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH YUBA RIVER NEAR GOODYEARS BAR								
U	45,383	196	2,512	17.7	2,637.4	2,637.4	2,638.4	1.0
V	46,817	411	7,754	5.4	2,649.9	2,649.9	2,650.9	1.0
W	47,847	285	3,413	12.2	2,654.1	2,654.1	2,655.1	1.0
X	47,928	300	4,032	10.4	2,658.5	2,658.5	2,658.6	0.1
Y	48,171	245	3,843	10.9	2,659.1	2,659.1	2,659.6	0.5

[1]Stream distance in feet above Highway 49 Crossing at North Yuba River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH YUBA RIVER NEAR GOODYEARS BAR

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually sheetflow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

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

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-annual chance floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

This FIRM includes some flood hazard information that was presented separately on the Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community up to and including this Countywide FIS are presented in Table 5, "Community Map History."

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Sierra County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports and FIRMs for all of the incorporated and unincorporated jurisdictions within Sierra County.

In 2008, the CADWR completed Awareness Floodplain Mapping studies for all California counties. The intent of the project was to identify flood hazard areas for all regions for mapped under FEMA's NFIP. The awareness maps identify the 1-percent-annual-chance flood hazard areas using approximate assessment procedures. These floodplains are shown as flood prone areas without specific depths and other flood hazard data (Reference 7).

The 1975 study of Downie River and North Yuba River was performed by the USACE, Sacramento District and was based on California Department of Transportation (Caltrans) contour maps developed from aerial photographs dated 1965 and 1966. Stream profiles and cross sections were developed from the contour maps and supplemented with field observations during the course of the study. Structural dimensions on bridges were furnished by Caltrans, or obtained by measurement in the field (Reference 2).

The Awareness Floodplain Maps are not FEMA regulatory floodplain maps; however, at the request of the community FEMA will include the data on the county's maps.

Sierra County requested that the Awareness Mapping study be incorporated into their mapping.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting:

FEMA, Federal Insurance and Mitigation Division
1111 Broadway, Suite 1200
Oakland, California 94607-4052

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Loyalton, City of	June 4, 1976	None	September 1, 1988	NA
Sierra County (Unincorporated Areas)	September 1, 1988	None	September 1, 1988	NA

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of the Army, Corps of Engineers, San Francisco District, Reconnaissance Report, Smithneck Creek, Section 205, City of Loyalton, Sierra County, California, March 1994.

2. U.S. Department of the Army, Corps of Engineers, Sacramento District, Flood Plain Information, North Yuba and Downie Rivers, Downieville, California, January 1975.

3. U.S. Bureau of the Census, 2007, Population Division, Population Projections Branch. July 1, 2008 http://quickfacts.census.gov/qfd/states/06/06091.html.

4. U.S. Department of the Army, Corps of Engineers, San Francisco District, Office Report Hydrologic Engineering, Smithneck Creek Basin, July 1992.

5. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package, Generalized Computer Program, Davis, California, September 1981.

6. U.S. Department of the Army, Corps of Engineers, Sacramento District, Office Report Probable Maximum Flood for Lake Oroville, Feather River Basin, October 1980.

7. California Department of Water Resources, Awareness Floodplain Maps, 2009, http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/awareness_floodplain_maps/.

8. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Version 4.6.2, Davis, California, May 1991.

9. U.S. Department of the Army, Corps of Engineers, Sacramento District, X-RATE, Hydrograph Routing, Computer Program, April 1981.

10. U.S. Department of the Army, Corps of Engineers, Sacramento District, Geotechnical Branch, Orthophoto Maps, Scale 1:4,800, Undated.

11. Federal Emergency Management Agency, Flood Insurance Rate Map, Sierra County, California and Incorporated Areas, September 1, 1988.

12. Wood Rodgers, Inc., Downie River and Yuba River in Sierra County FEMA 100-Year Floodplain Evaluation and Delineation Technical Support Data Notebook, September 2011.

10.0 REVISIONS DESCRIPTIONS

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

10.1 First Revision (TBD)

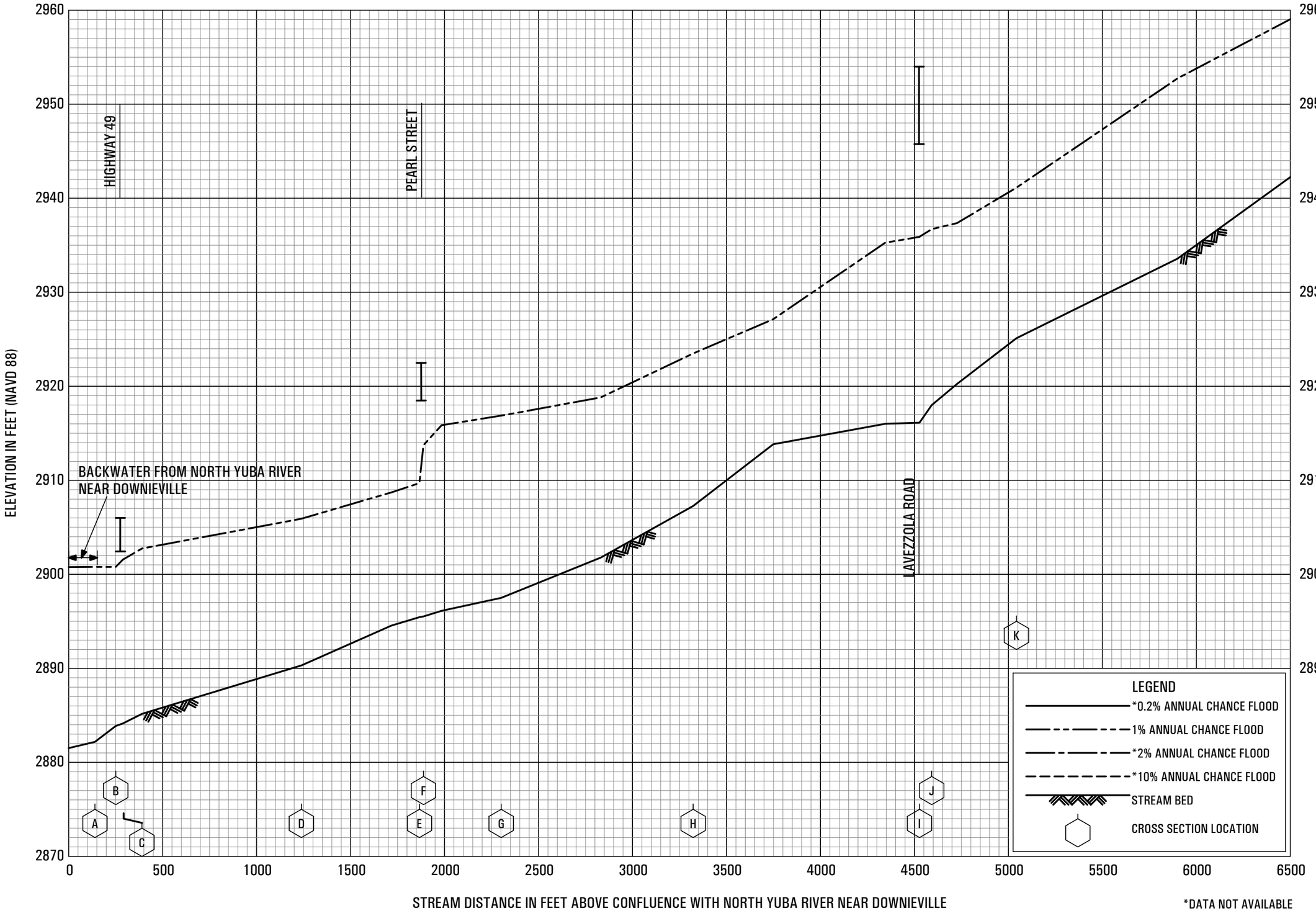
This study was revised on TBD, to incorporate the Physical Map Revision (PMR) for the North Yuba River and tributaries.

Downie River and Yuba River Study

For this revision, BakerAECOM was contracted in 2011; contract number HSFEHQ-09-D-0368, Task Order HSFE09-11-J-0001, to perform a Physical Map Revision (PMR). The California Department of Water Resources (DWR) contracted Wood Rodgers, Inc., to perform a FIS for portions of the Downie River, Goodyears Creek, and the North Yuba River (Reference 13). This project was issued under the Lower Sacramento River Basin contract as part of the FEMA Cooperating Technical Partner (CTP) program. The study area is located near the communities of Downieville and Goodyears Bar.

The North Yuba River study reach includes both approximate and detailed hydraulic model delineations. An approximate floodplain was modeled for the section of the North Yuba River downstream of the Goodyears Creek confluence since the topographic data for that area is based upon a 30-meter Digital Elevation Model (DEM) accuracy. Detailed floodplain delineations were developed for other portions of the North Yuba River, the Downie River, and Goodyears Creek since these reaches were within higher resolution LiDAR topographic data locations. Both the approximate and detailed hydraulic model reaches were analyzed utilizing the USACE HEC-RAS modeling software, Version 4.1.0, one-dimensional steady flow application. The North Yuba River delineation between Goodyears Creek and the Downie River, from River Mile 9.30 to 12.14, was not modeled and the effective floodplain delineation was not revised.

Additional details describing the studies are incorporated within the appropriate sections and tables of this FIS.



*DATA NOT AVAILABLE

FLOOD PROFILES

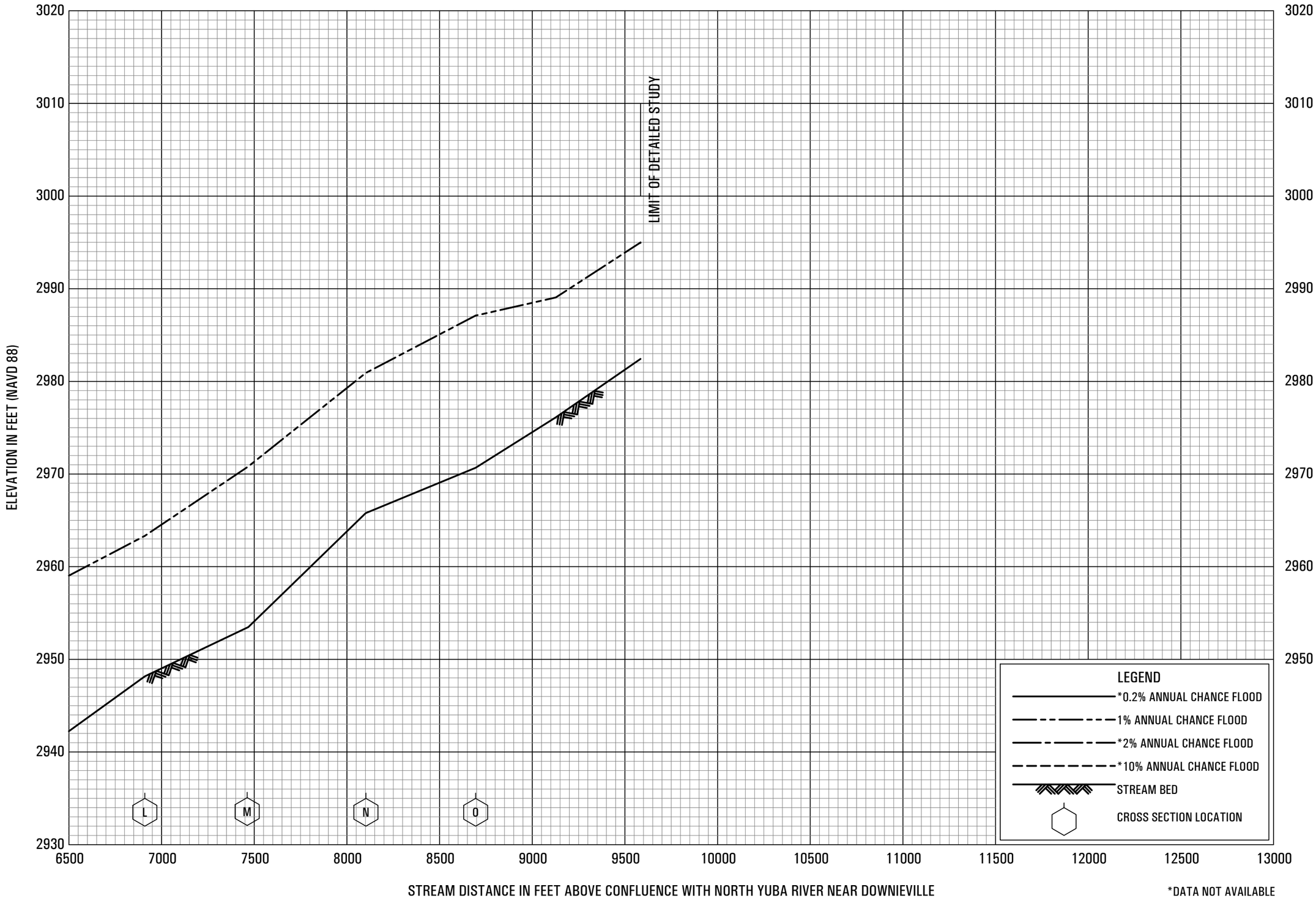
DOWNIE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS

06P



FLOOD PROFILES

DOWNIE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS

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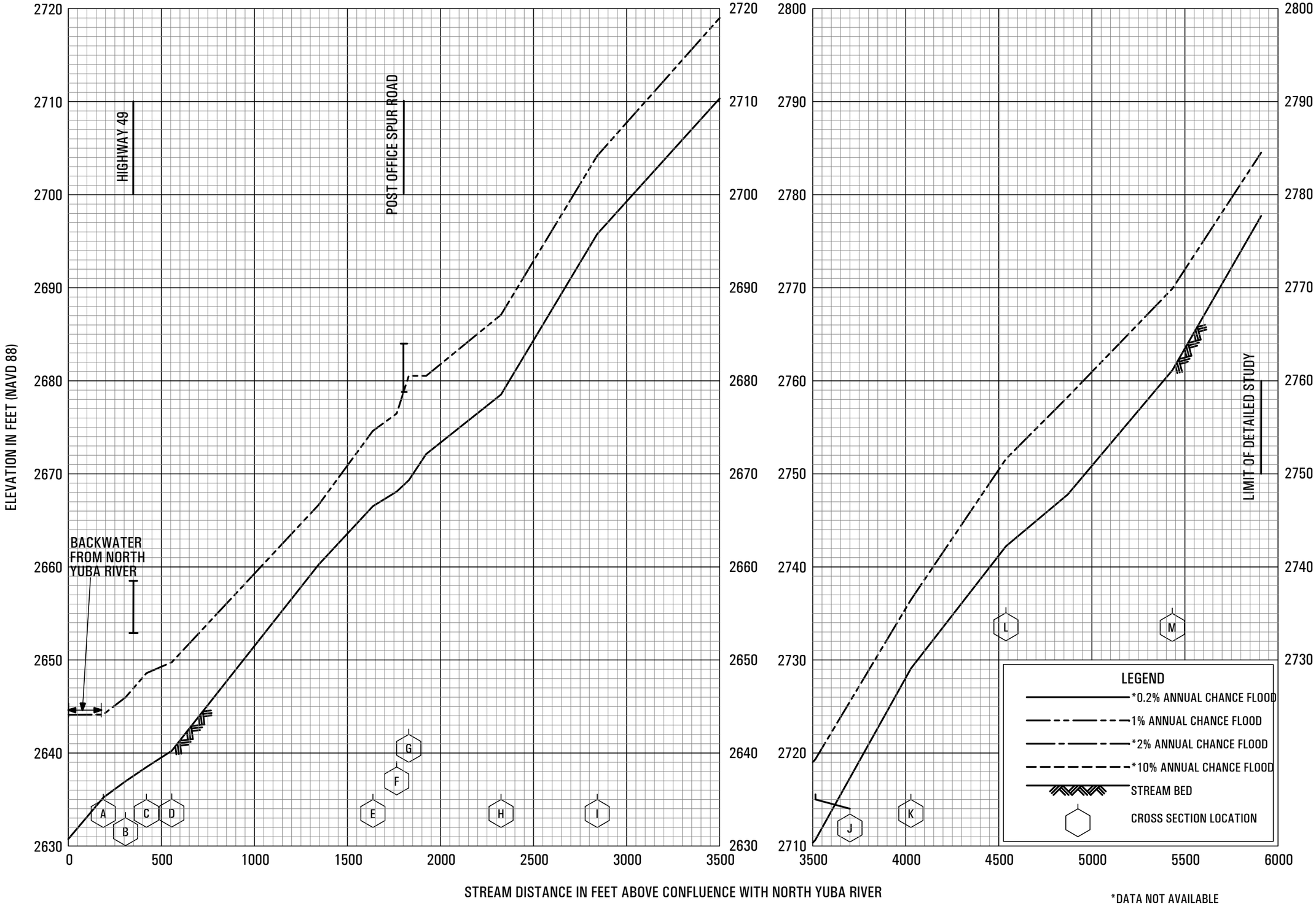

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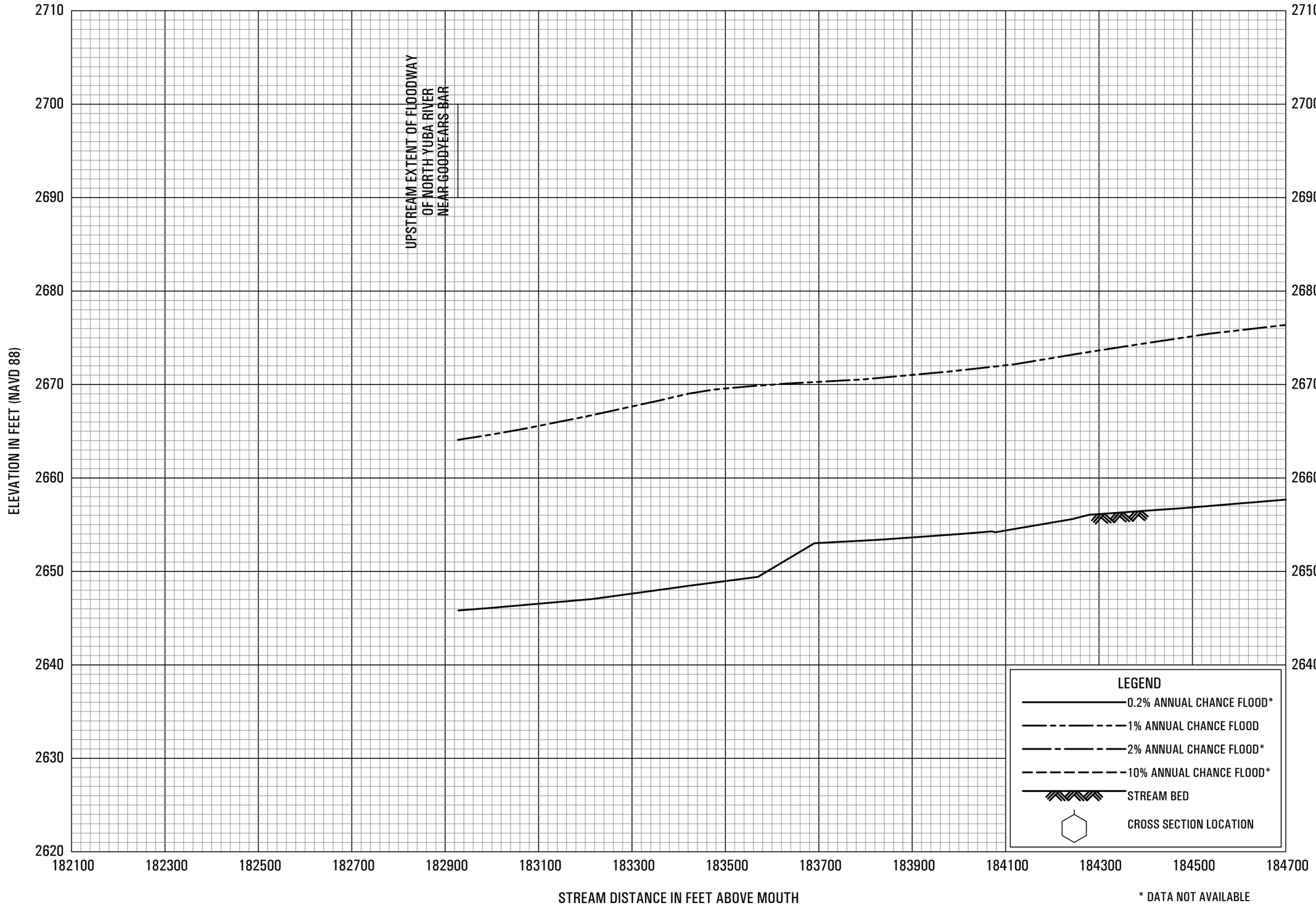
FLOOD PROFILES

GOODYEARS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



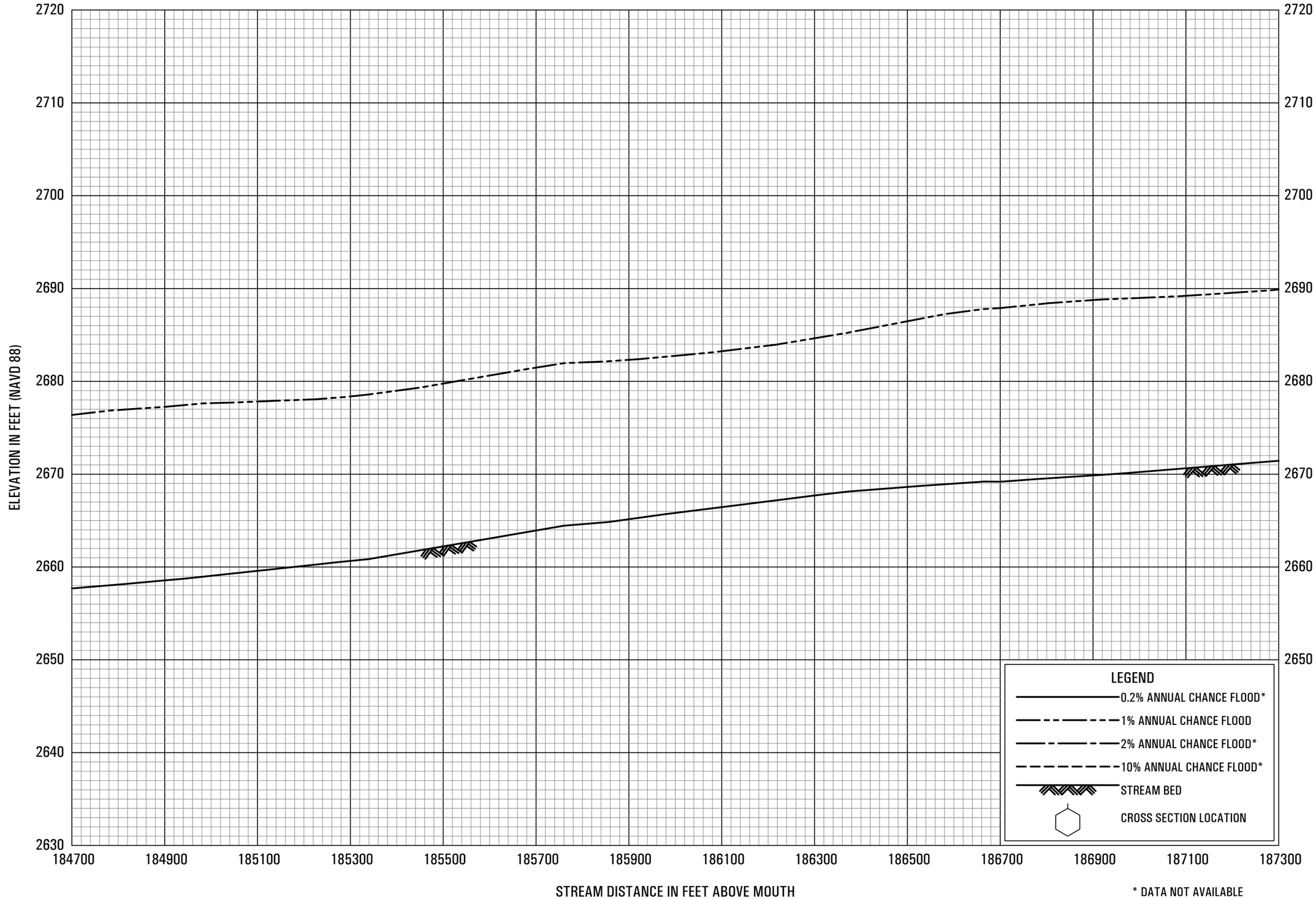
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



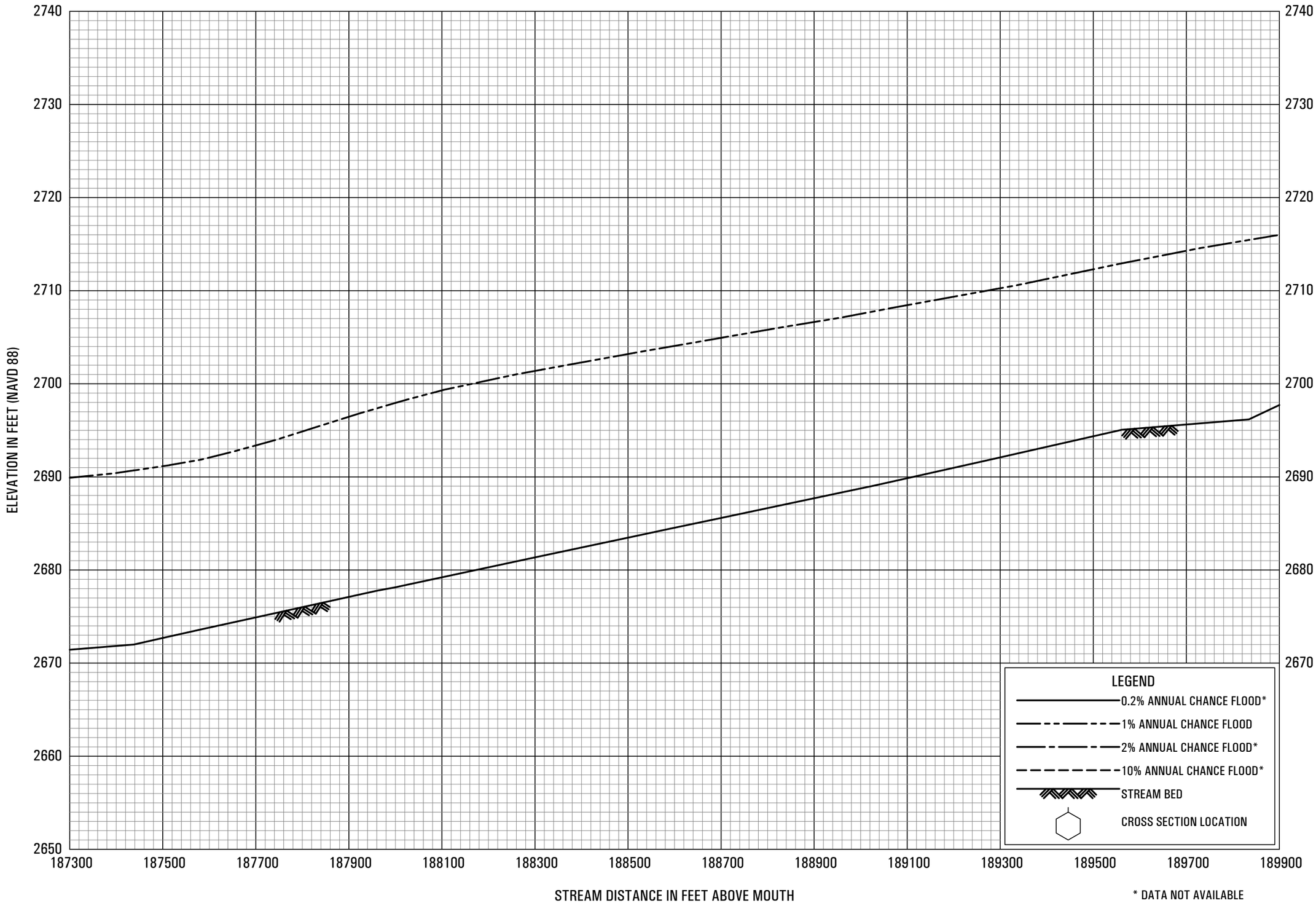
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



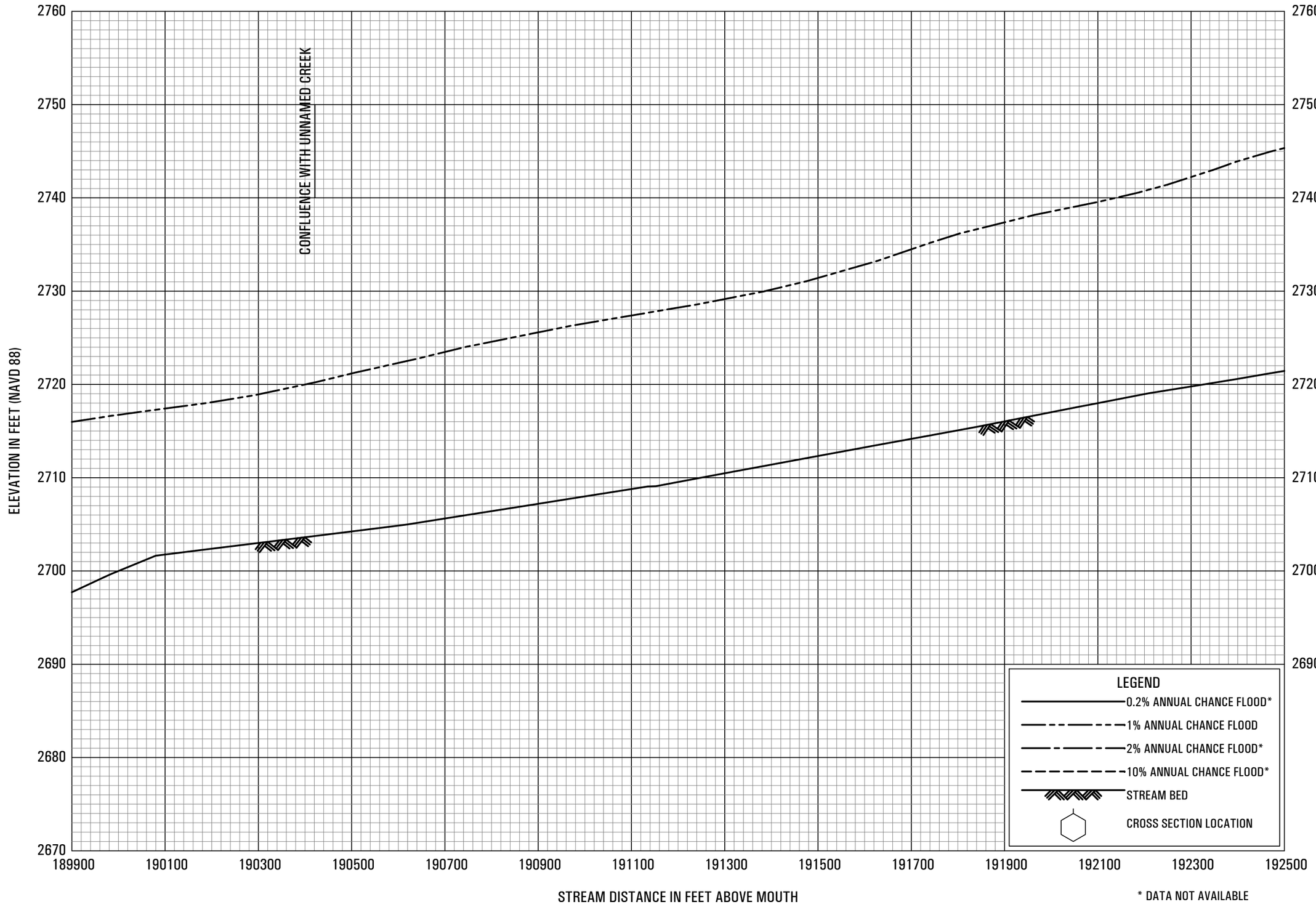
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



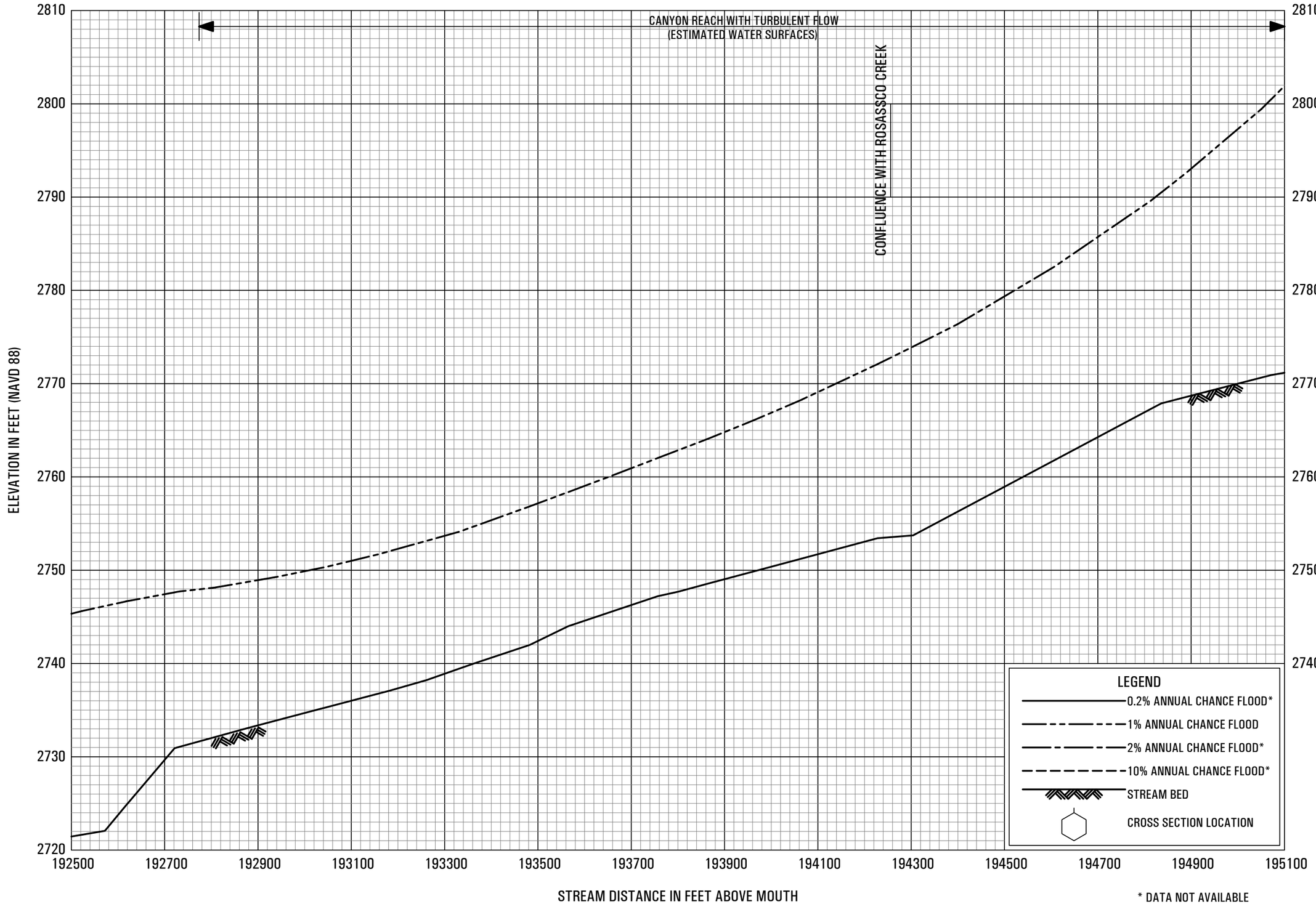
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



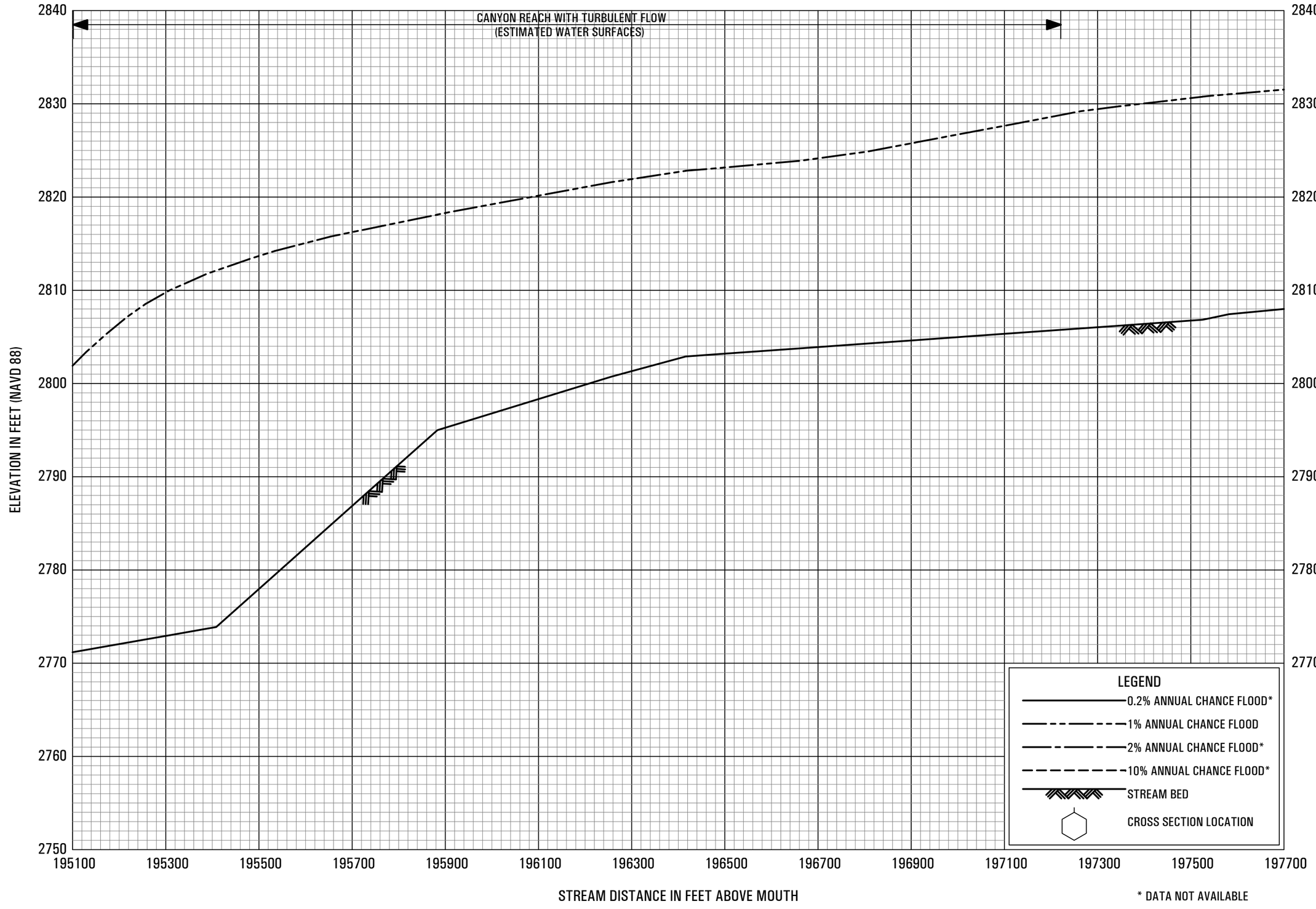
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



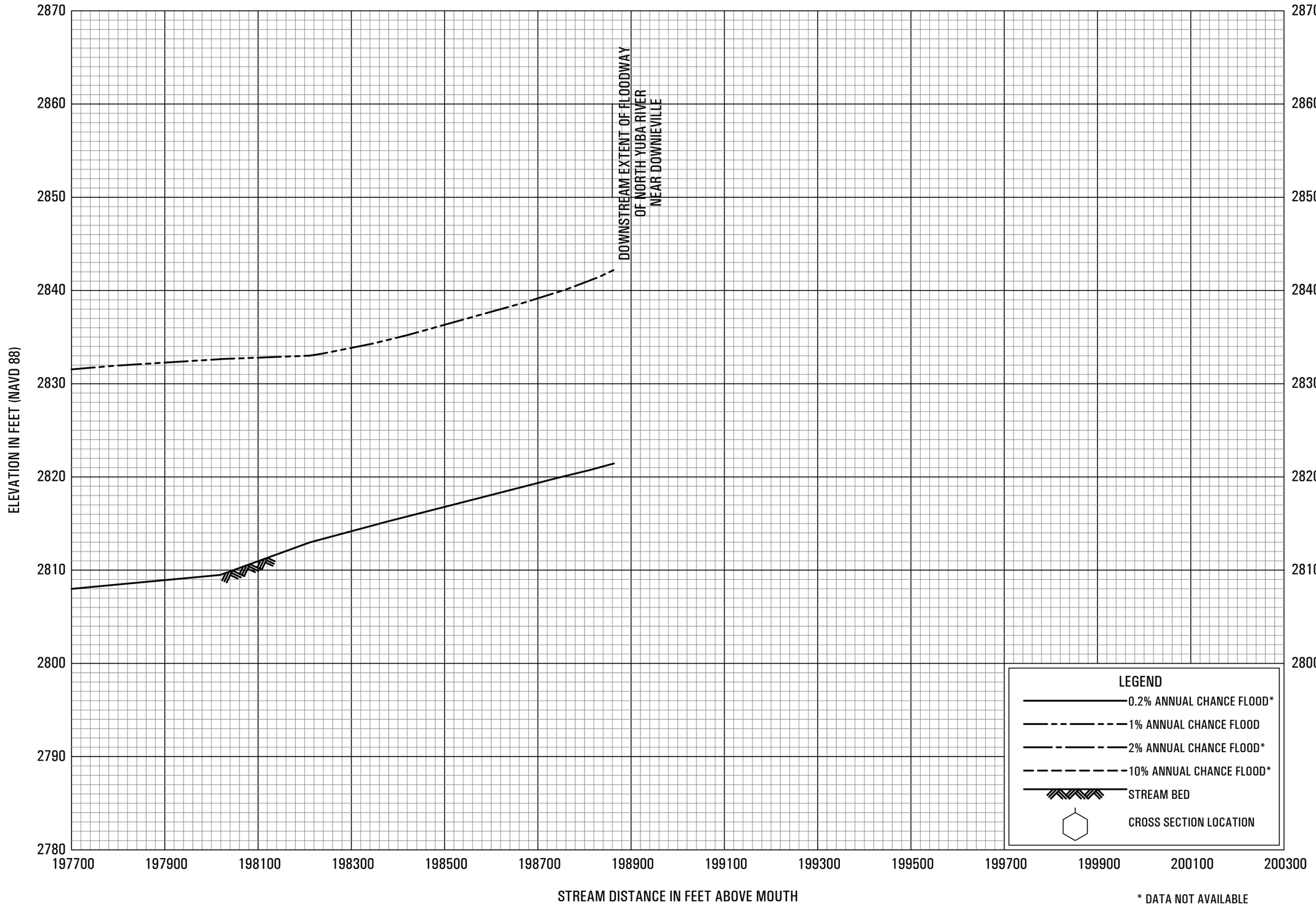
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



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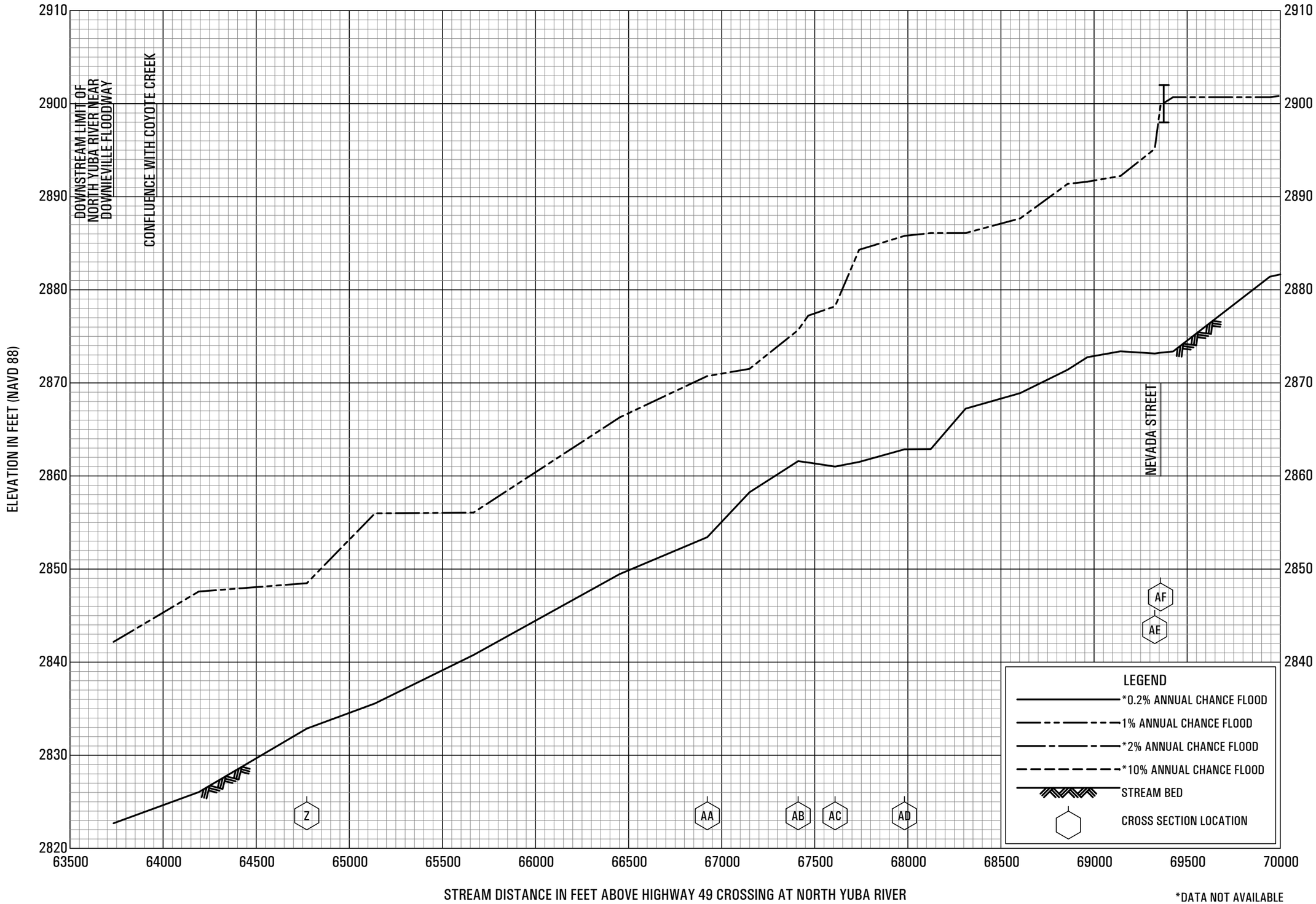
FLOOD PROFILES

NORTH YUBA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



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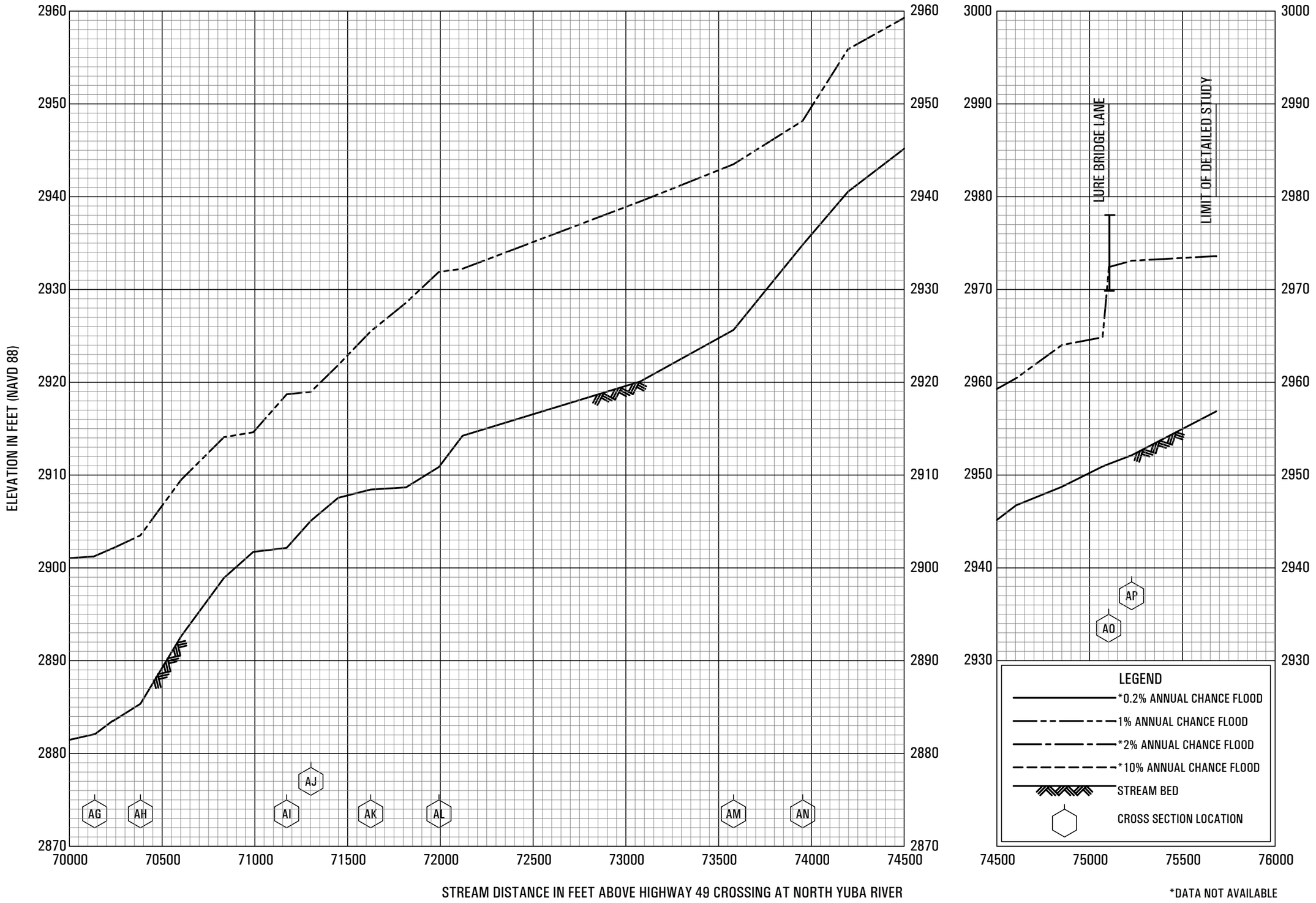
FLOOD PROFILES

NORTH YUBA RIVER NEAR DOWNIEVILLE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



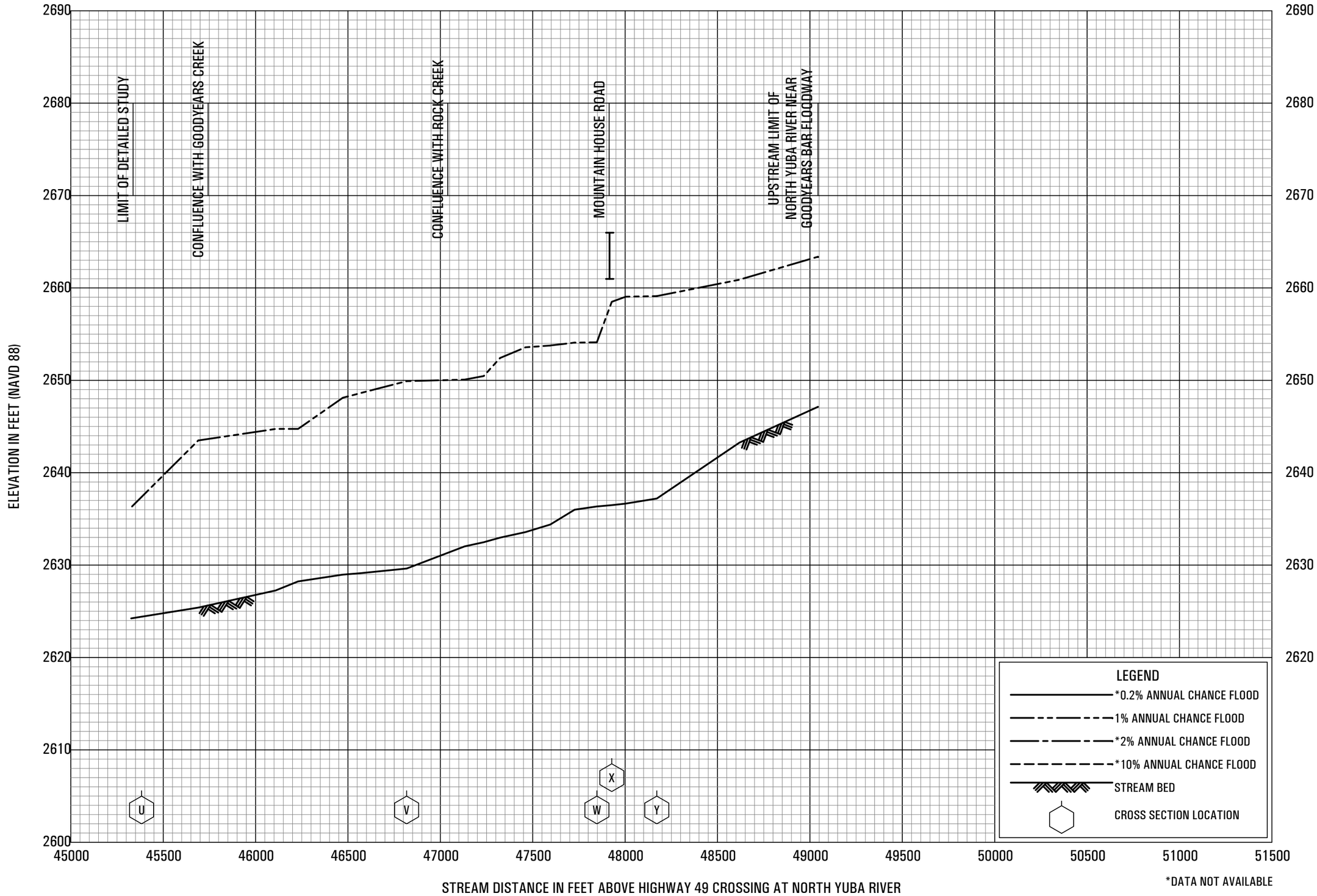
FLOOD PROFILES

NORTH YUBA RIVER NEAR DOWNIEVILLE

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



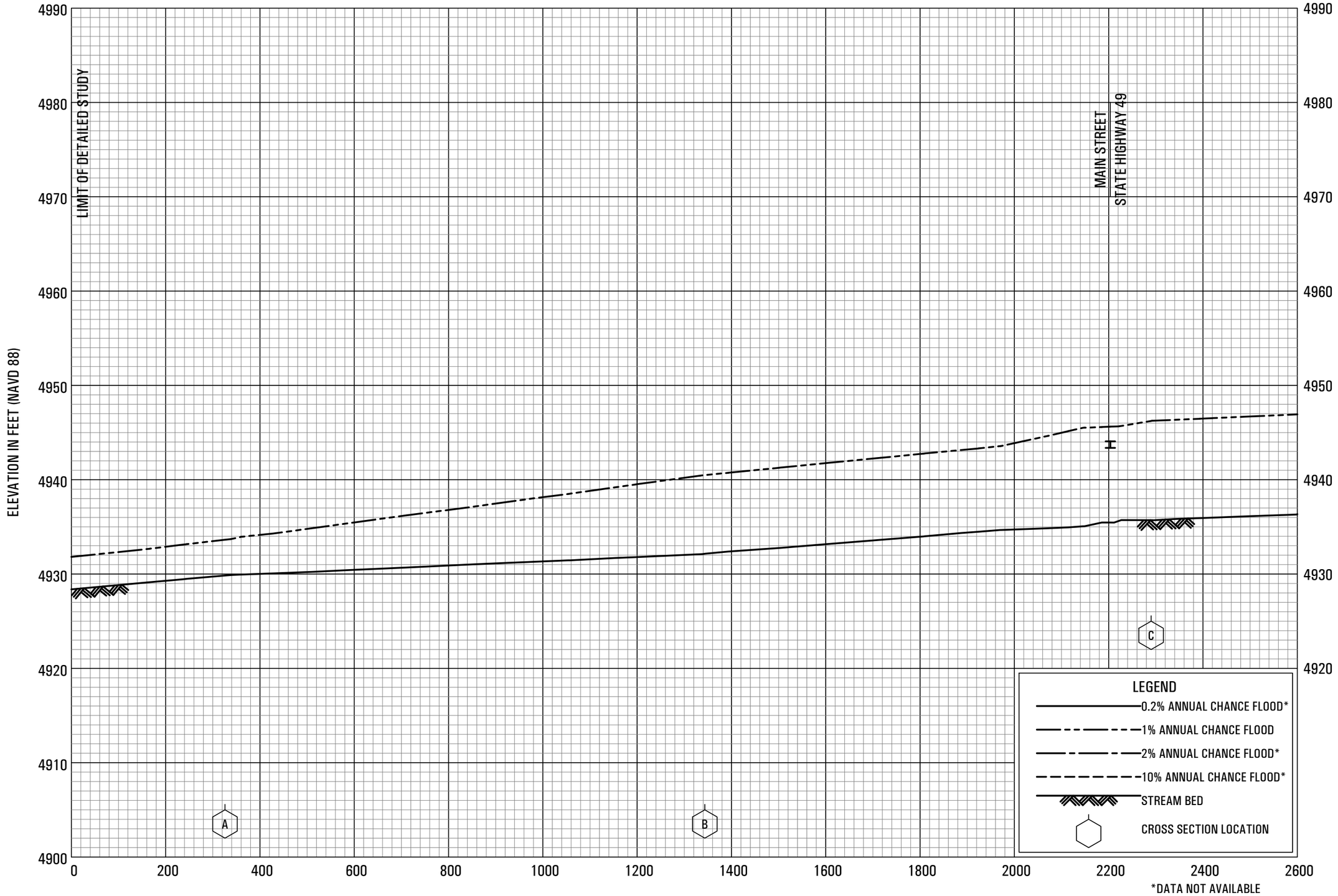
FLOOD PROFILES

NORTH YUBA RIVER NEAR GOODYEARS BAR

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



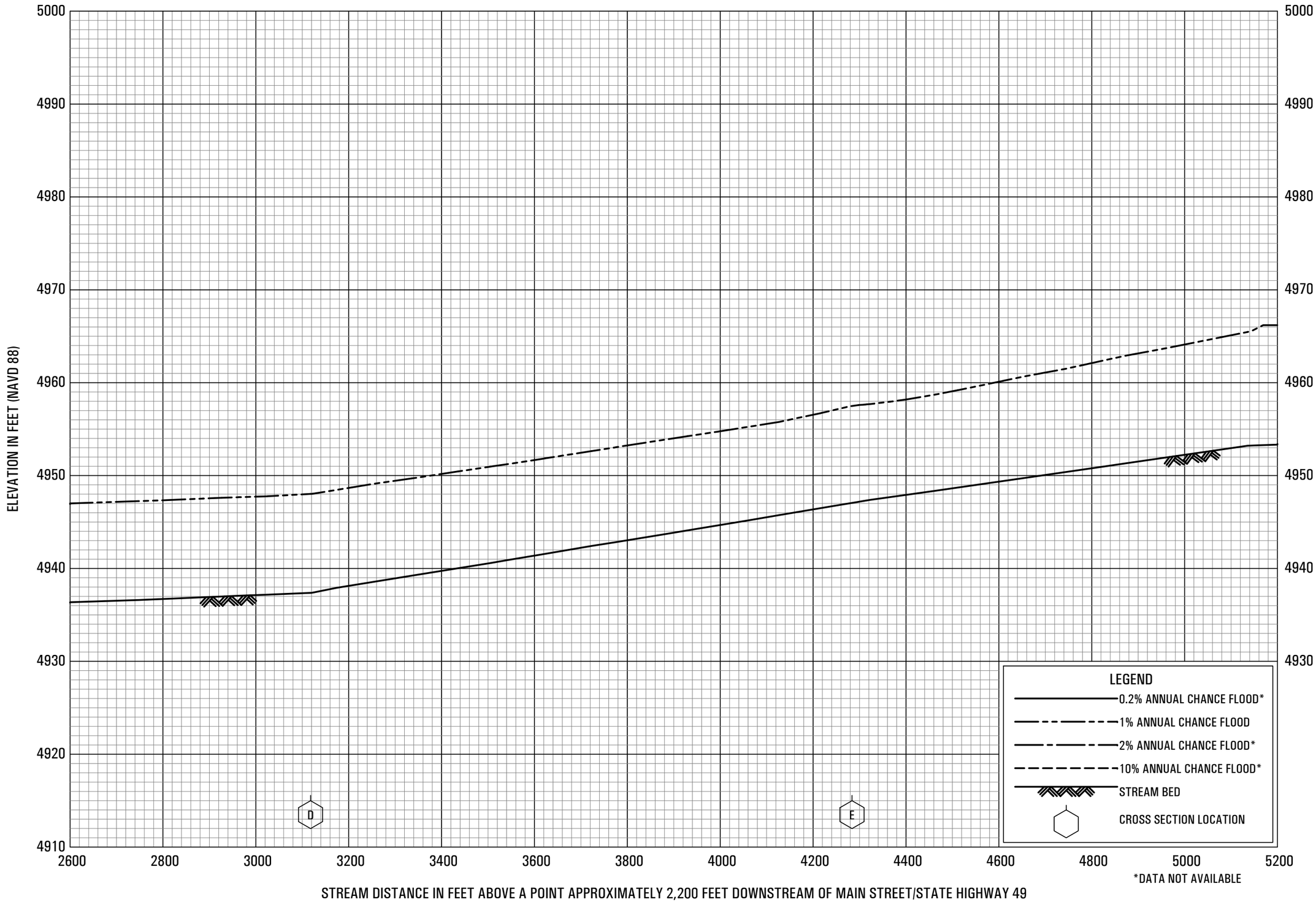
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



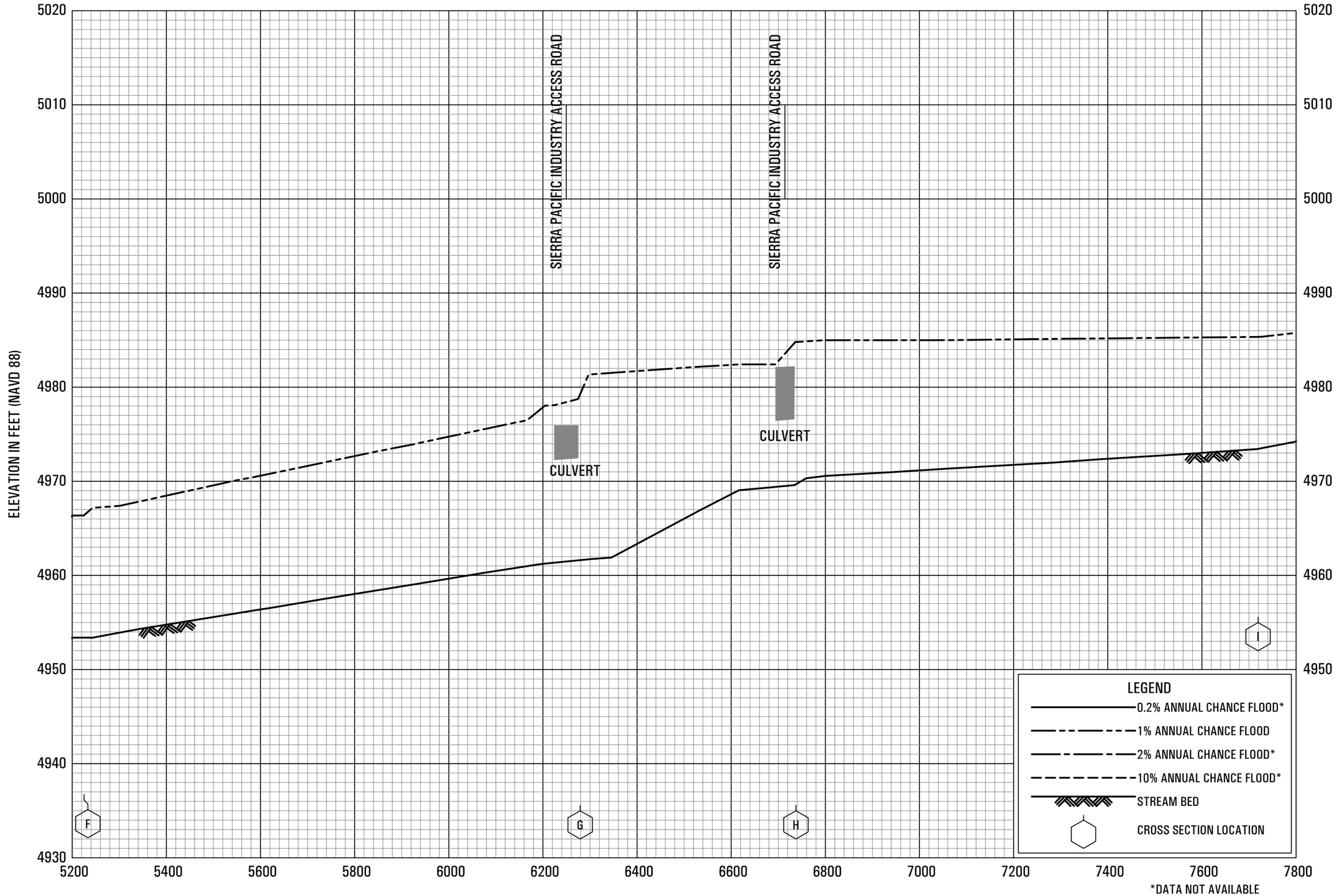
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



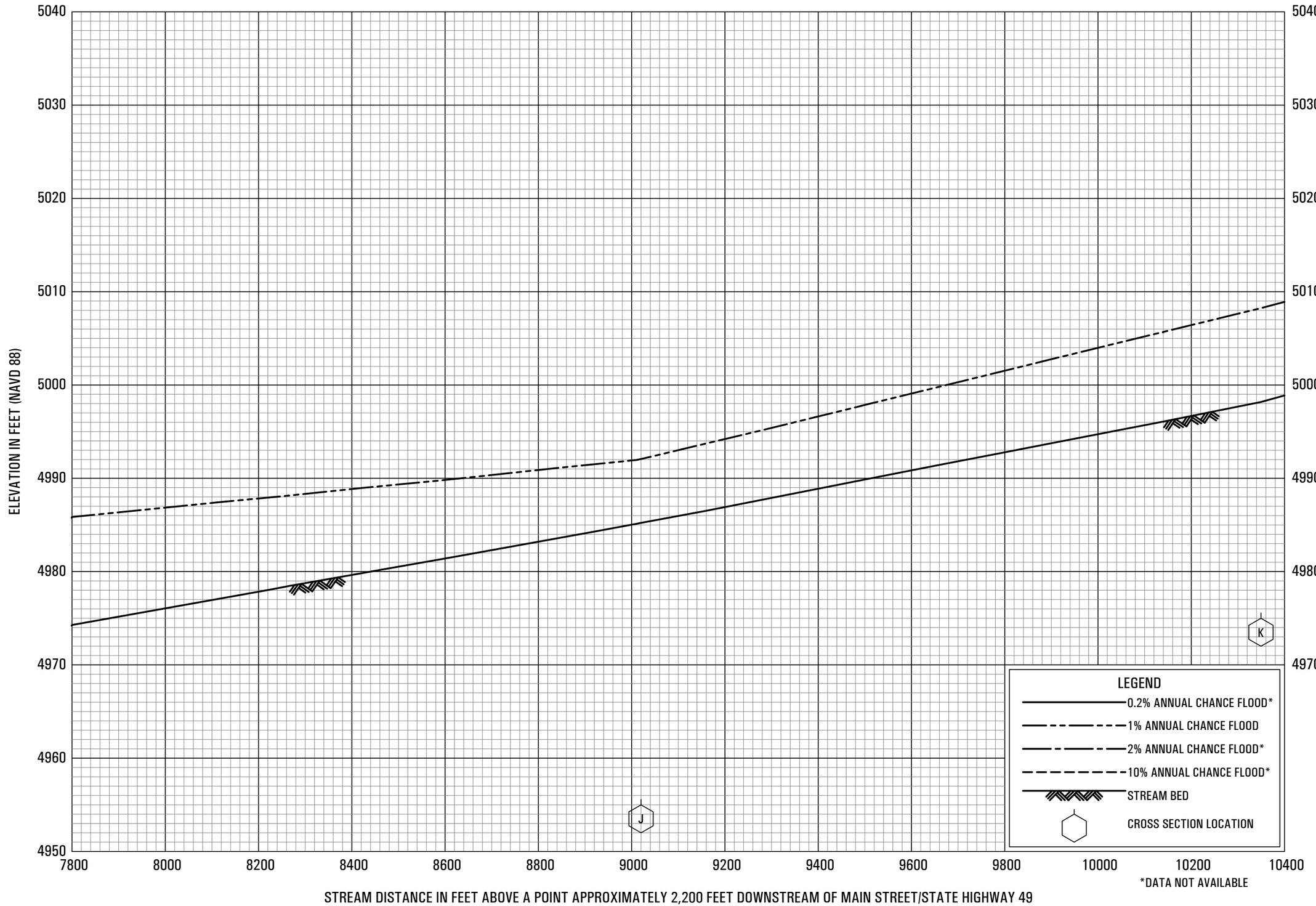
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



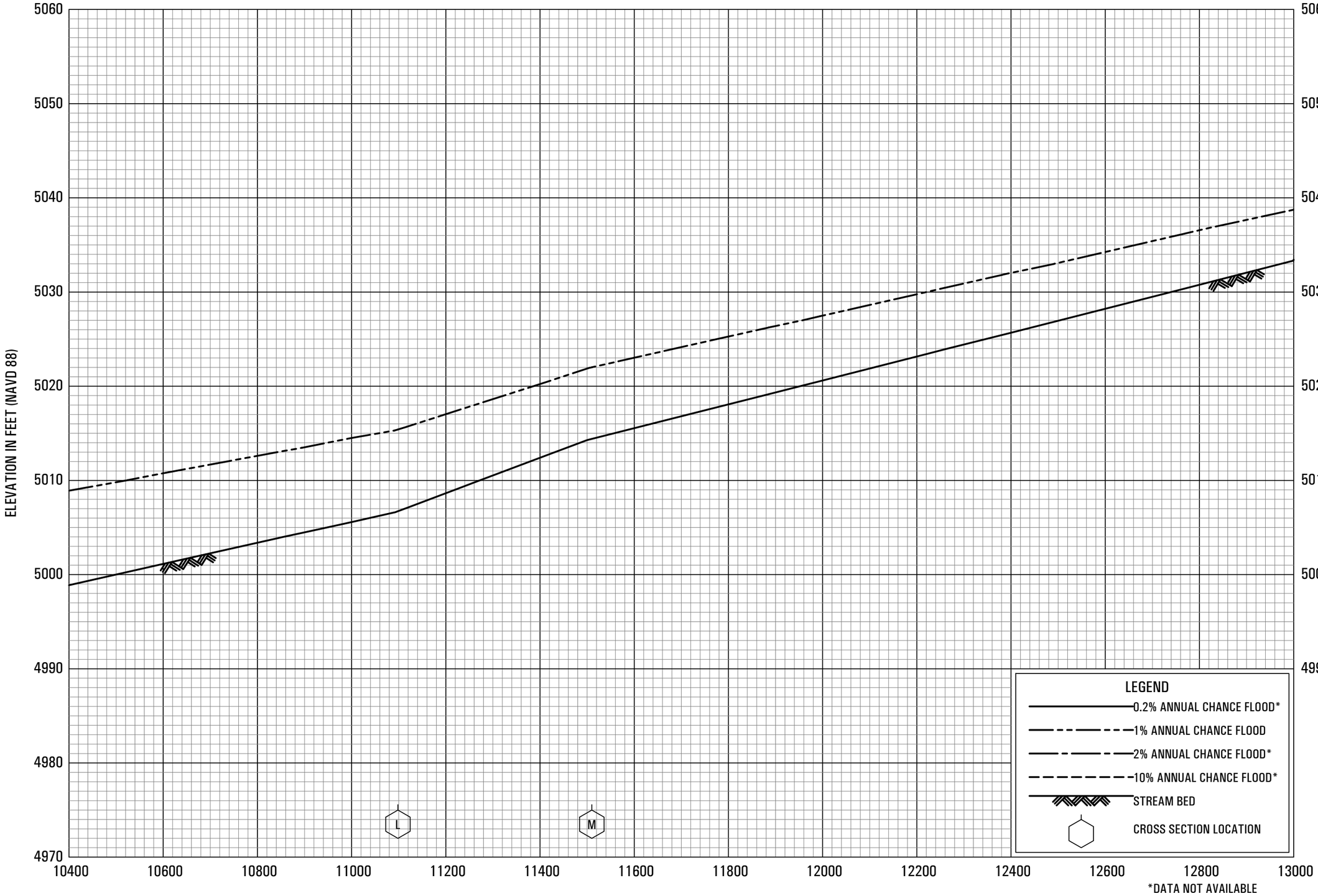
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



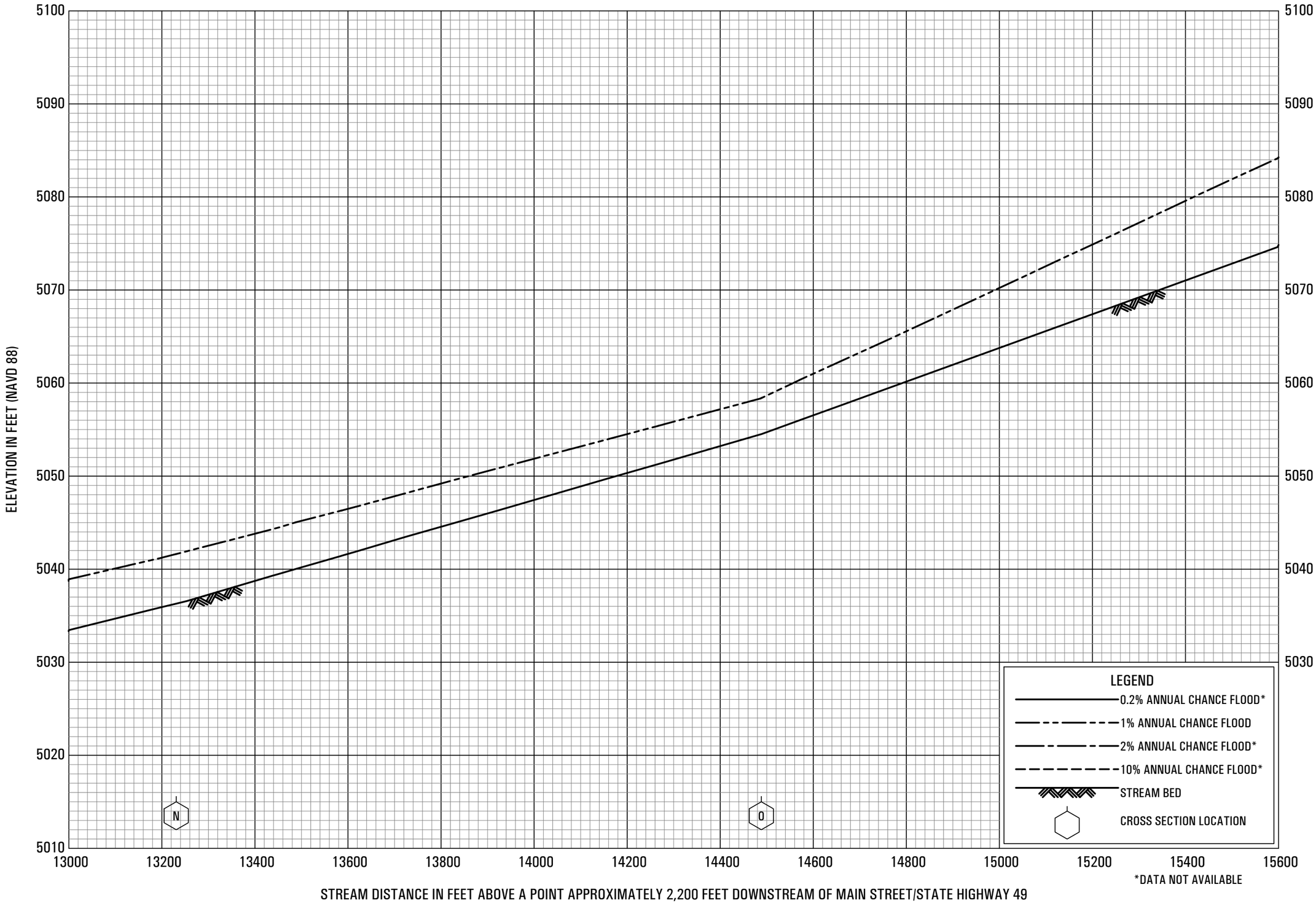
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



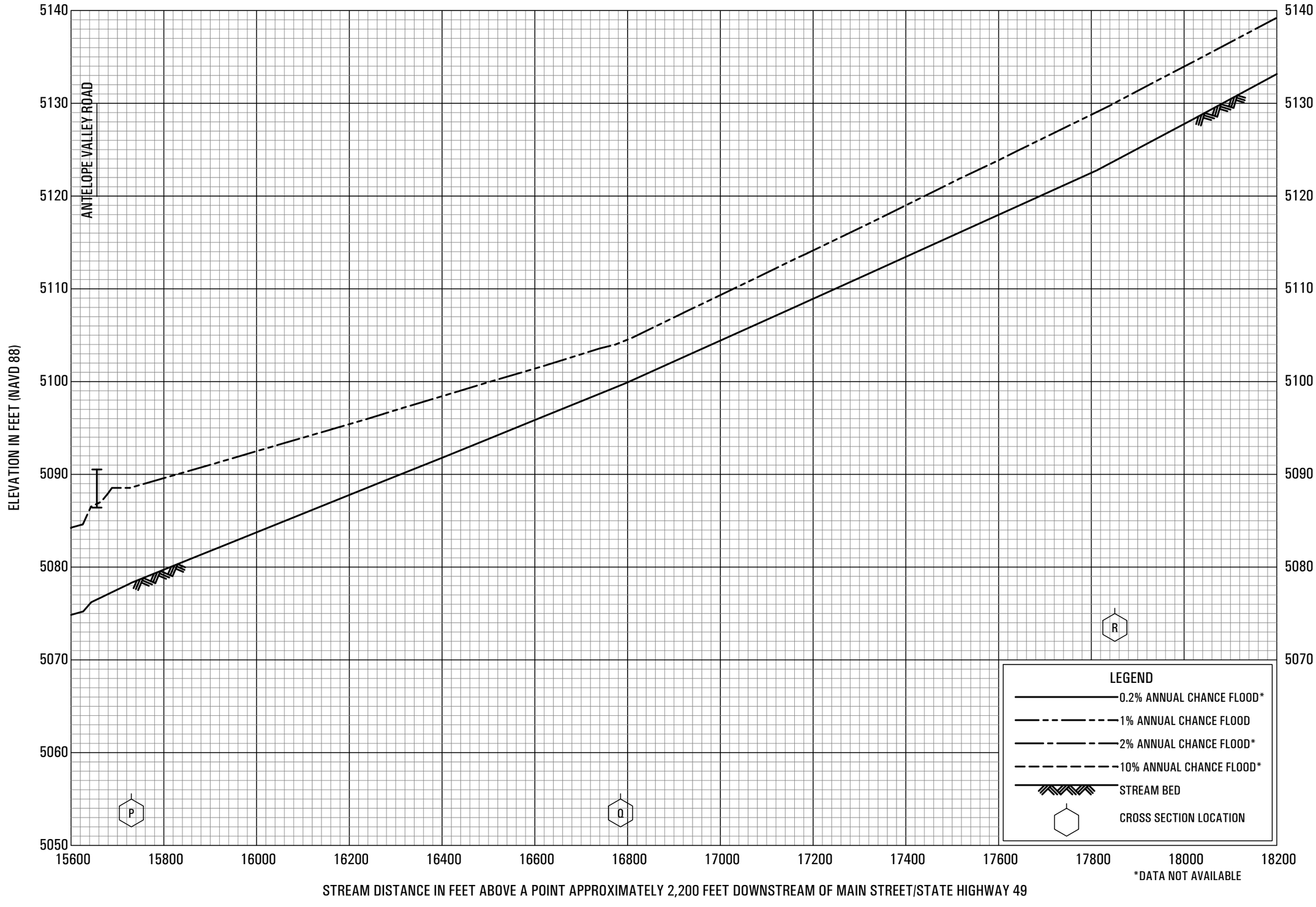
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



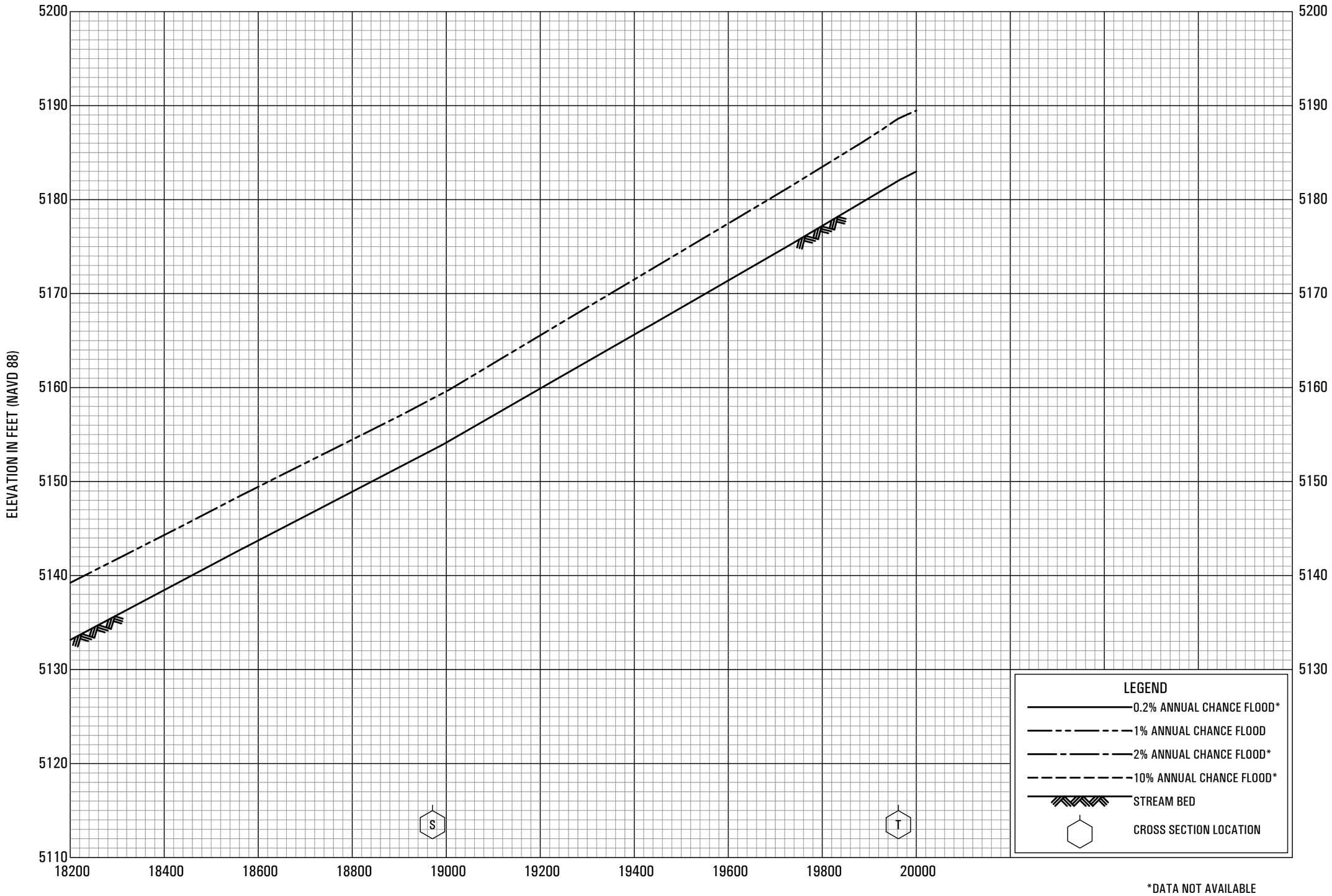
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



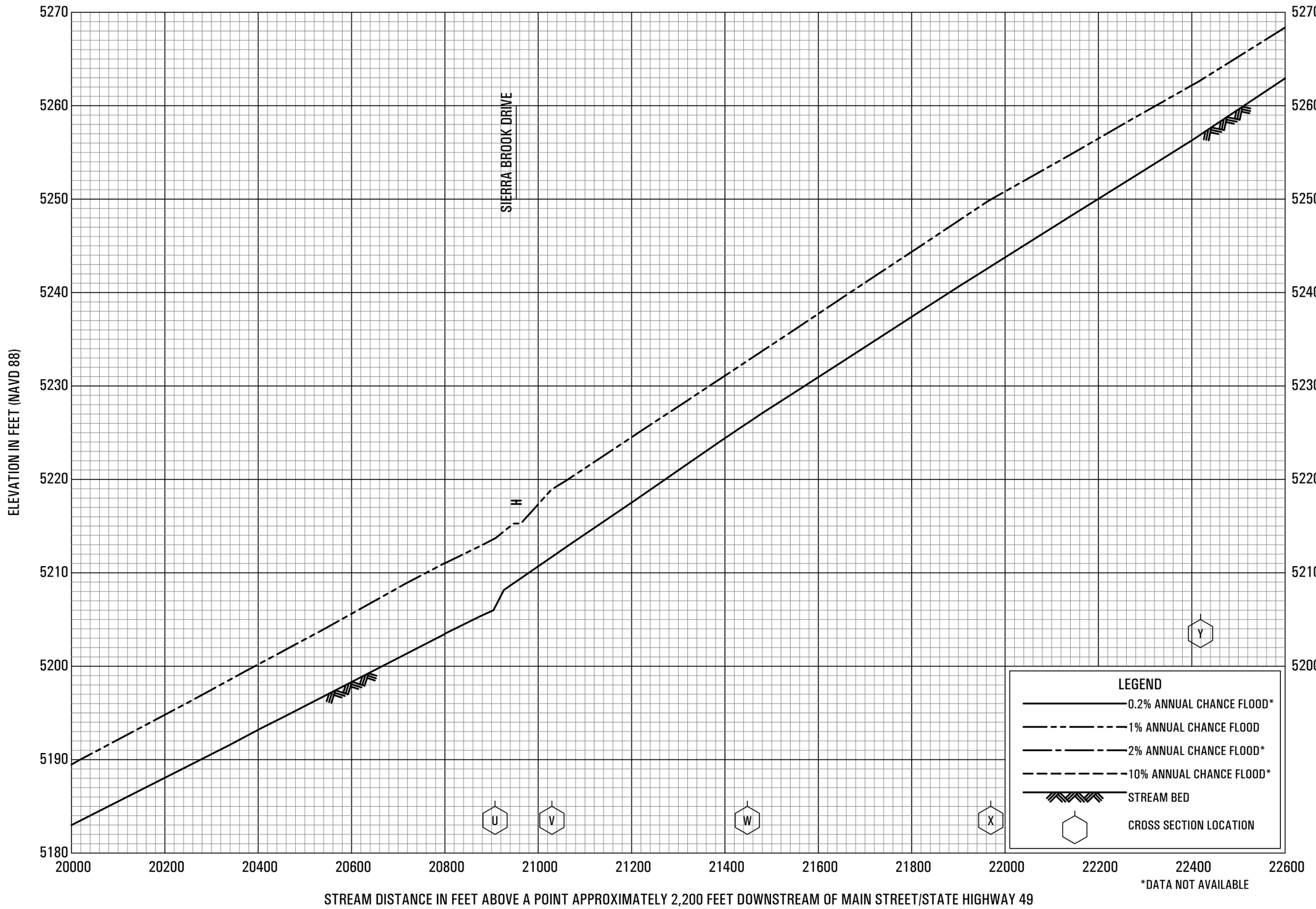
FLOOD PROFILES

SMITHNECK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SIERRA COUNTY, CA

AND INCORPORATED AREAS



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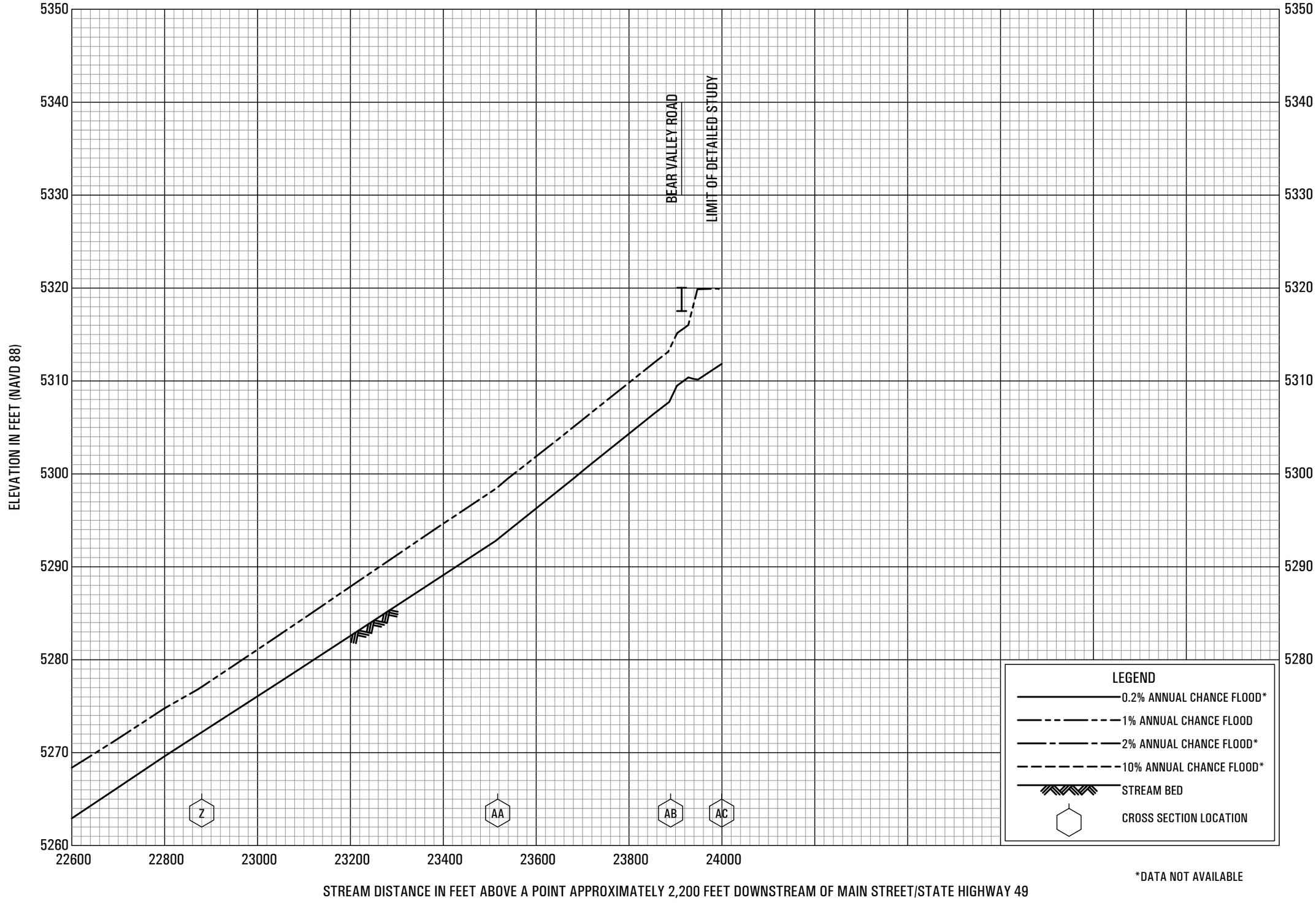

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