FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 5 OF 5

VENTURA COUNTY, CALIFORNIA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CAMARILLO, CITY OF	065020
FILLMORE, CITY OF	060415
MOORPARK, CITY OF	060712
OJAI, CITY OF	060416
OXNARD, CITY OF	060417
PORT HUENEME, CITY OF	065051
SAN BUENAVENTURA, CITY OF	060419
SANTA PAULA, CITY OF	060420
SIM VALLEY, CITY OF	060421
THOUSAND OAKS, CITY OF	060422
VENTURA COUNTY, UNINCORPORATED AREAS	060413

FEMA

PRELIMINARY

09/30/2016

REVISED:

FLOOD INSURANCE STUDY NUMBER
06111CV005D

Version Number 2.3.3.3

TABLE OF CONTENTS
Volume 1

		Page
SECTION 1.0 – INTRODUCTION		**1**
1.1	The National Flood Insurance Program	1
1.2	Purpose of this Flood Insurance Study Report	2
1.3	Jurisdictions Included in the Flood Insurance Study Project	2
1.4	Considerations for using this Flood Insurance Study Report	9
SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS		**21**
2.1	Floodplain Boundaries	21
2.2	Floodways	53
2.3	Base Flood Elevations	54
2.4	Non-Encroachment Zones	54
2.5	Coastal Flood Hazard Areas	54
2.5.1	Water Elevations and the Effects of Waves	54
2.5.2	Floodplain Boundaries and BFEs for Coastal Areas	56
2.5.3	Coastal High Hazard Areas	57
2.5.4	Limit of Moderate Wave Action	58
SECTION 3.0 – INSURANCE APPLICATIONS		**59**
3.1	National Flood Insurance Program Insurance Zones	59
3.2	Coastal Barrier Resources System	59
SECTION 4.0 – AREA STUDIED		**60**
4.1	Basin Description	60
4.2	Principal Flood Problems	61
4.3	Non-Levee Flood Protection Measures	75
4.4	Levees	82

Figures

	Page
Figure 1: FIRM Panel Index	12
Figure 2: FIRM Notes to Users	14
Figure 3: Map Legend for FIRM	17
Figure 4: Floodway Schematic	53
Figure 5: Wave Runup Transect Schematic	56
Figure 6: Coastal Transect Schematic	58

Tables

	Page
Table 1: Listing of NFIP Jurisdictions	2
Table 2: Flooding Sources Included in this FIS Report	22
Table 3: Flood Zone Designations by Community	59
Table 4: Coastal Barrier Resources System Information	59
Table 5: Basin Characteristics	60
Table 6: Principal Flood Problems	61
Table 7: Historic Flooding Elevations	71
Table 8: Non-Levee Flood Protection Measures	75
Table 9: Levees	84

Volume 2

	Page
SECTION 5.0 – ENGINEERING METHODS	**89**
5.1 Hydrologic Analyses	89
5.2 Hydraulic Analyses	107
5.3 Coastal Analyses	146
5.3.1 Total Stillwater Elevations	146
5.3.2 Waves	148
5.3.3 Coastal Erosion	148
5.3.4 Wave Hazard Analyses	149
5.4 Alluvial Fan Analyses	166
SECTION 6.0 – MAPPING METHODS	**167**
6.1 Vertical and Horizontal Control	167
6.2 Base Map	168
6.3 Floodplain and Floodway Delineation	168

Figures

	Page
Figure 7: Frequency Discharge-Drainage Area Curves	105
Figure 8: 1% Annual Chance Total Water Levels for Coastal Areas	147
Figure 9: Transect Location Map	162

Tables

	Page
Table 10: Summary of Discharges	90
Table 11: Summary of Non-Coastal Stillwater Elevations	106
Table 12: Stream Gage Information used to Determine Discharges	107
Table 13: Summary of Hydrologic and Hydraulic Analyses	108
Table 14: Roughness Coefficients	145

Table 15: Summary of Coastal Analyses 146
Table 16: Tide Gage Analysis Specifics 148
Table 17: Coastal Transect Parameters 150
Table 18: Summary of Alluvial Fan Analyses 166
Table 19: Results of Alluvial Fan Analyses 166
Table 20: Countywide Vertical Datum Conversion 167
Table 21: Stream-Based Vertical Datum Conversion 167
Table 22: Base Map Sources 168
Table 23: Summary of Topographic Elevation Data used in Mapping 169

Volume 3

Page

SECTION 6.0 – MAPPING METHODS, continued
6.4 Coastal Flood Hazard Mapping 198
6.5 FIRM Revisions 202
6.5.1 Letters of Map Amendment 202
6.5.2 Letters of Map Revision Based on Fill 203
6.5.3 Letters of Map Revision 203
6.5.4 Physical Map Revisions 204
6.5.5 Contracted Restudies 204
6.5.6 Community Map History 204

SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION 206
7.1 Contracted Studies 206
7.2 Community Meetings 226

SECTION 8.0 – ADDITIONAL INFORMATION 229

SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES 231

Tables

Page

Table 24: Floodway Data 171
Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams 198
Table 26: Summary of Coastal Transect Mapping Considerations 199
Table 27: Incorporated Letters of Map Change 204
Table 28: Community Map History 205
Table 29: Summary of Contracted Studies Included in this FIS Report 207
Table 30: Community Meetings 227
Table 31: Map Repositories 229
Table 32: Additional Information 230
Table 33: Bibliography and References 232

Exhibits

Flood Profiles	Panel
Adams Canyon	01 P
Arroyo Santa Rosa	02-07 P
Arroyo Santa Rosa Tributary	08-09 P
Beardsley Wash	10-12 P
Bell Canyon Creek	13-15 P
Brown Barranca	16 P
Bus Canyon Drain	17-19 P
Bus Canyon Drain Tributary	20 P

Volume 4

Exhibits

Flood Profiles	Panel
Calleguas Creek – Arroyo Las Posas-Arroyo Simi	21-53 P
Camarillo Hills Drain	54-56 P
Conejo Creek	57-63 P
Coyote Creek	64-66 P
Dry Canyon Drain	67-68 P
Erringer Drain	69-71 P
Fagan Canyon	72-73 P
Fox Canyon Storm Drain	74-78 P
Happy Valley Drain	79-80 P
Happy Valley Drain South	81-82 P
Harmon Barranca	83-84 P
Lang Creek	85-86 P
Las Llajas Canyon Channel	87-91 P
Las Posas Estates Drain	92-93 P
Miramonte Drain	94 P
North Simi Drain	95-100 P
Peach Hill Wash	101 P
Piru Creek	102-103 P
Pole Creek	104-106 P
Reeves Creek	107-110 P
Rincon Creek	111 P

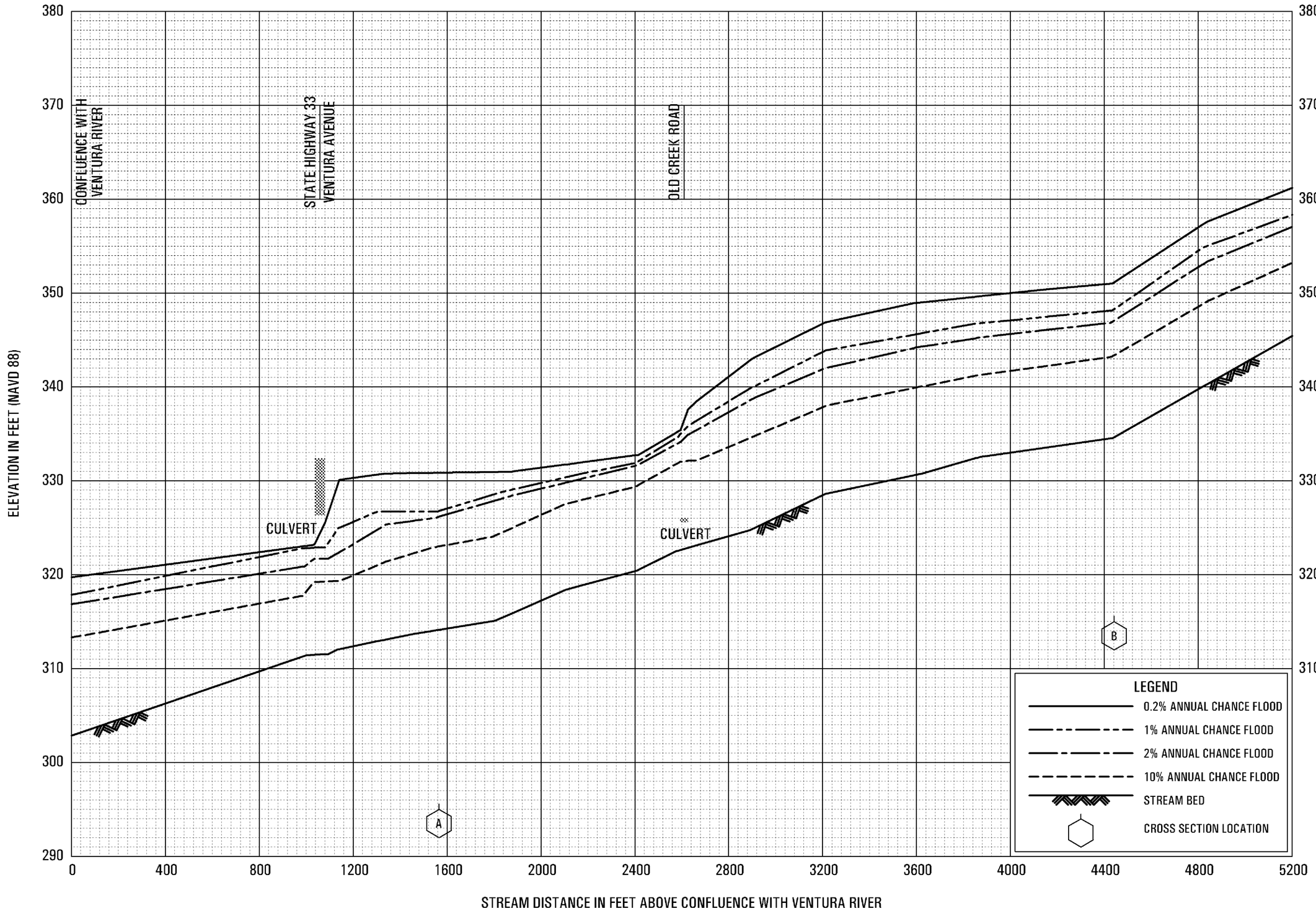
Volume 5

Exhibits

Flood Profiles	Panel
San Antonio Creek	112-120 P
Santa Clara River	121-136 P
Santa Clara River Breakout	137-138 P
Santa Paula Creek	139-141 P
Sespe Creek	142-145 P
South Branch Arroyo Conejo	146-149 P
Stewart Canyon Creek	150-154 P
Tapo Canyon Channel	155-157 P
Thacher Creek	158-167 P
Thousand Oaks North Drain	168-169 P
Ventura River	170-187 P
Ventura River without Levee	188 P
Walnut Creek Drain/Gabbart Canyon Creek	189-192 P

Published Separately

Flood Insurance Rate Map (FIRM)



FLOOD PROFILES

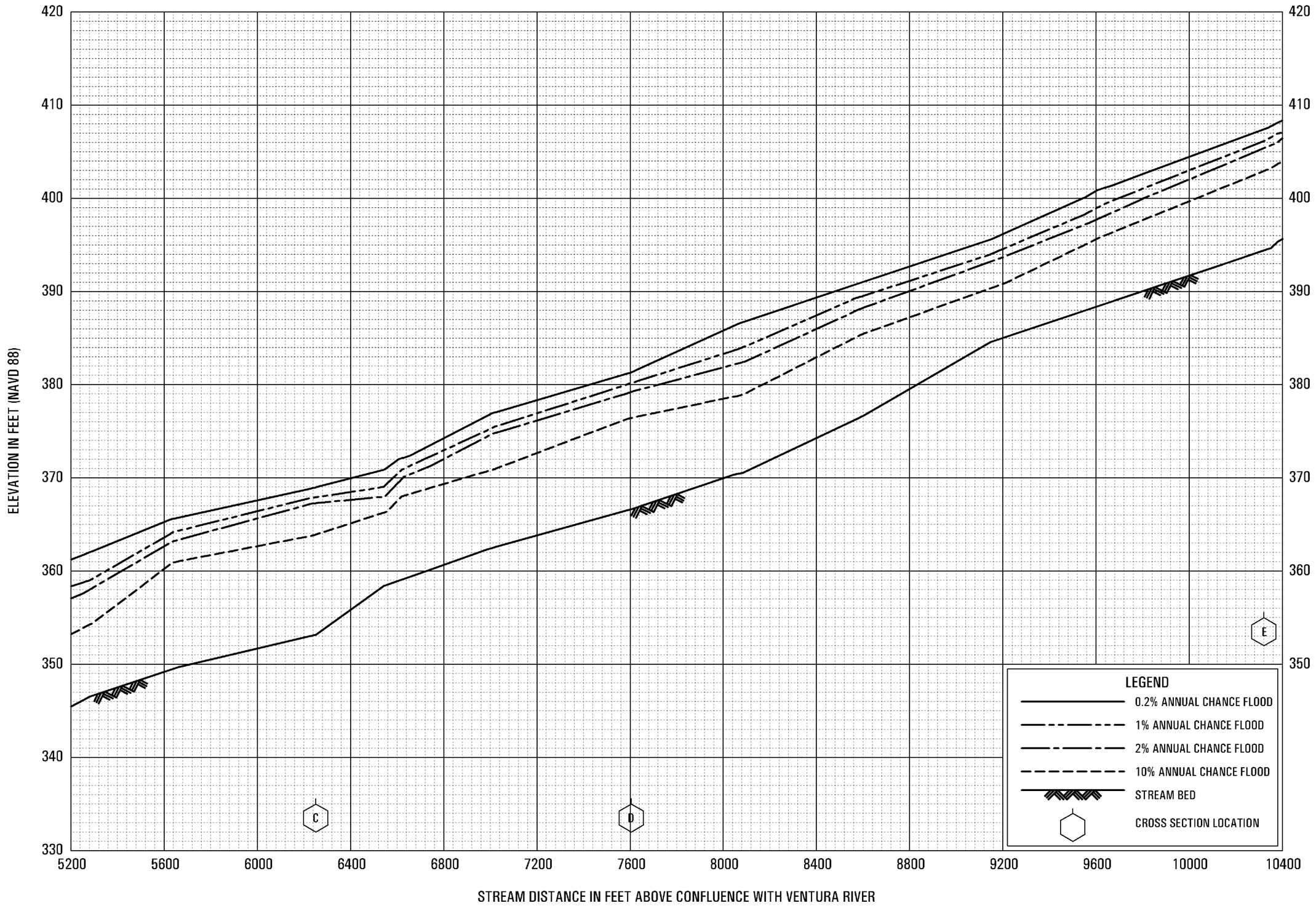
SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

112P



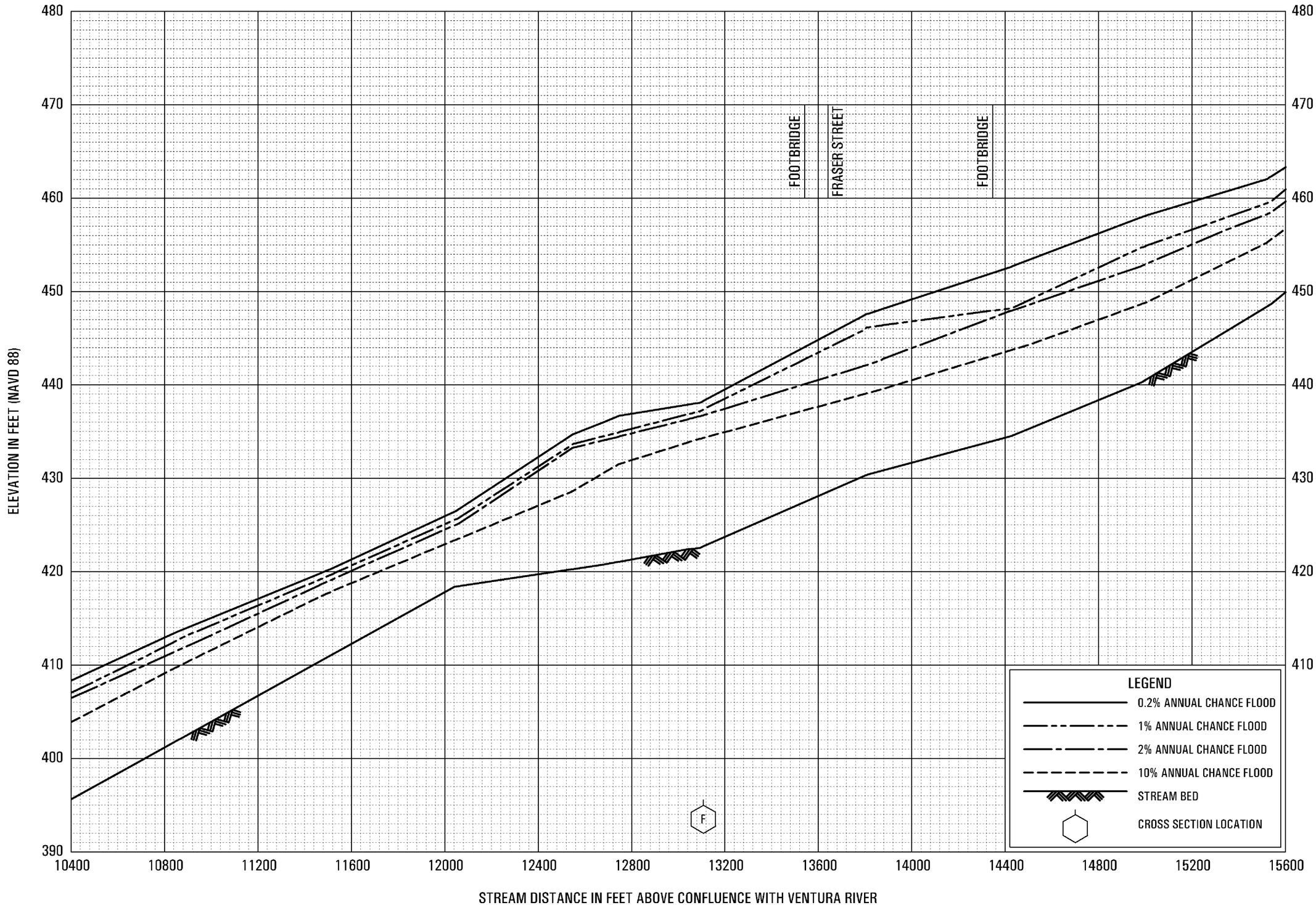
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



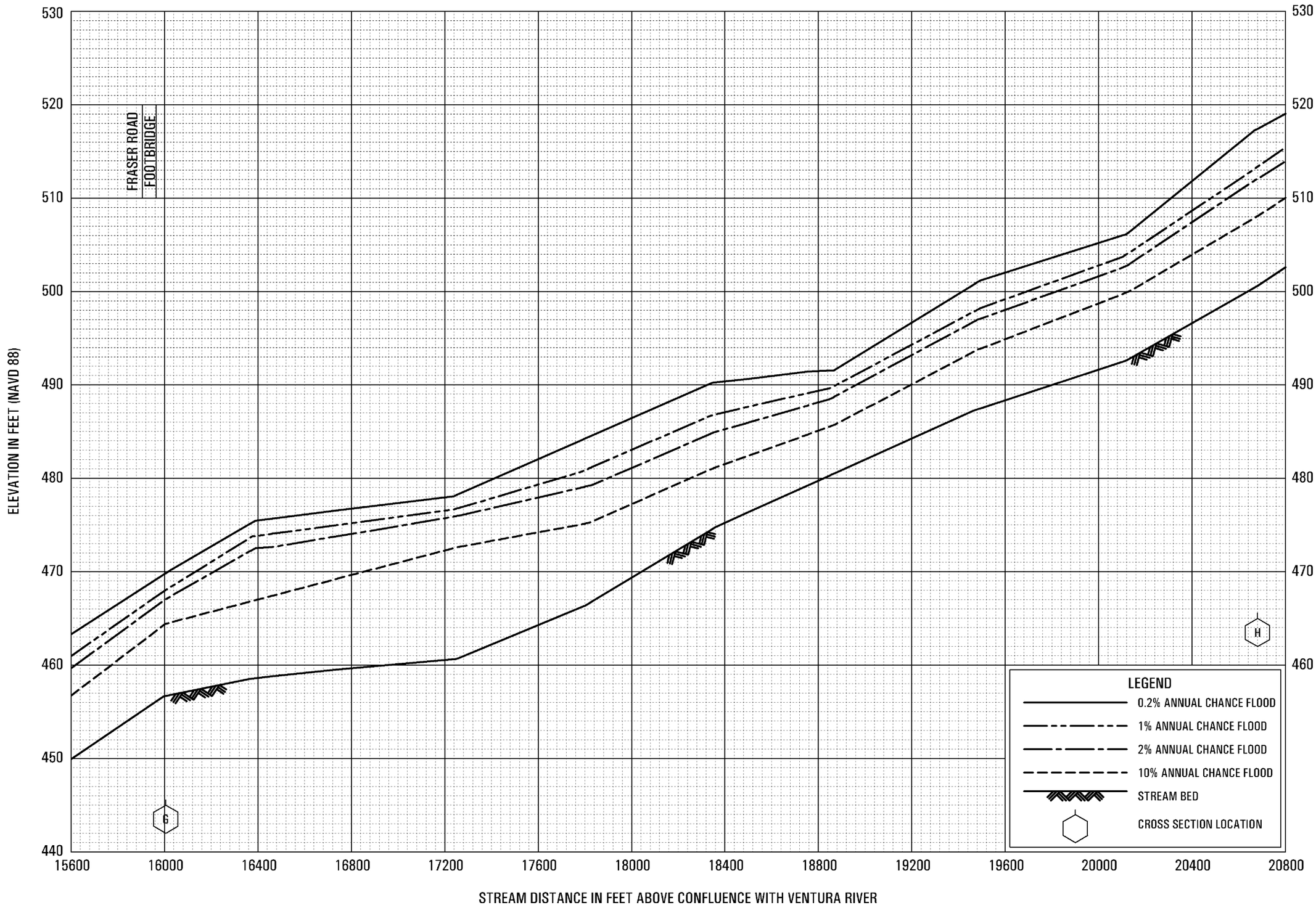
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

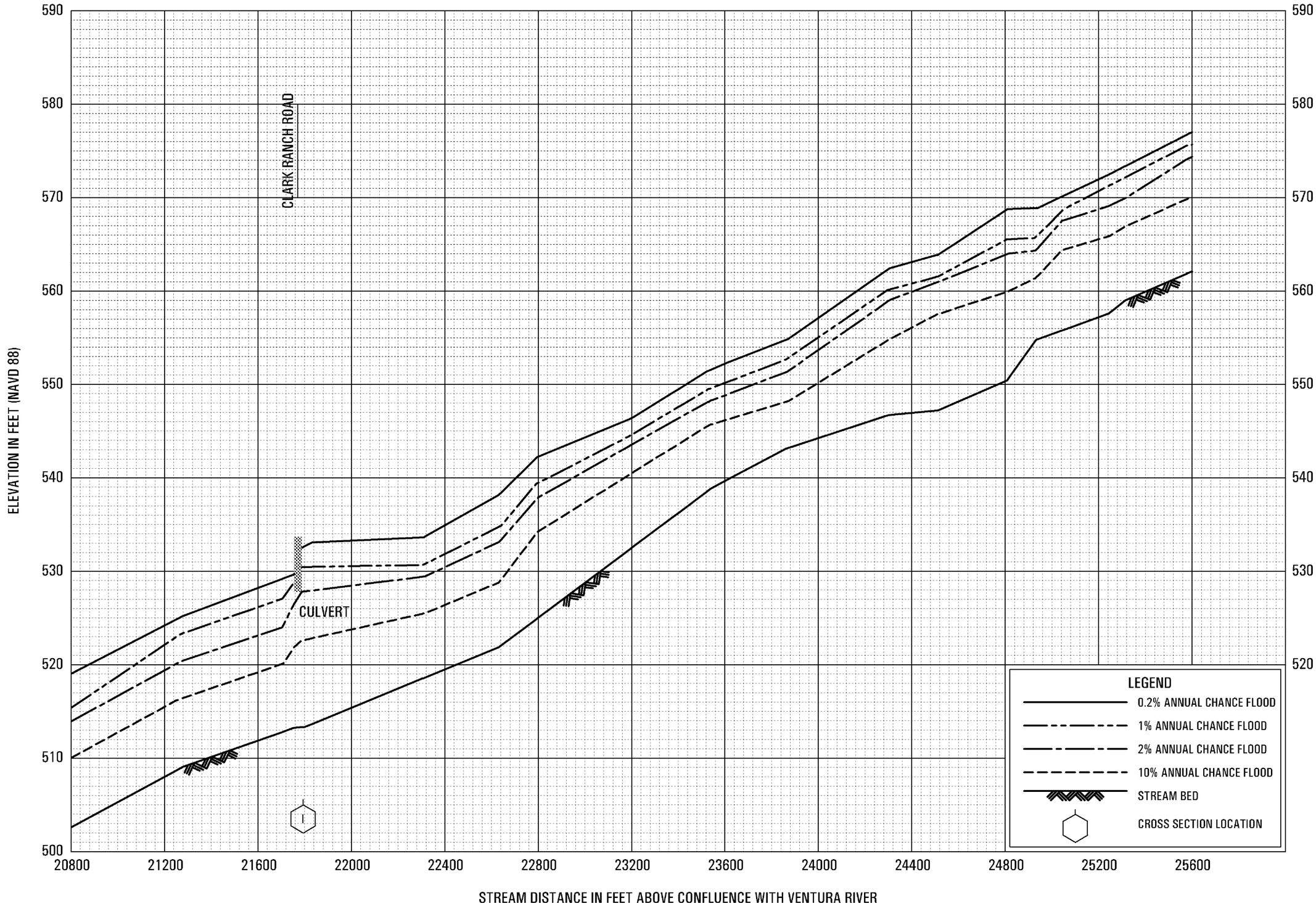
SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

115P



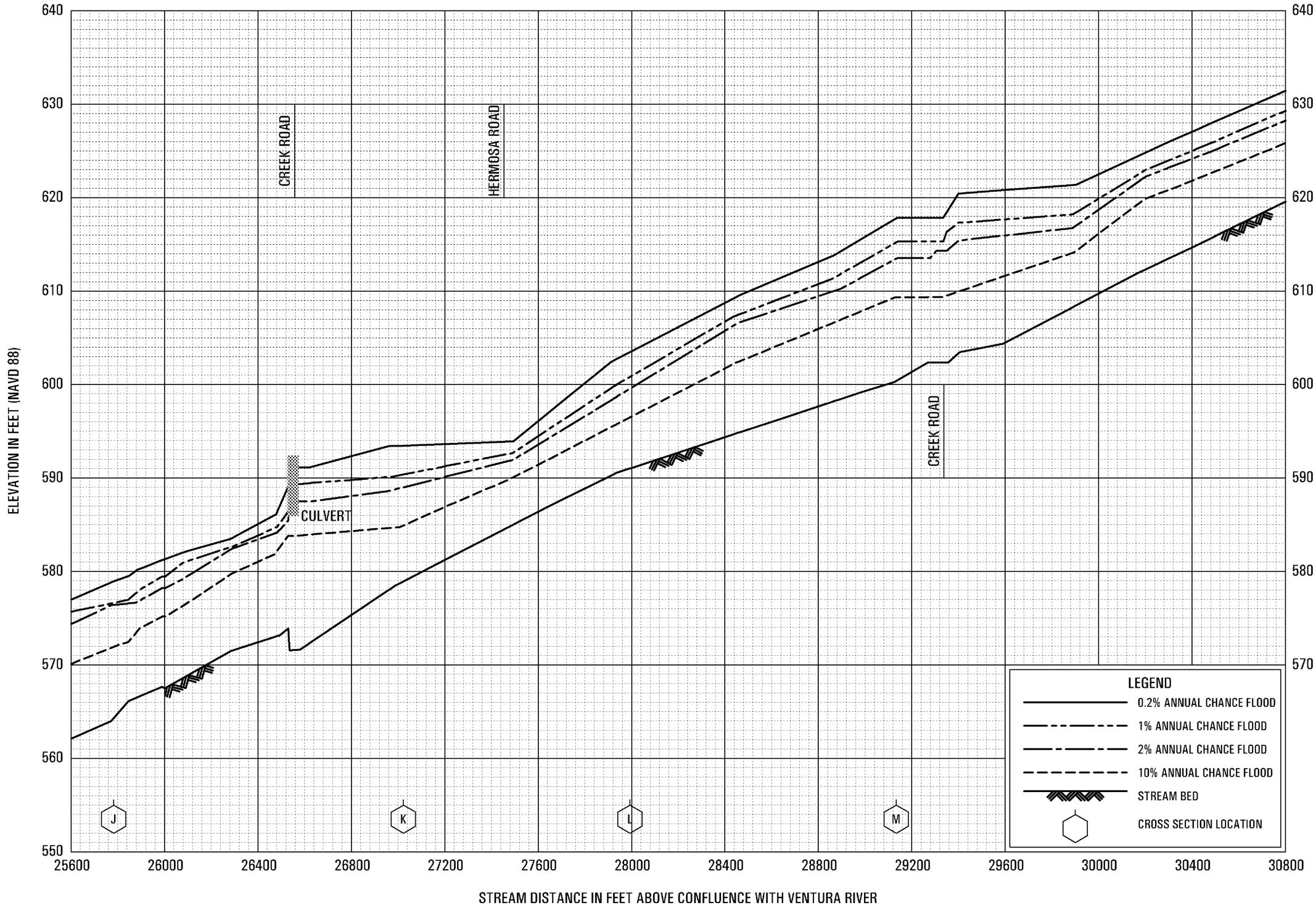
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



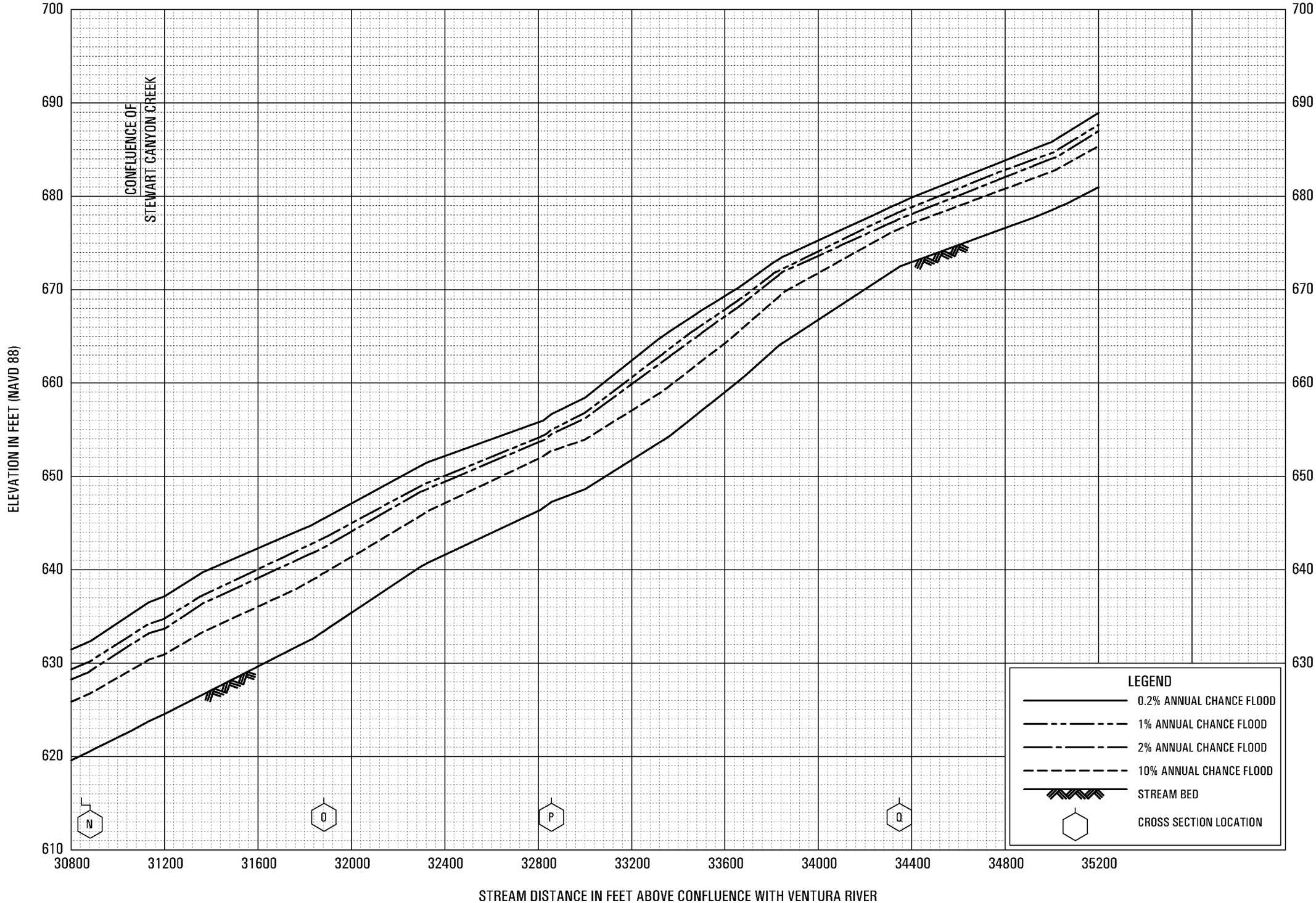
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



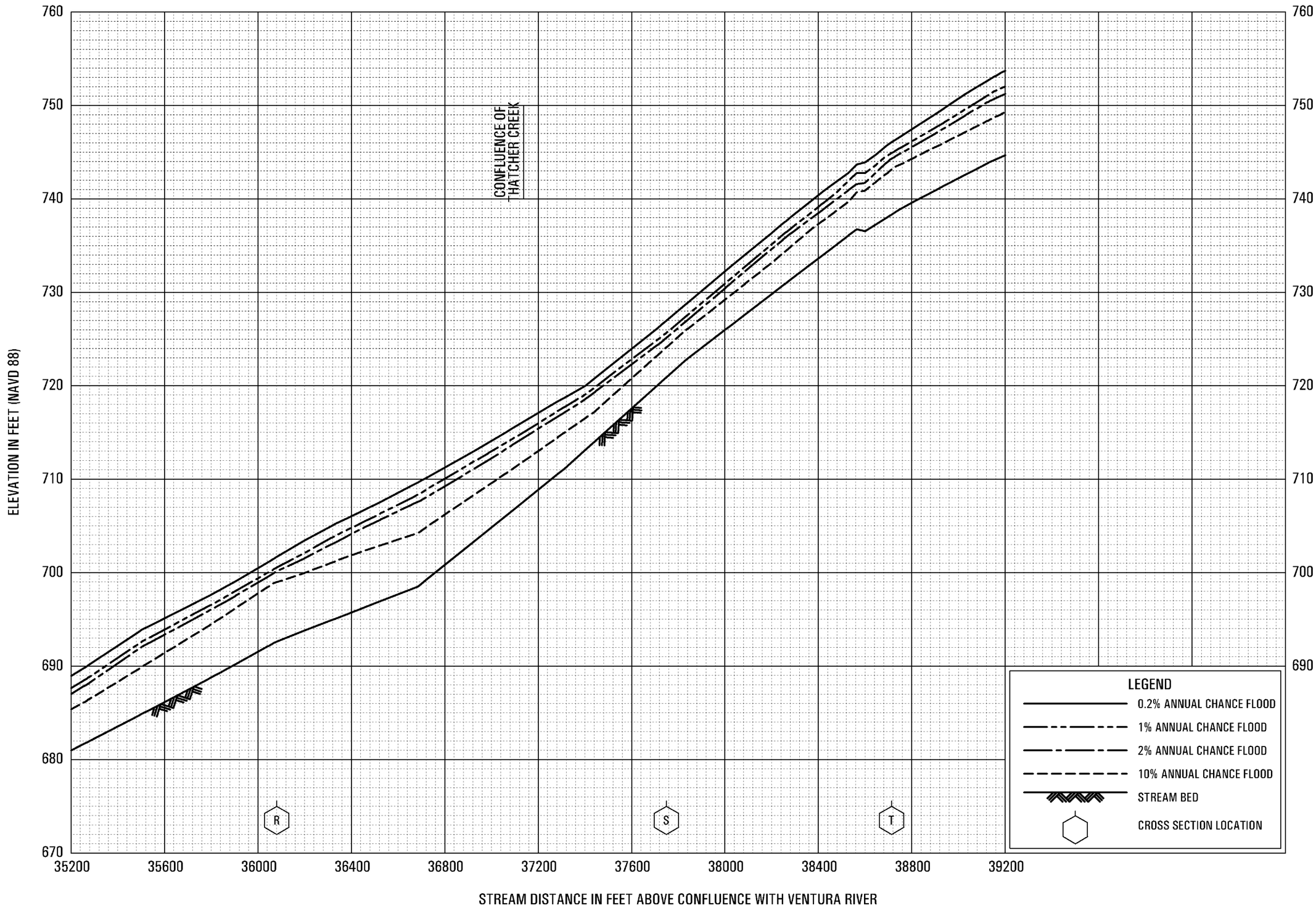
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



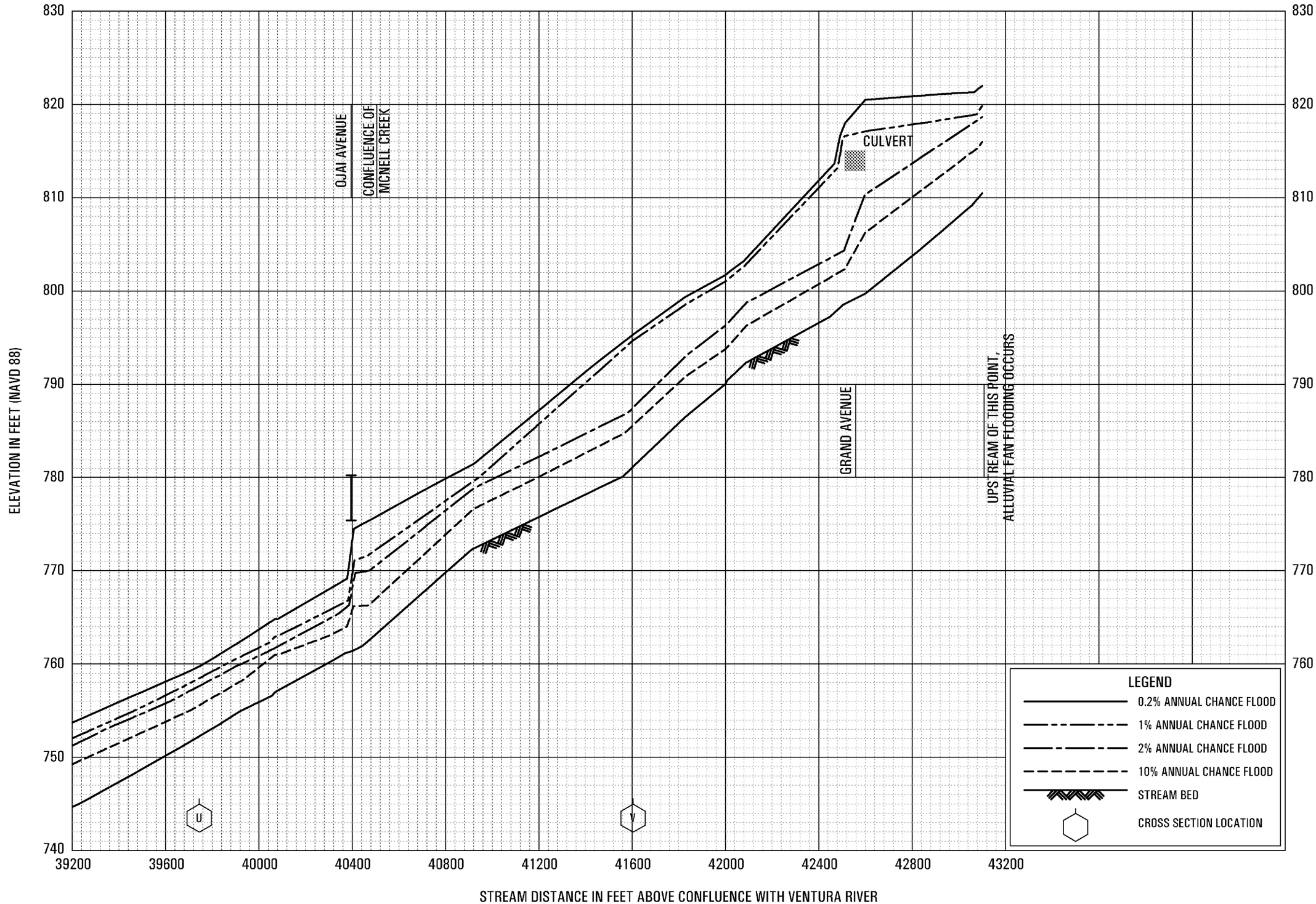
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



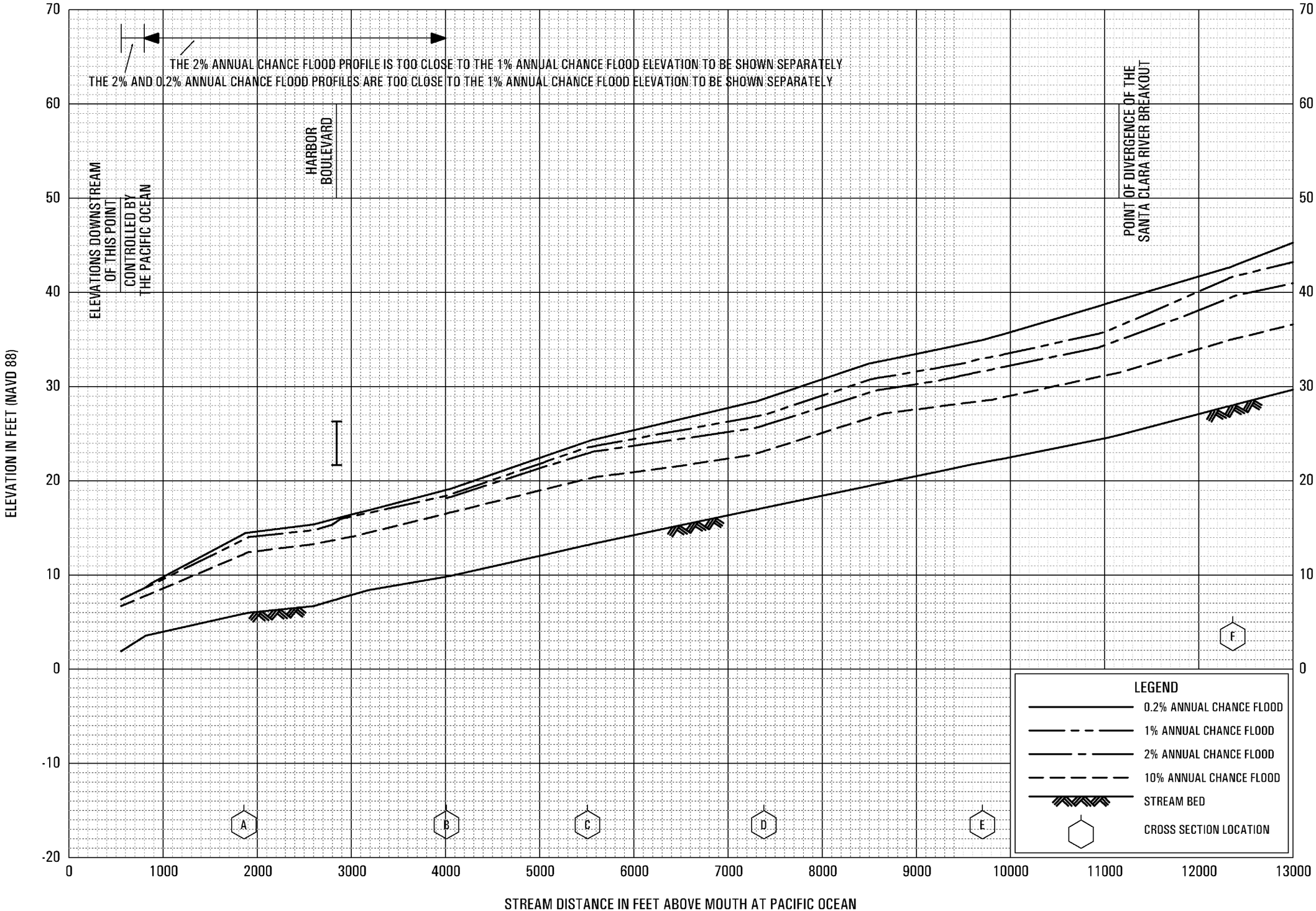
FLOOD PROFILES

SAN ANTONIO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

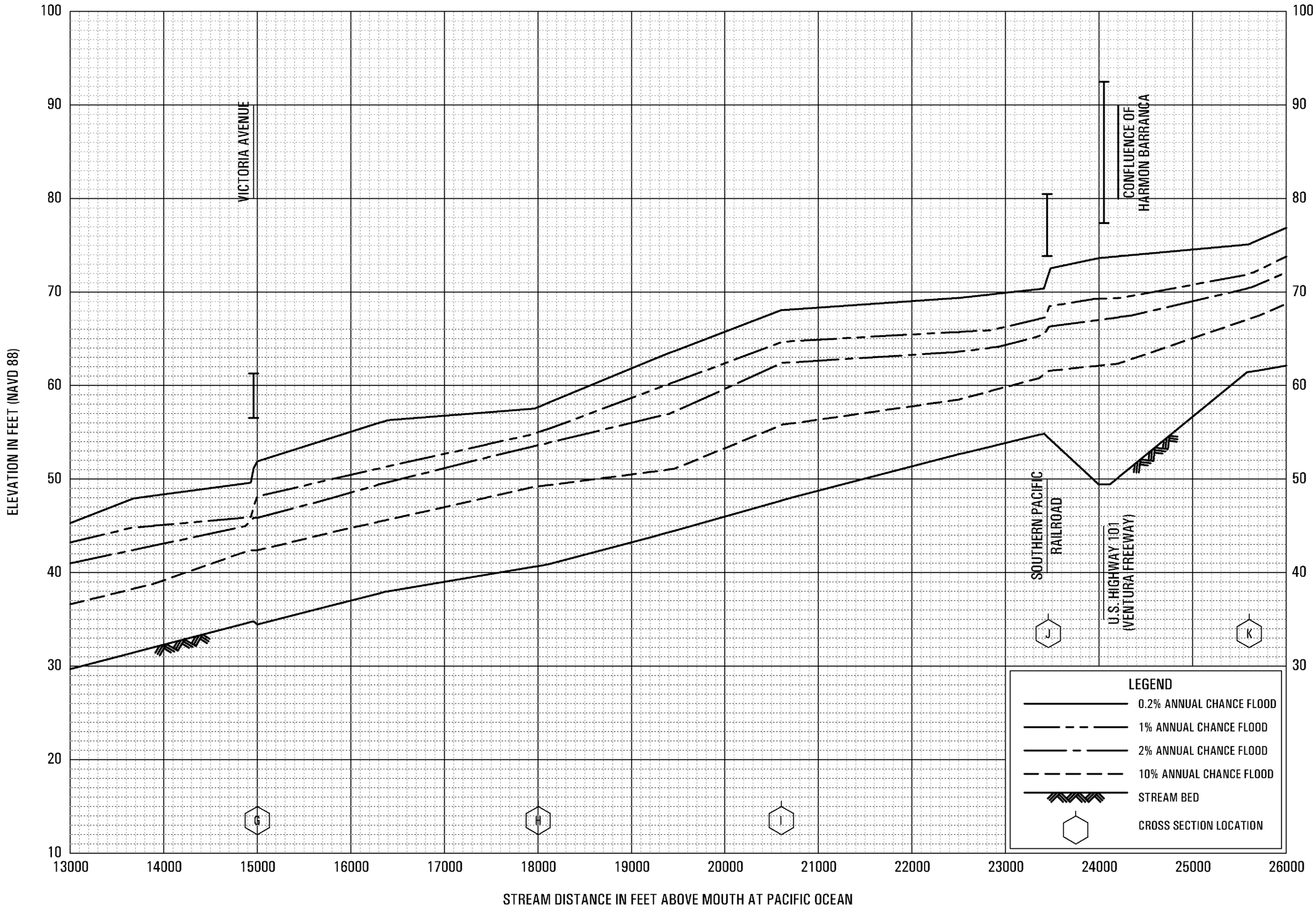
SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

121P



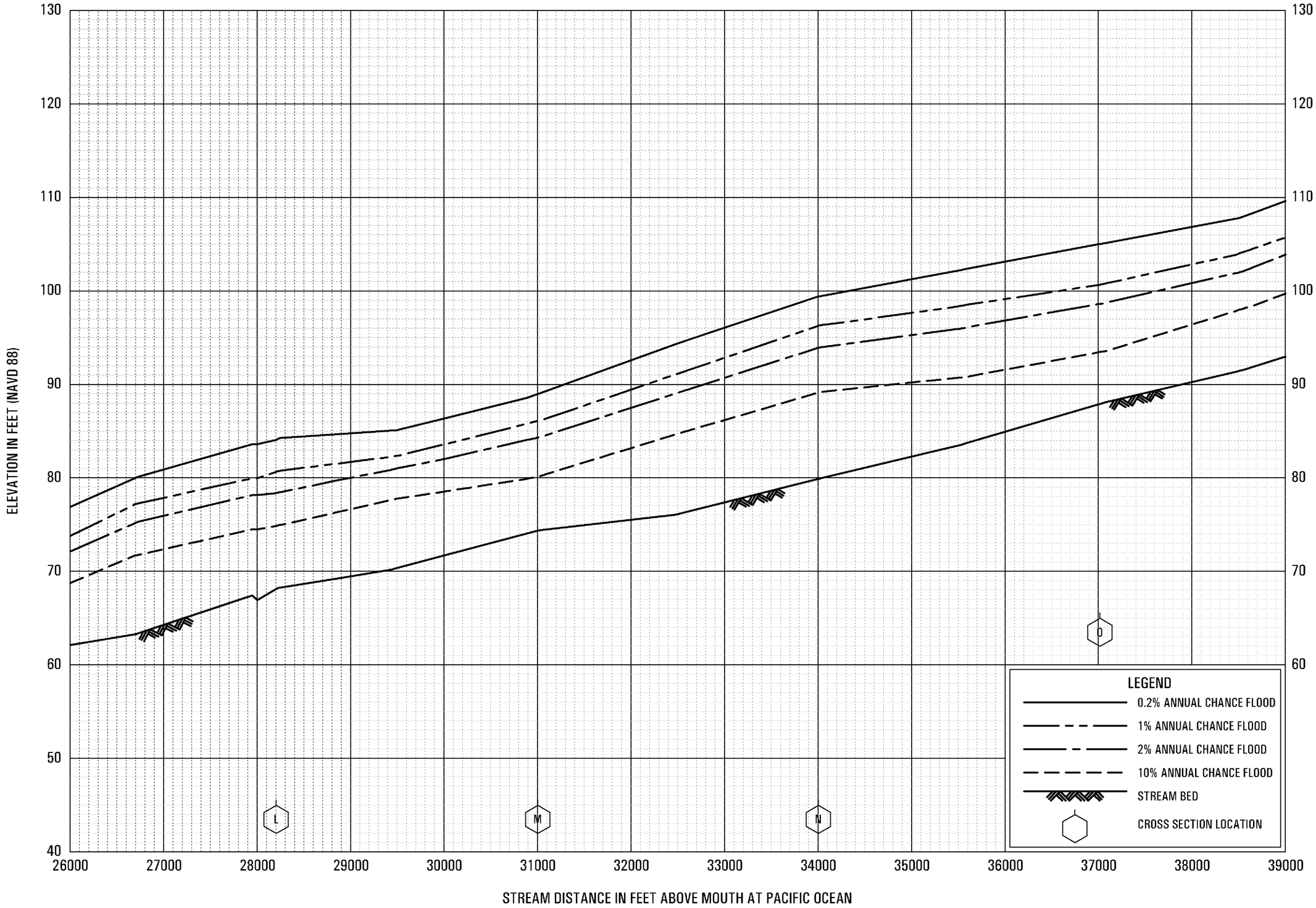
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



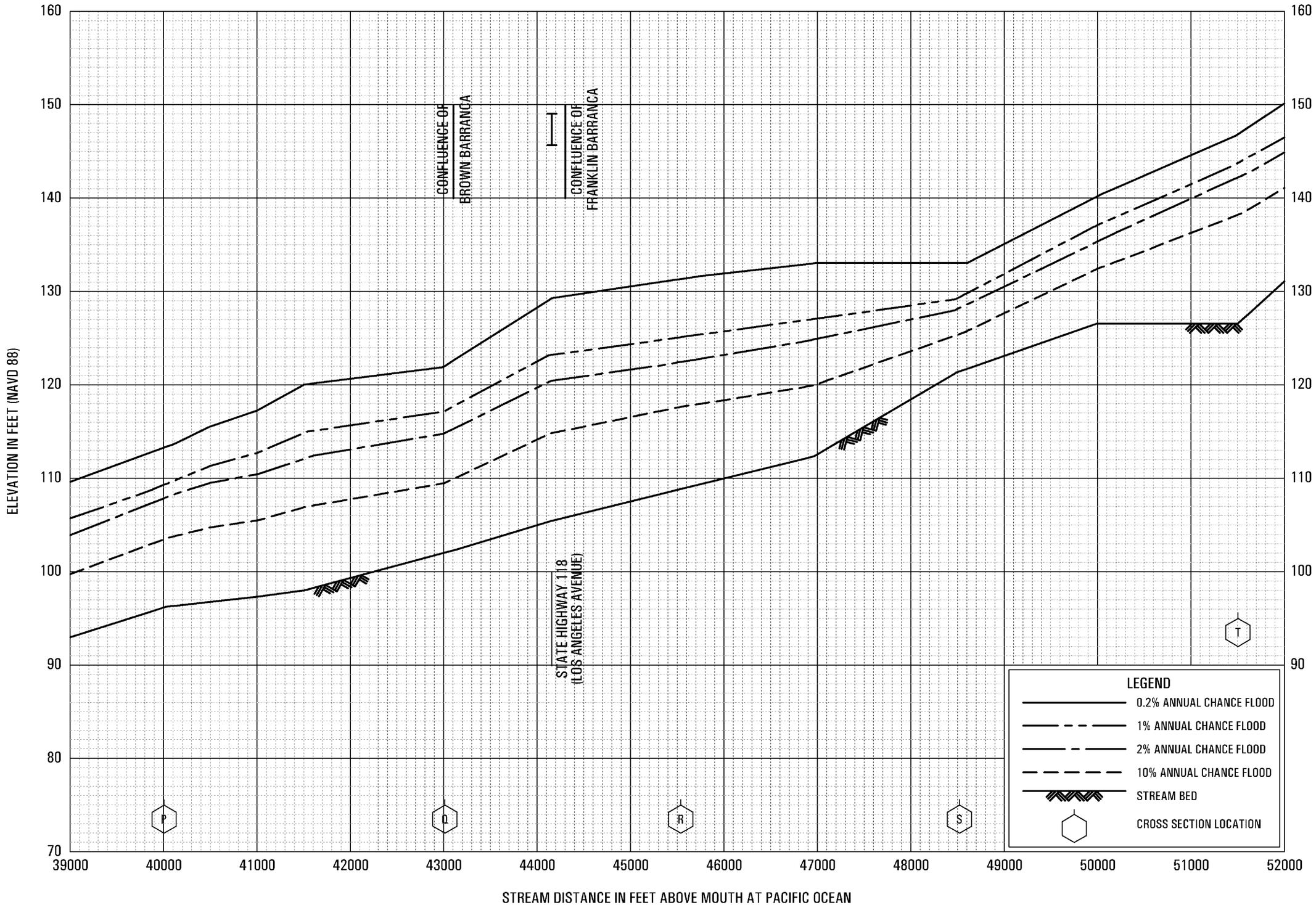
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

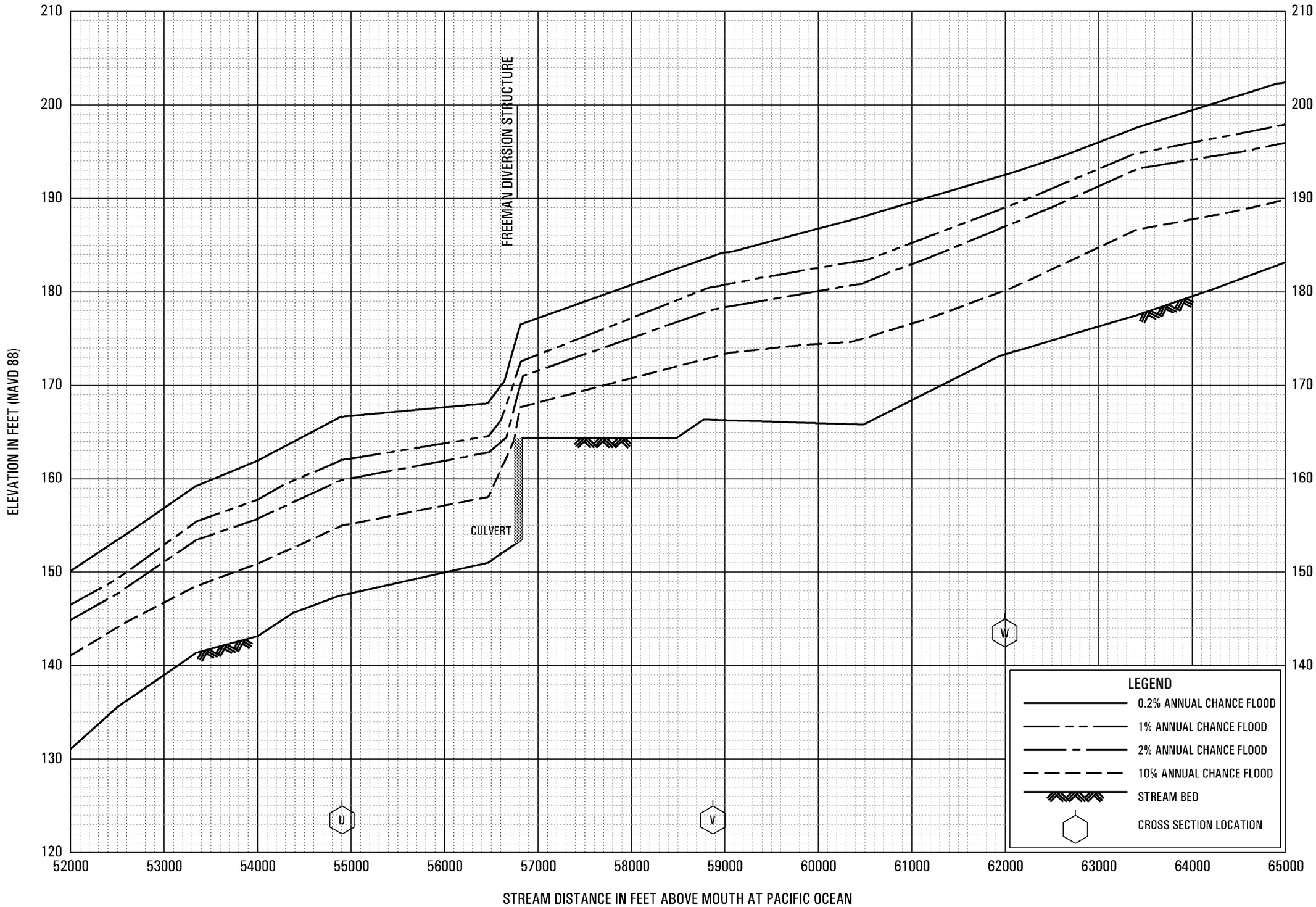
SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

124P



FLOOD PROFILES

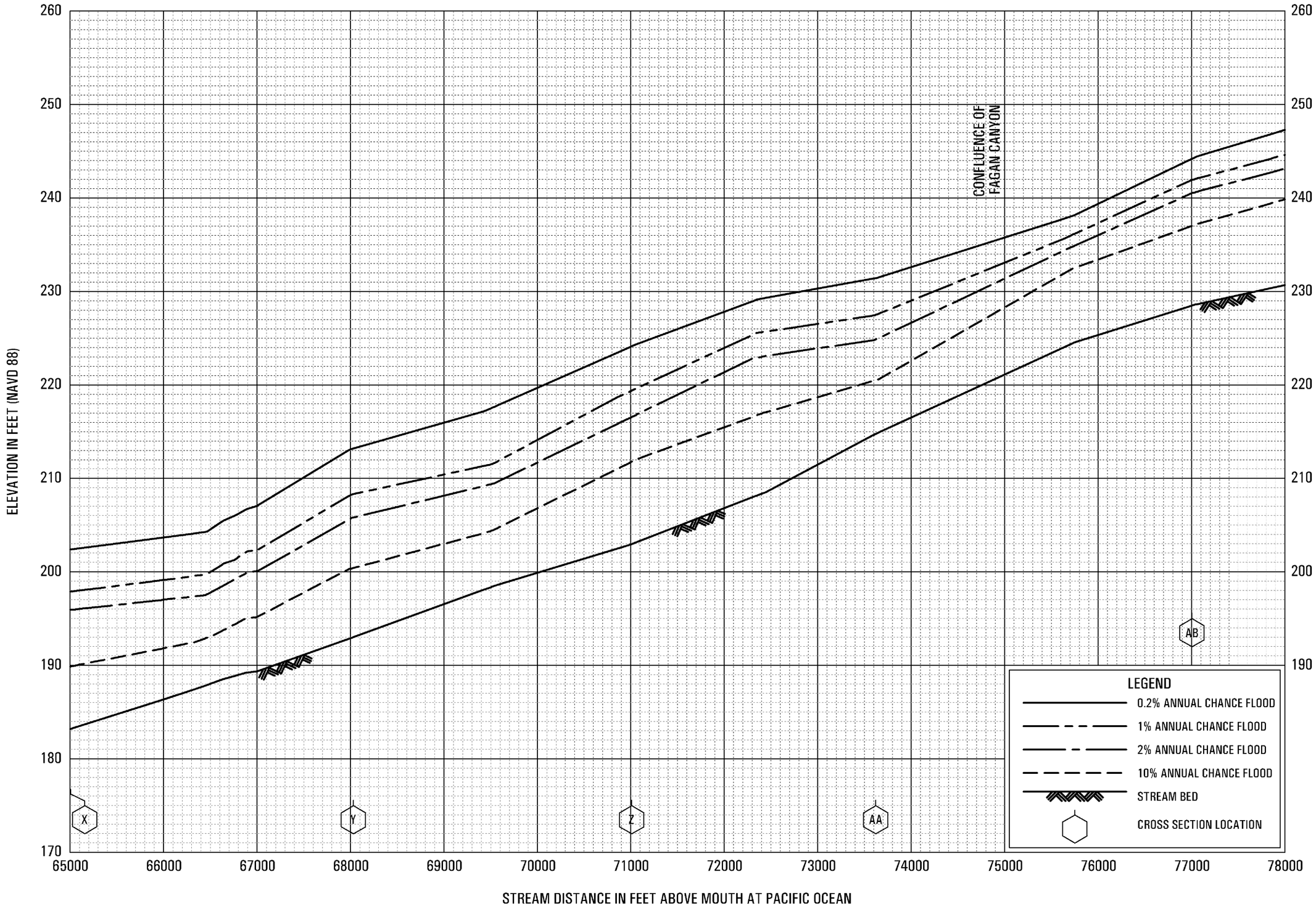
SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

125P



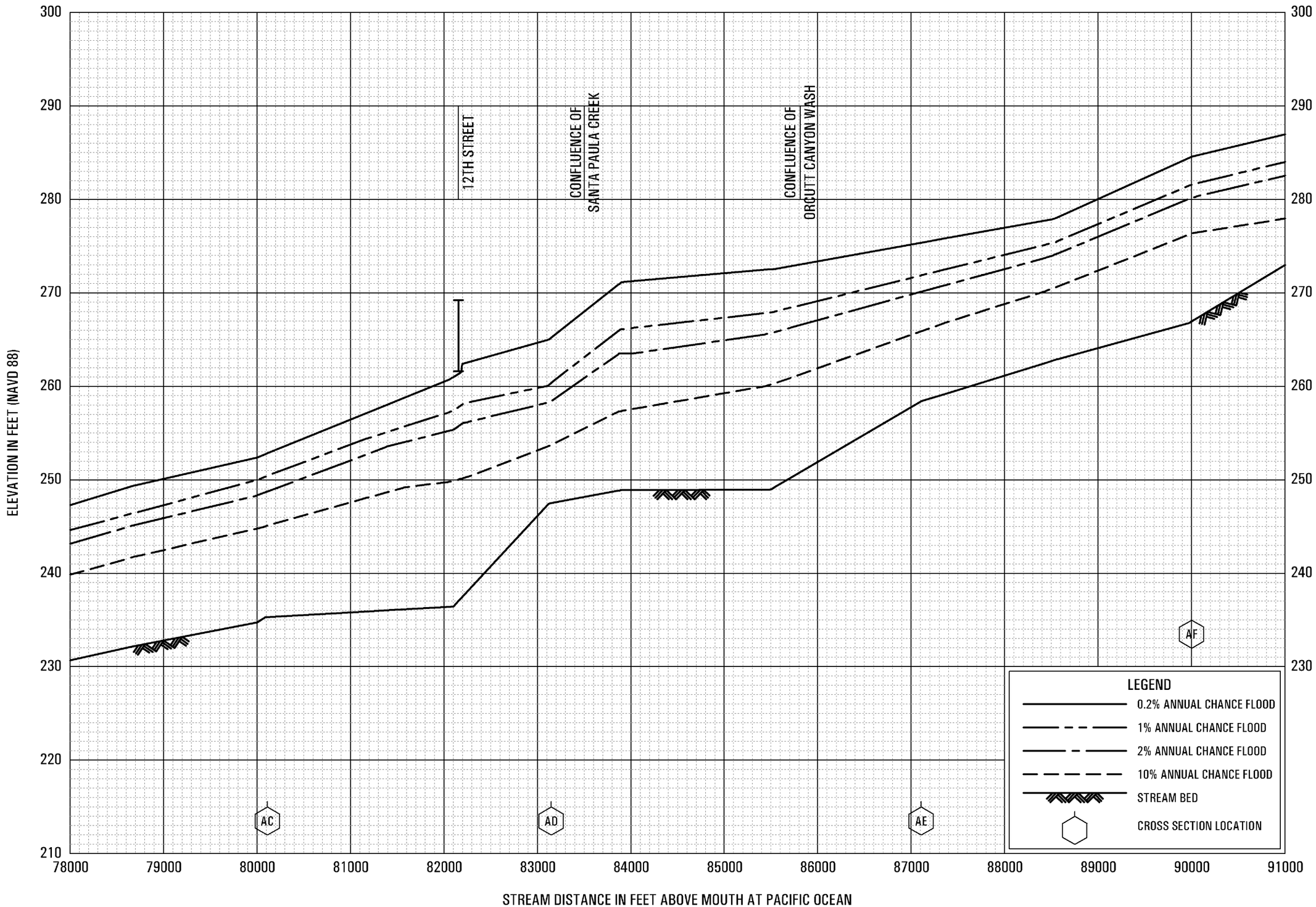
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



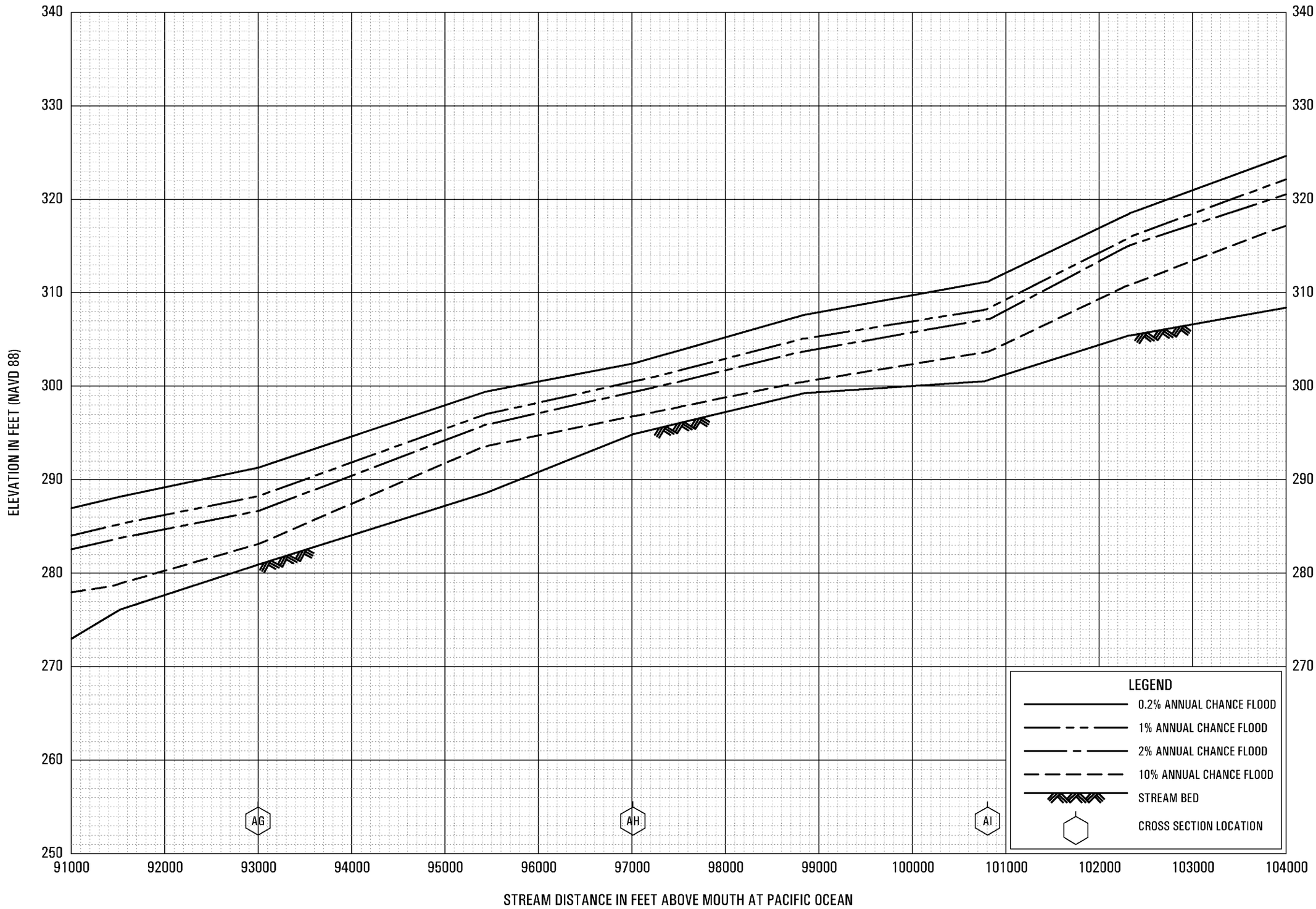
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



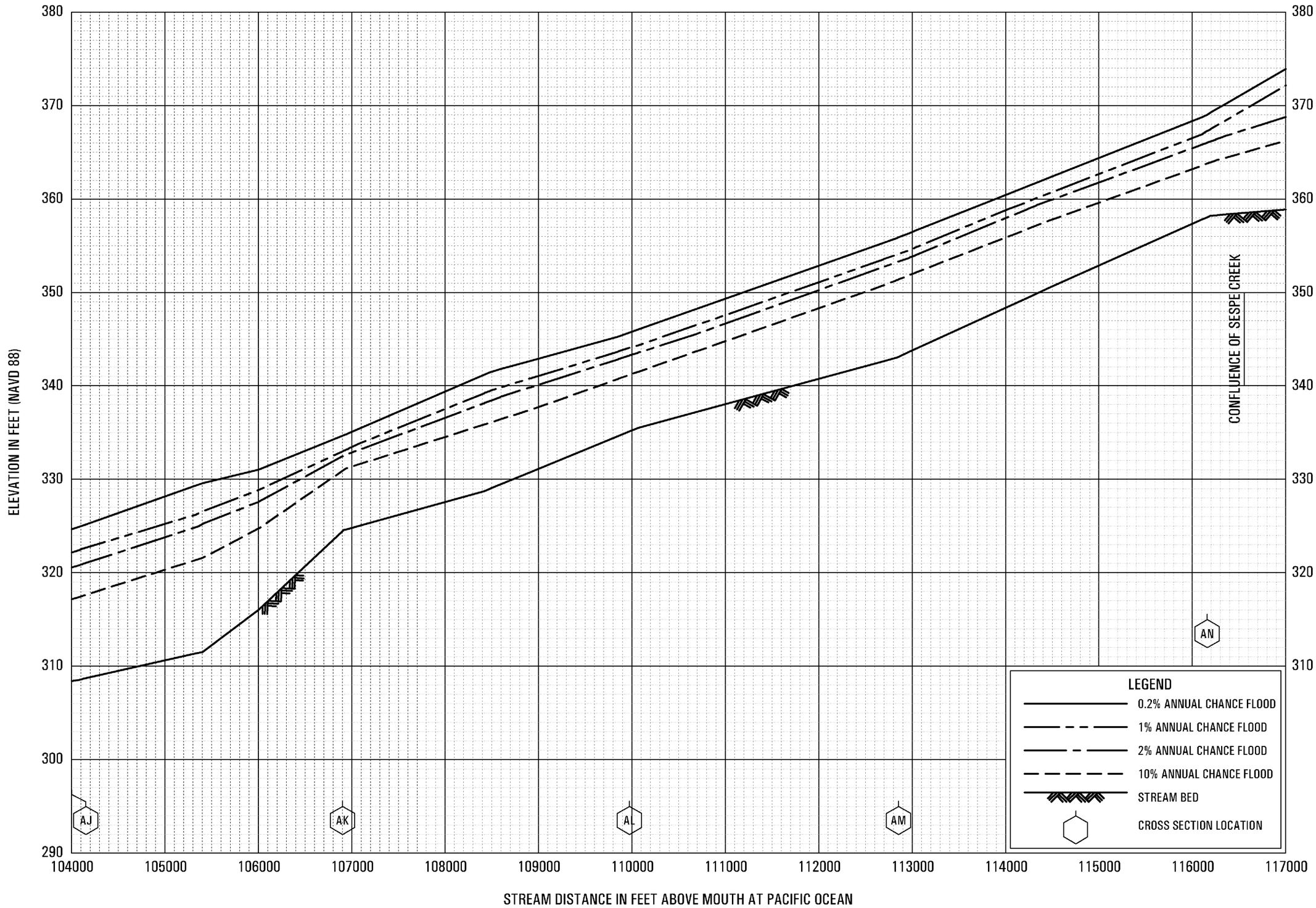
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



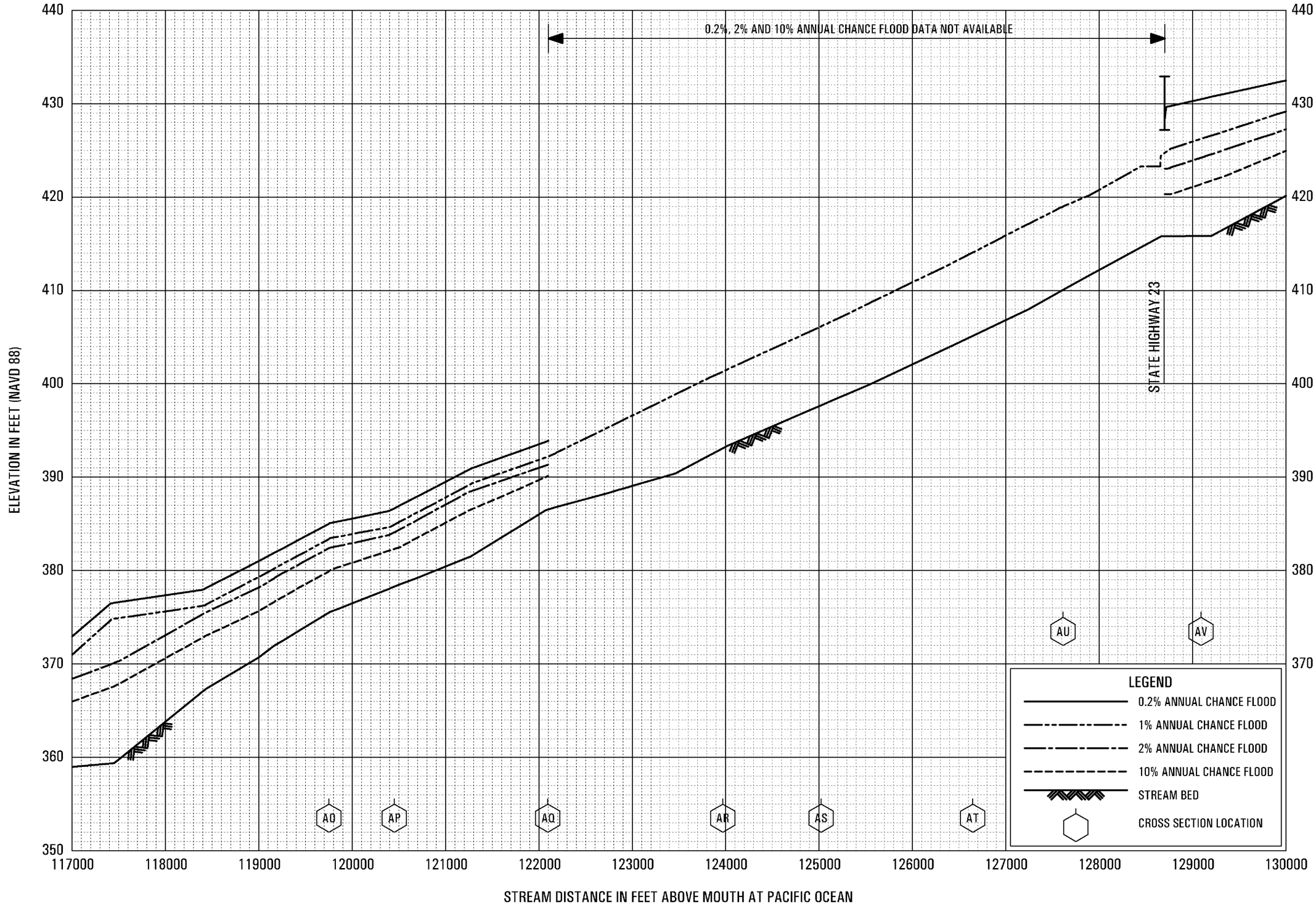
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



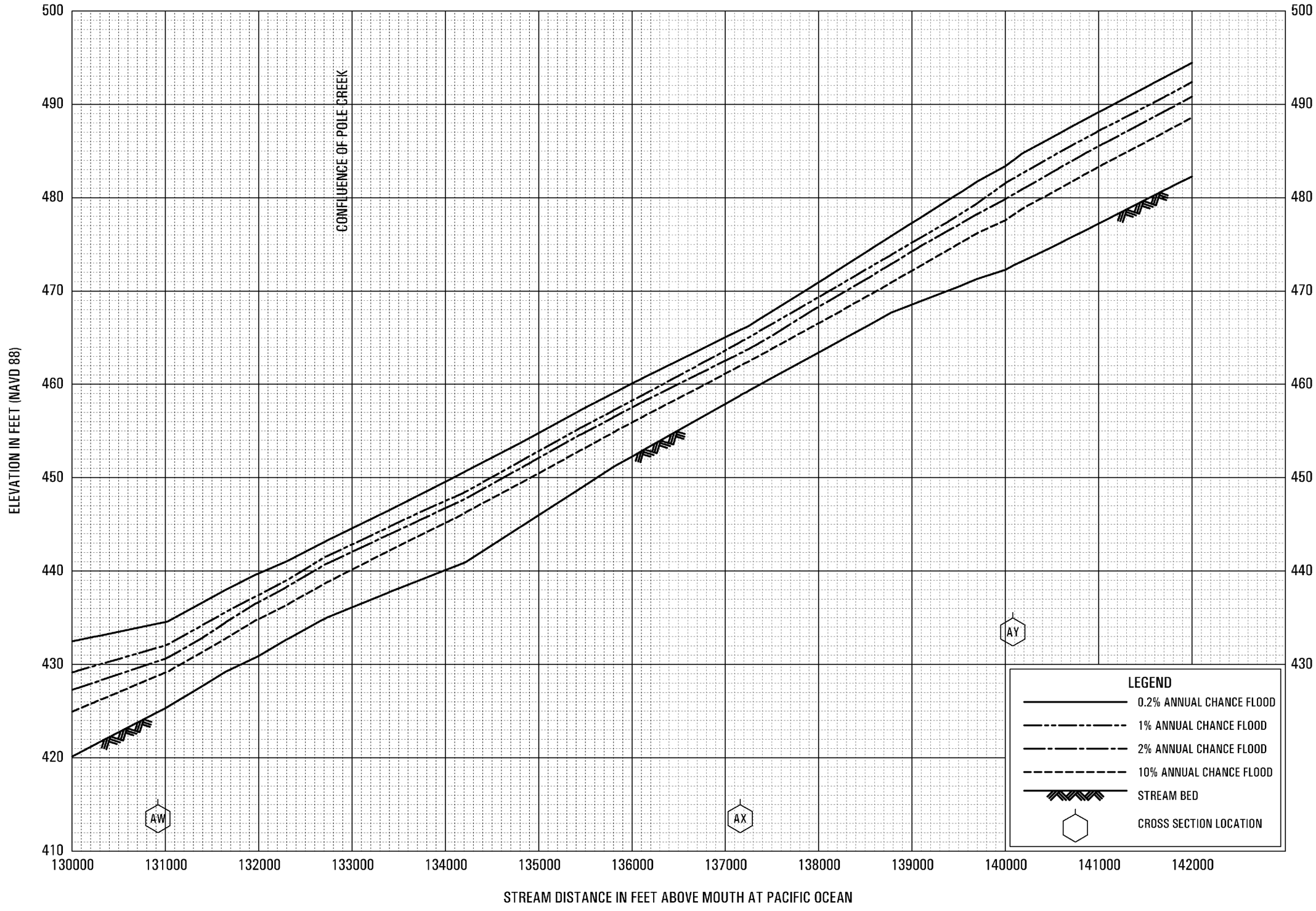
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



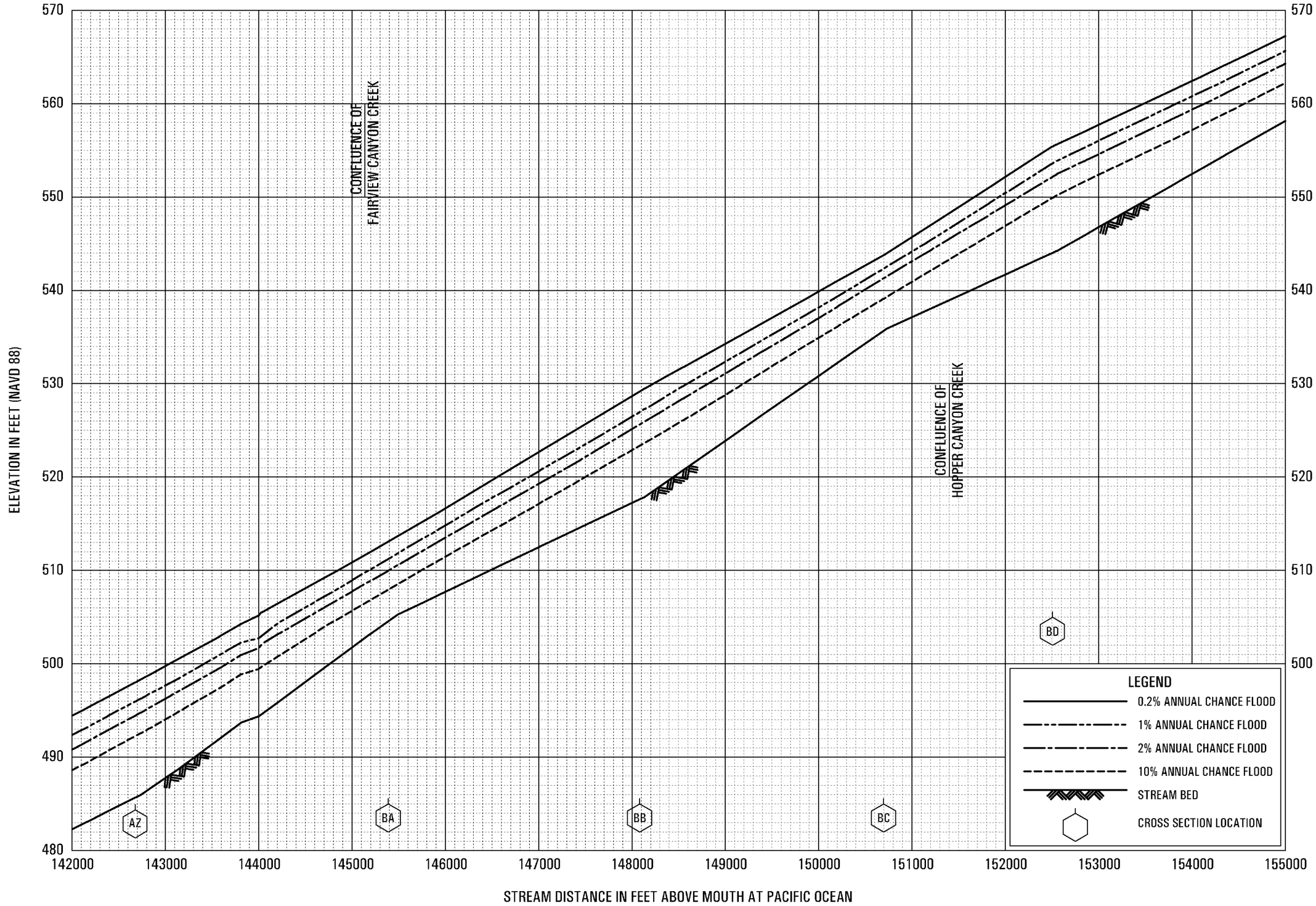
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



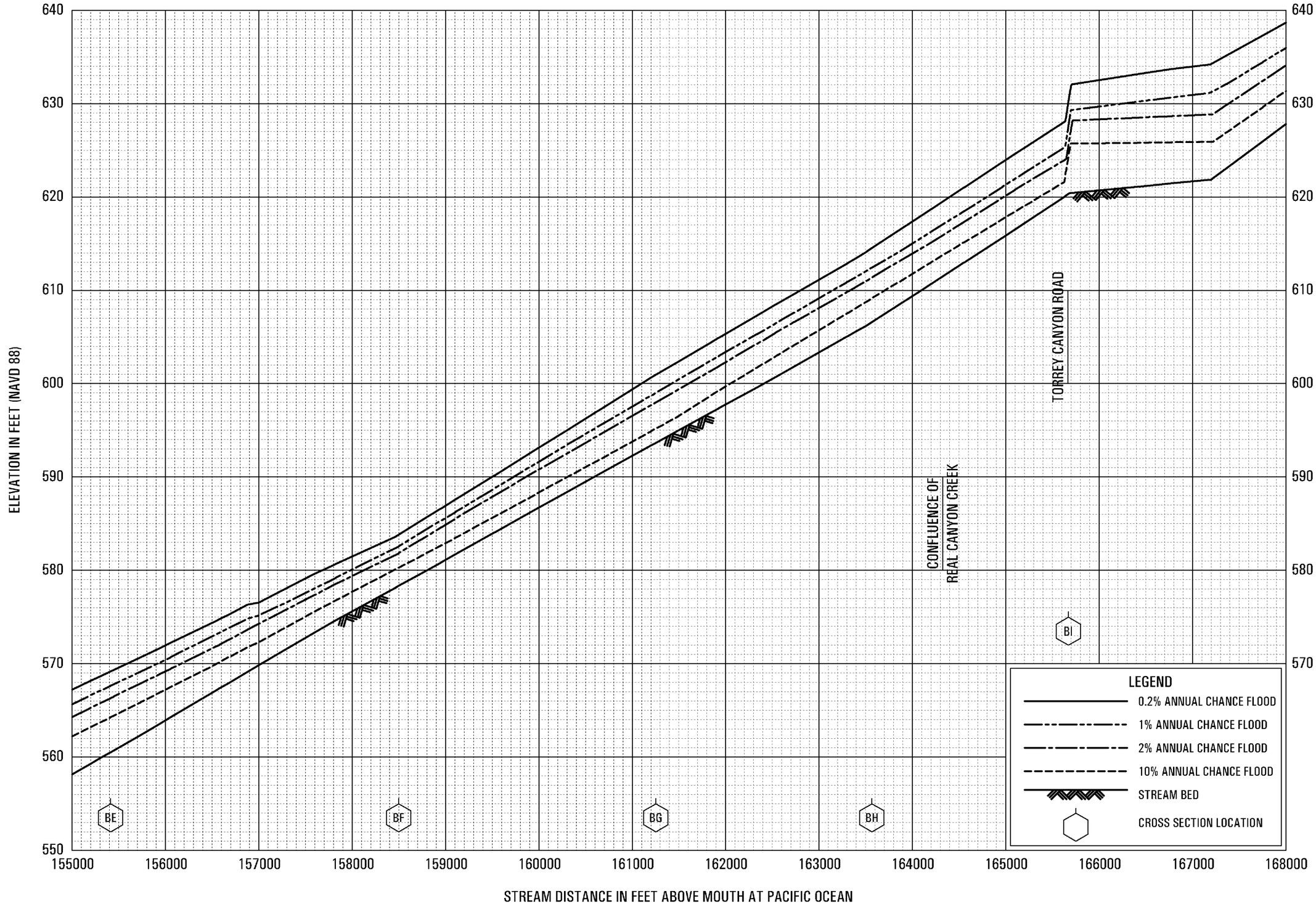
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

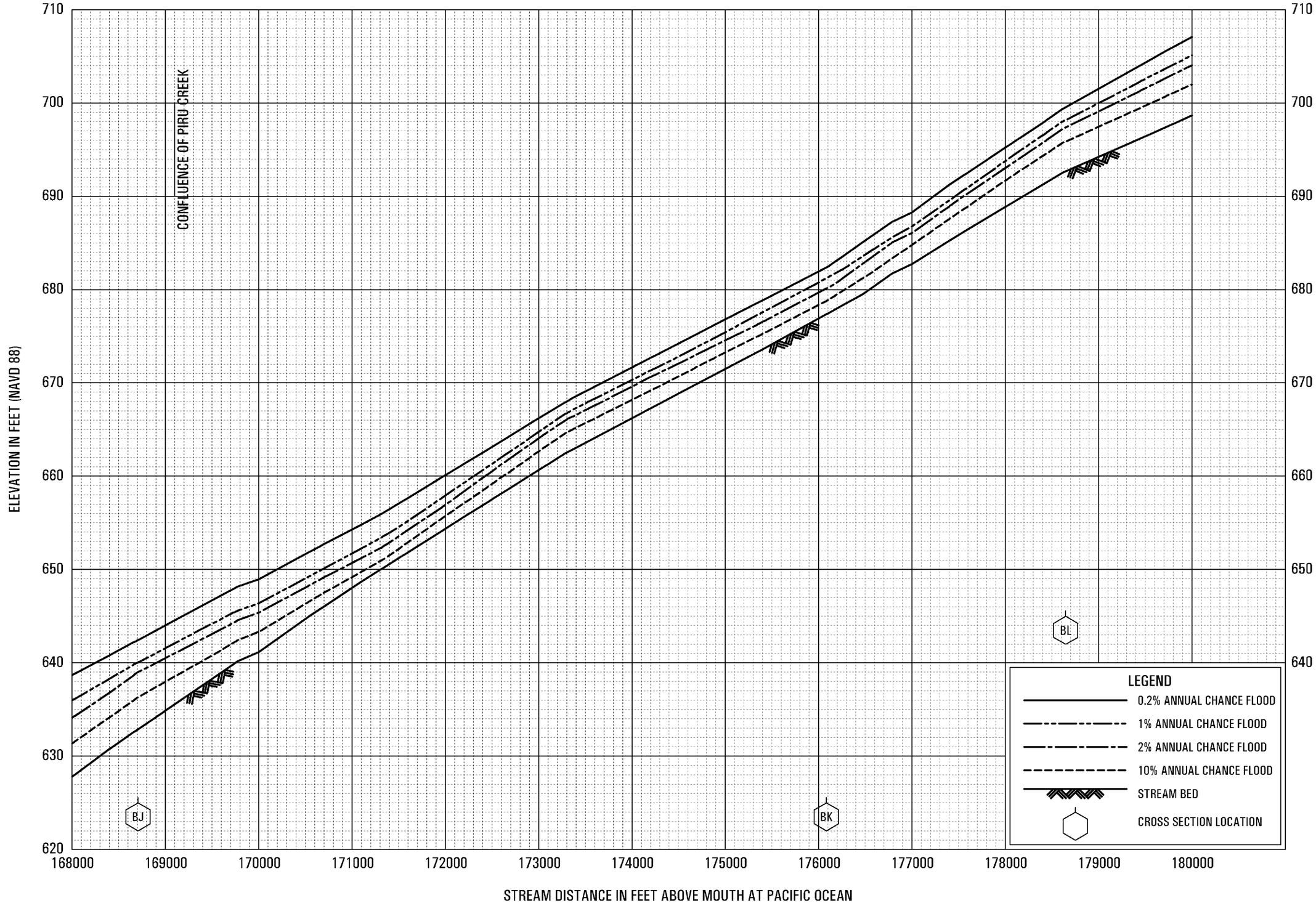
SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

133P



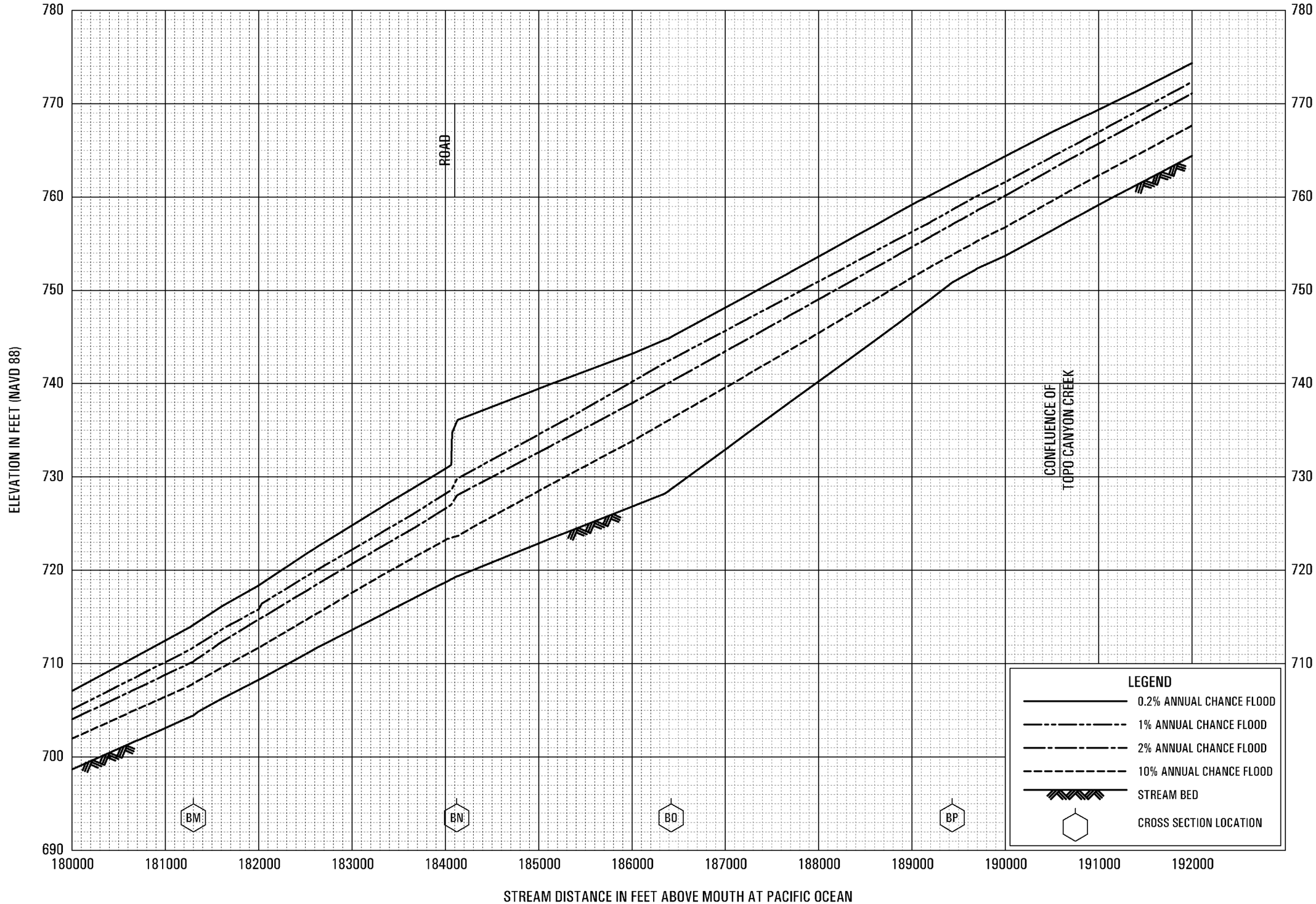
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



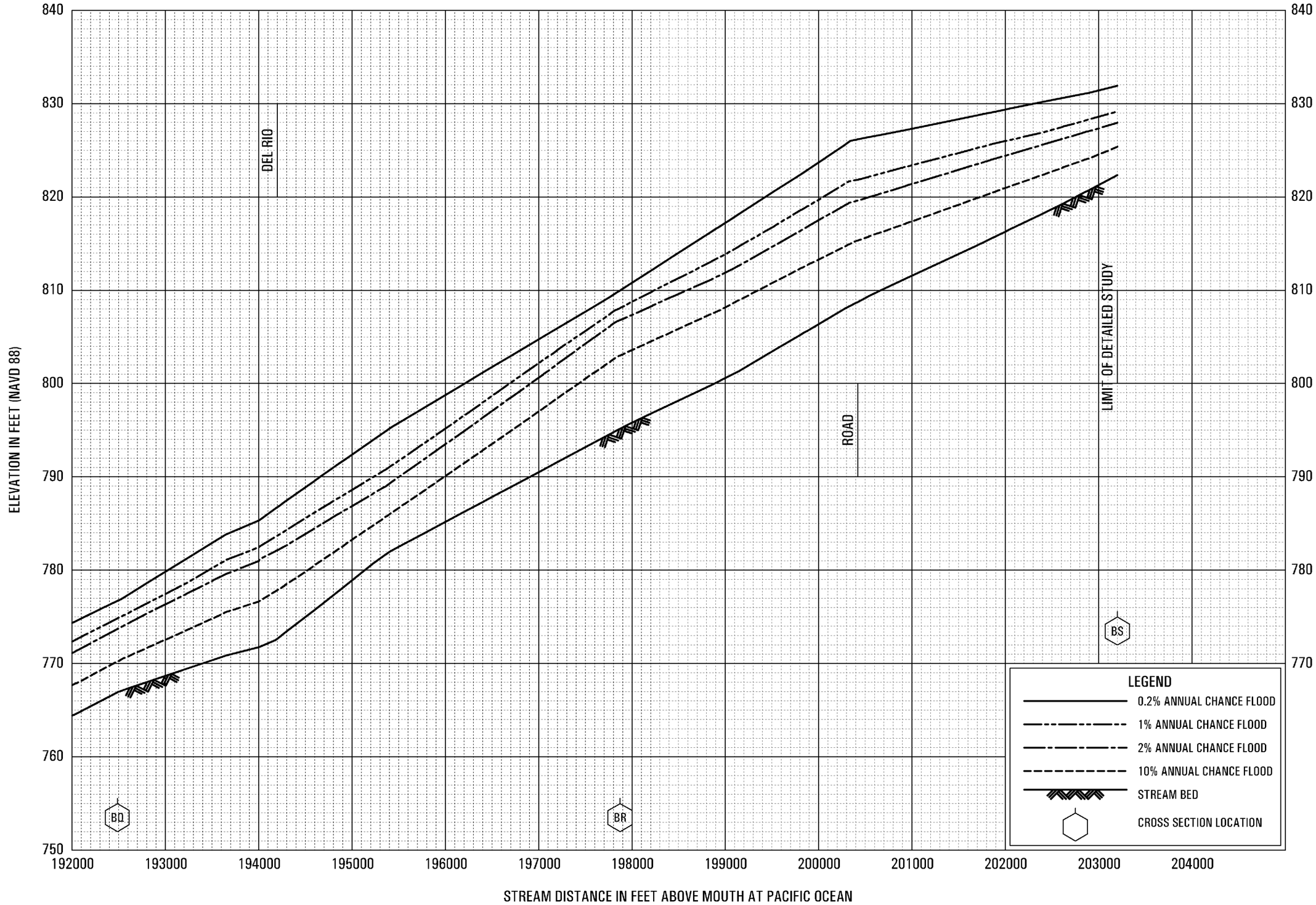
FLOOD PROFILES

SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

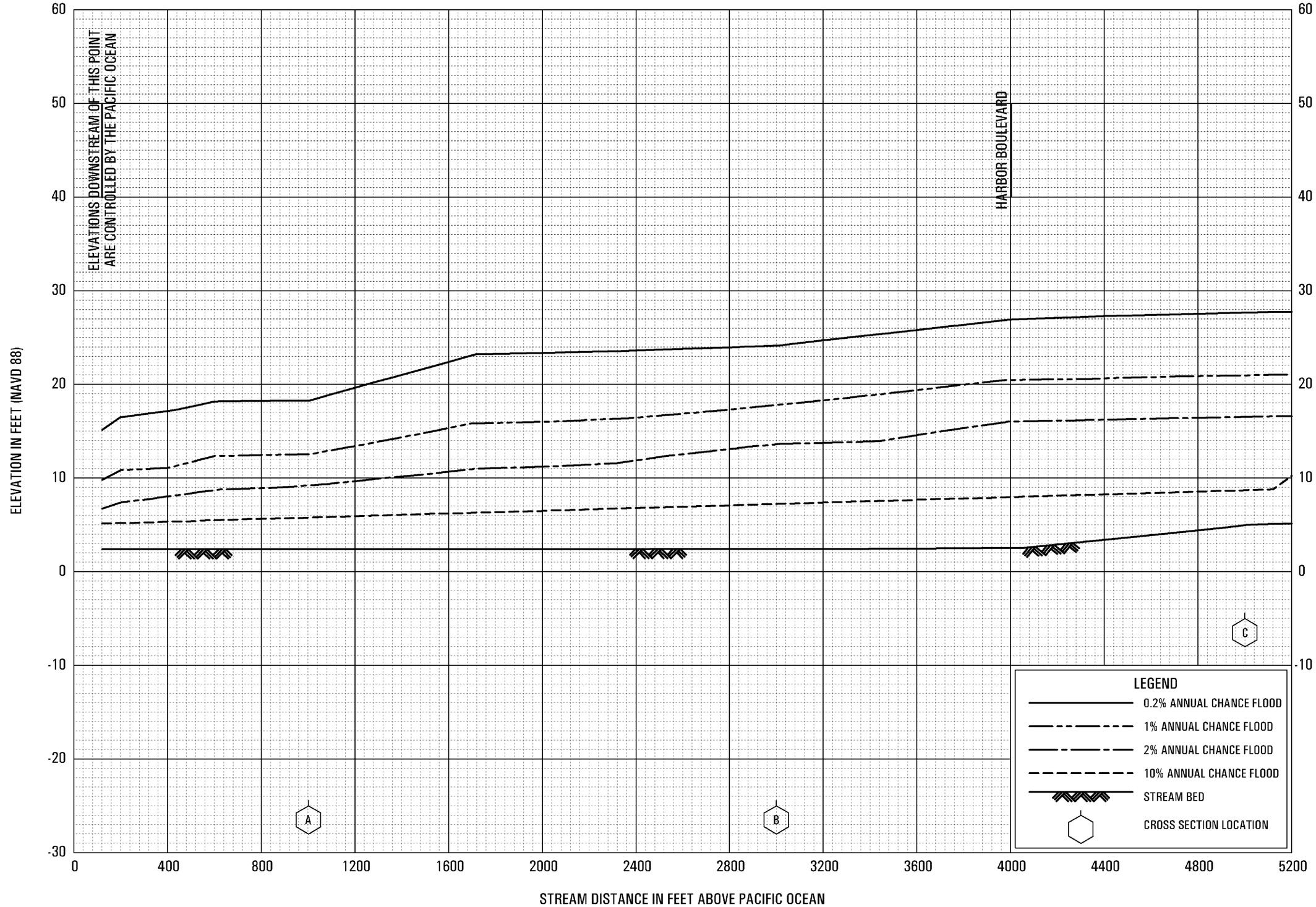
SANTA CLARA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

136P



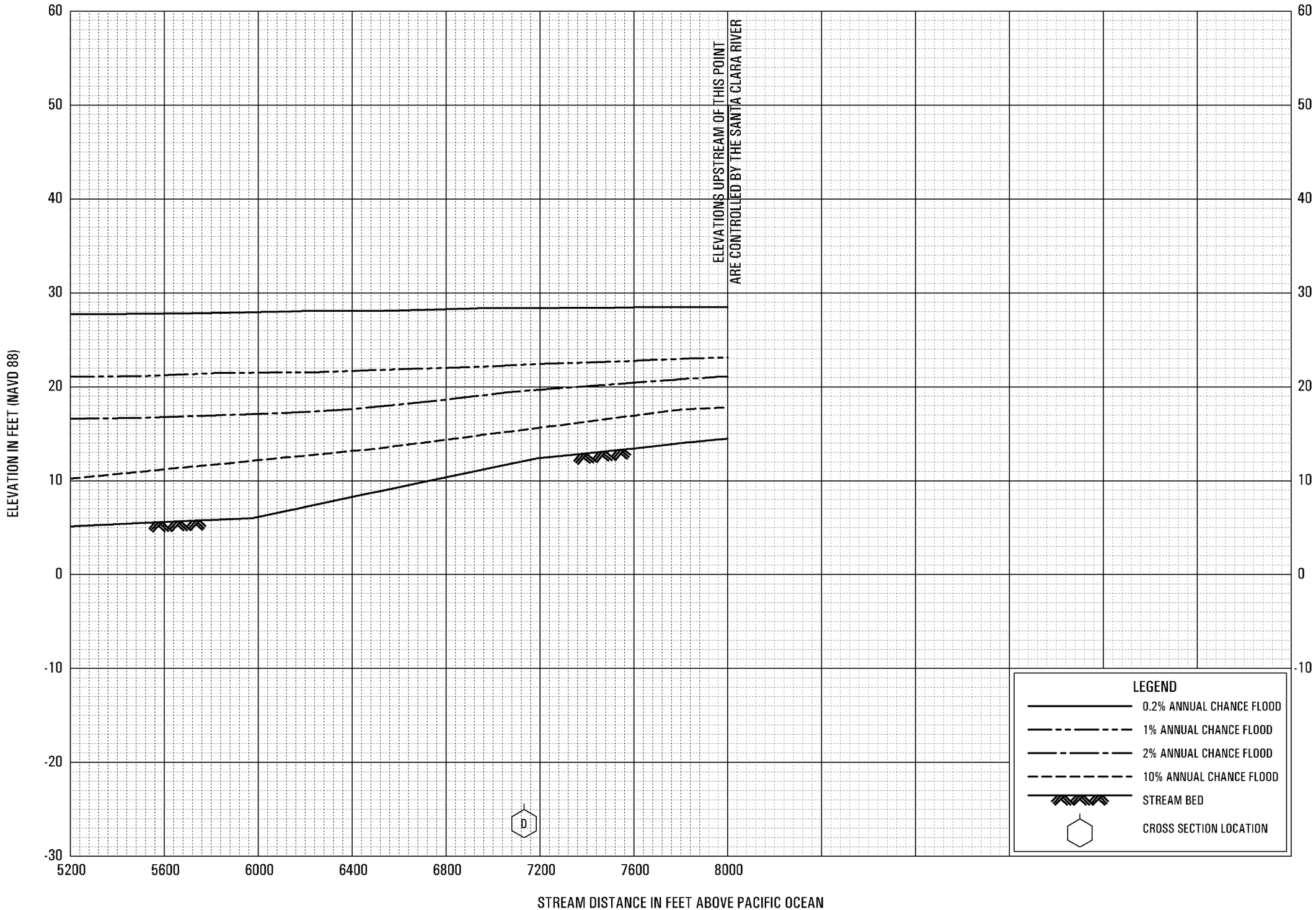
FLOOD PROFILES

SANTA CLARA RIVER BREAKOUT

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

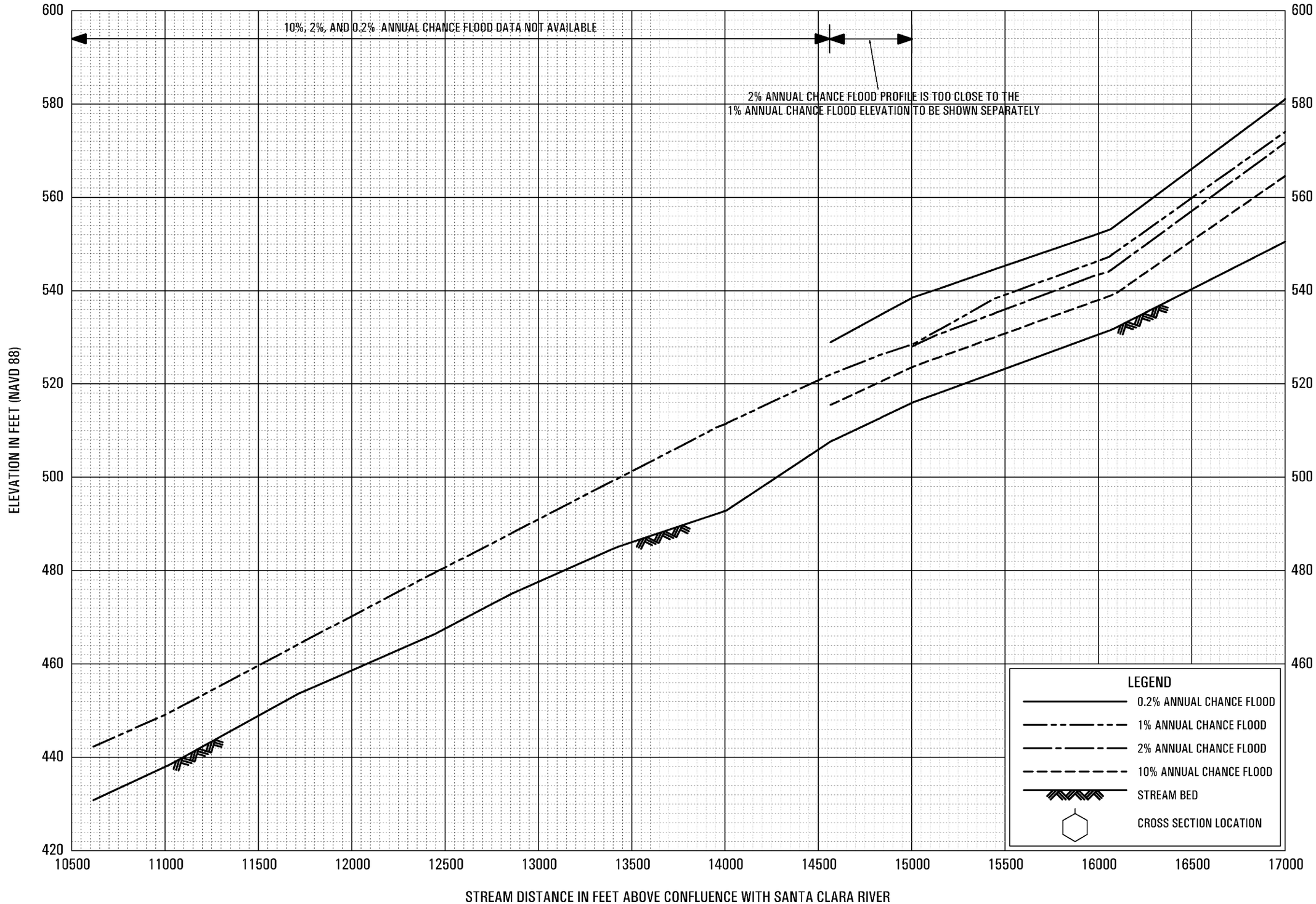
SANTA CLARA RIVER BREAKOUT

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

138P



FLOOD PROFILES

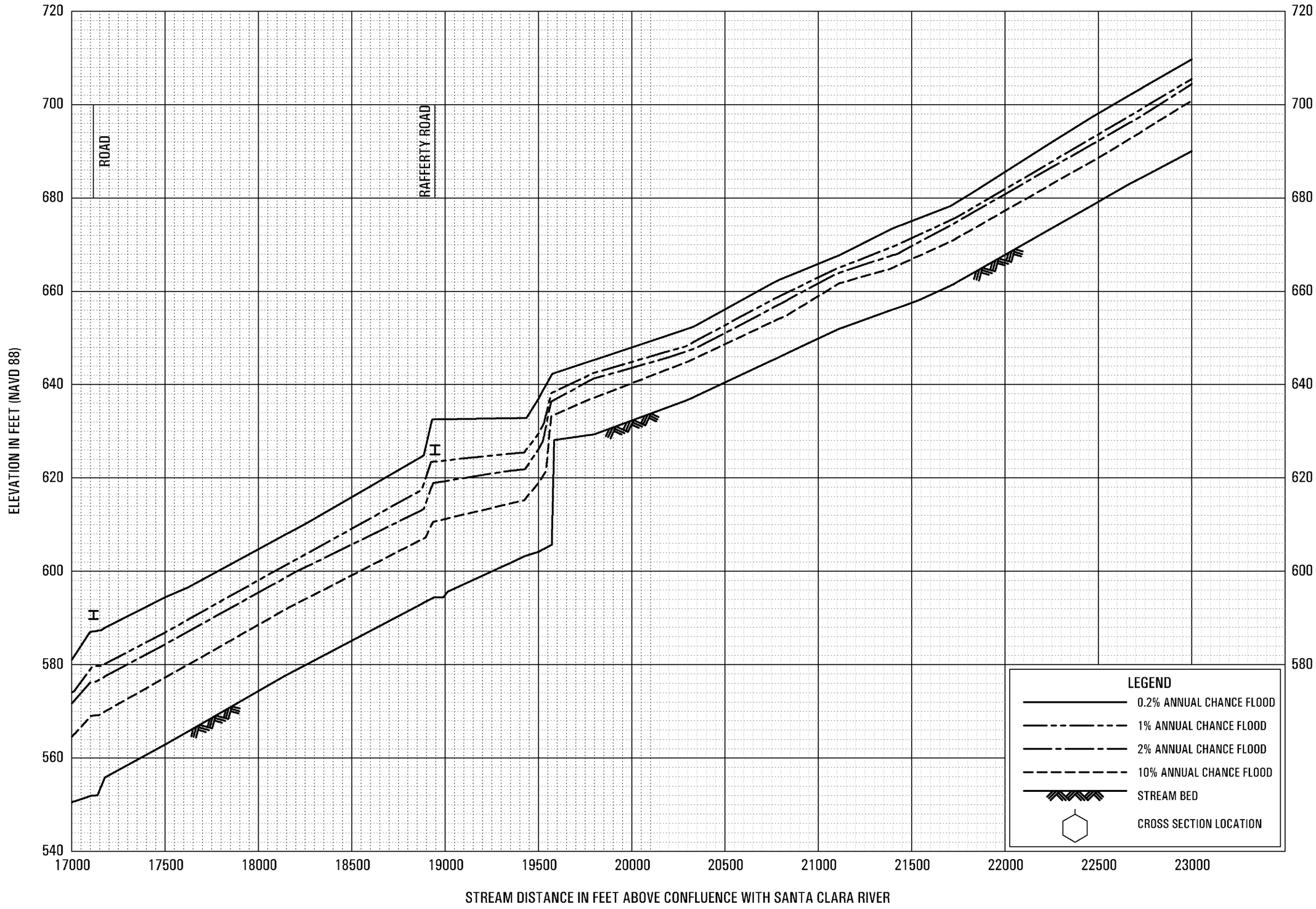
SANTA PAULA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

139P



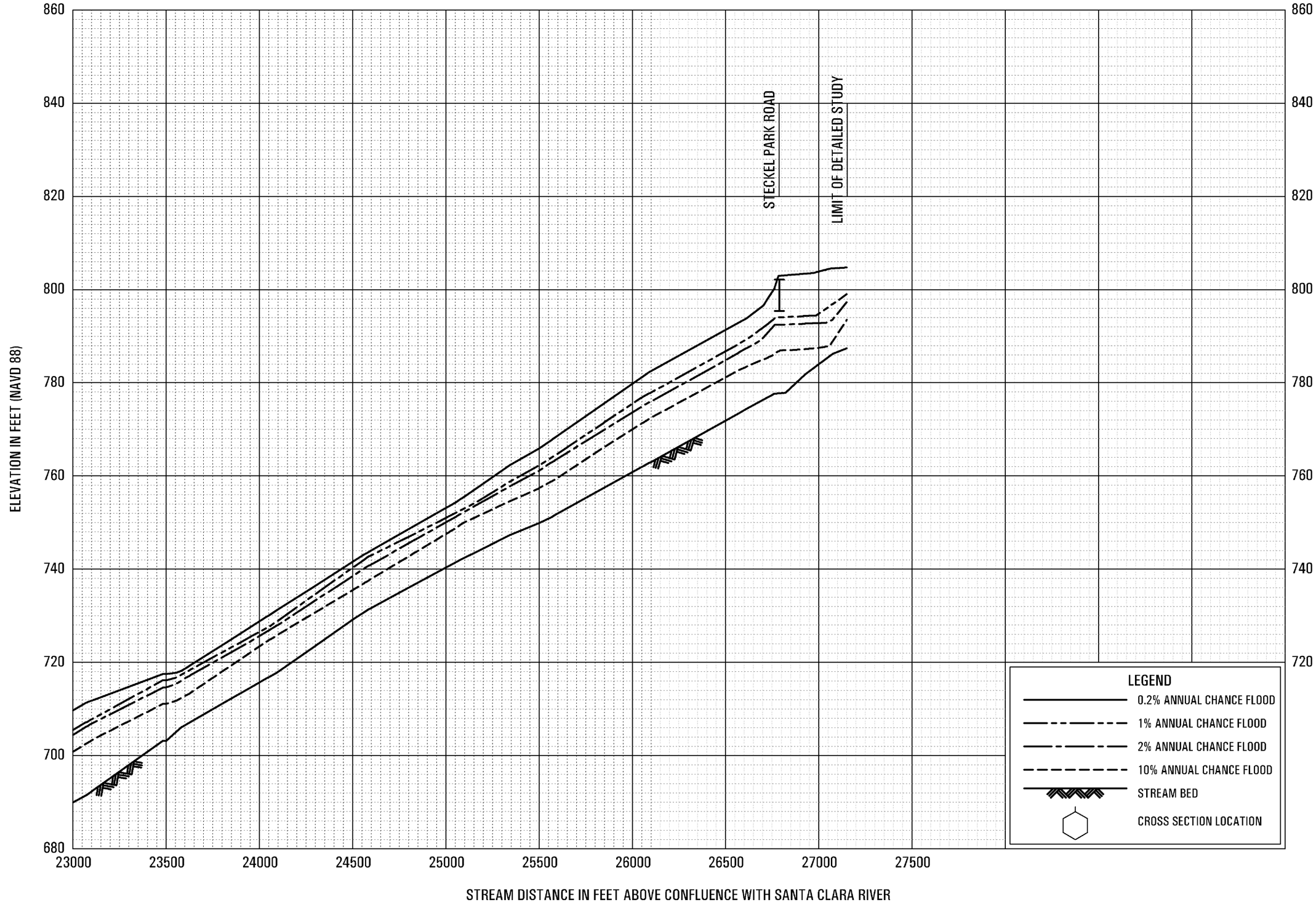
FLOOD PROFILES

SANTA PAULA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



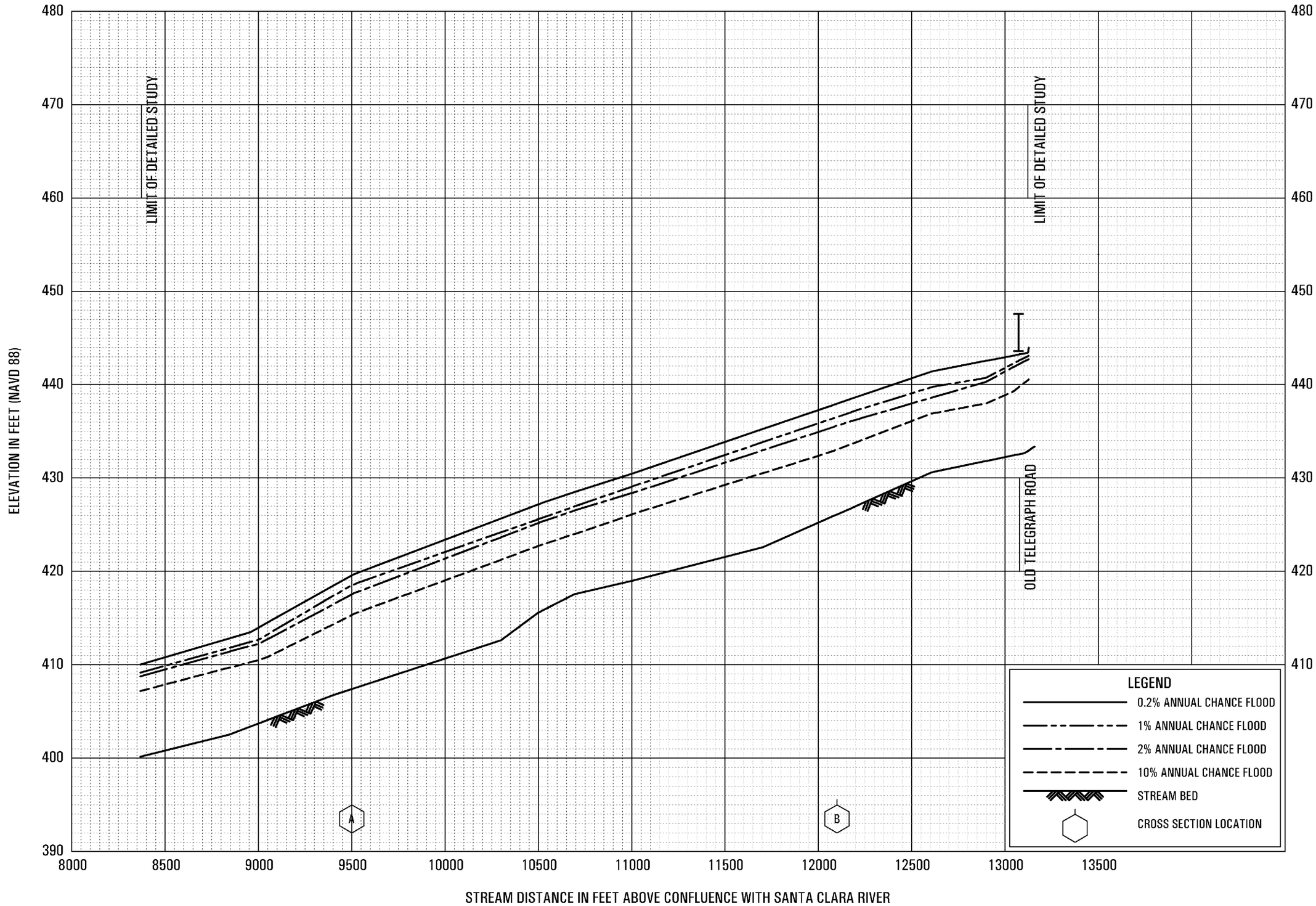
FLOOD PROFILES

SANTA PAULA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



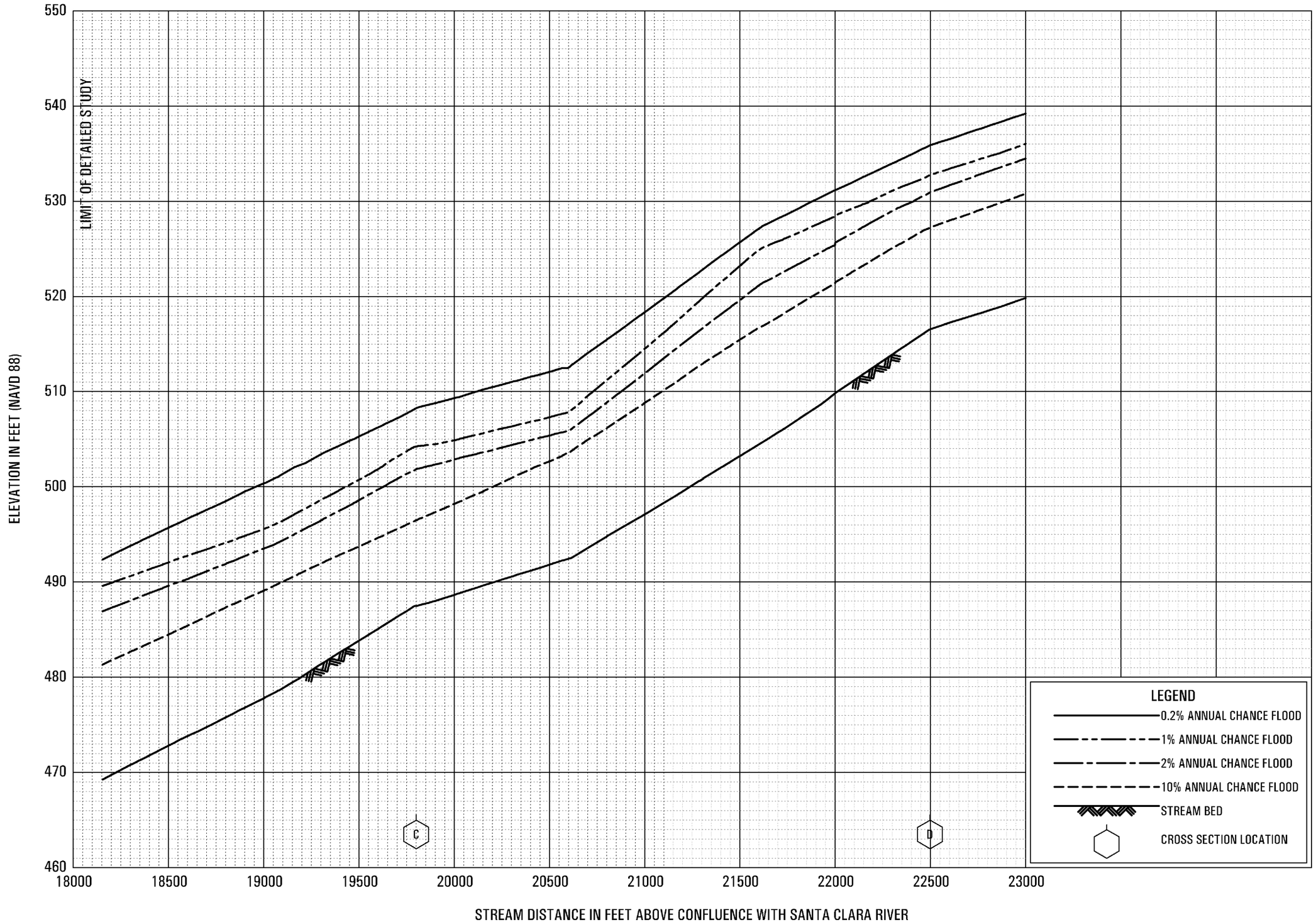
FLOOD PROFILES

SESPE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



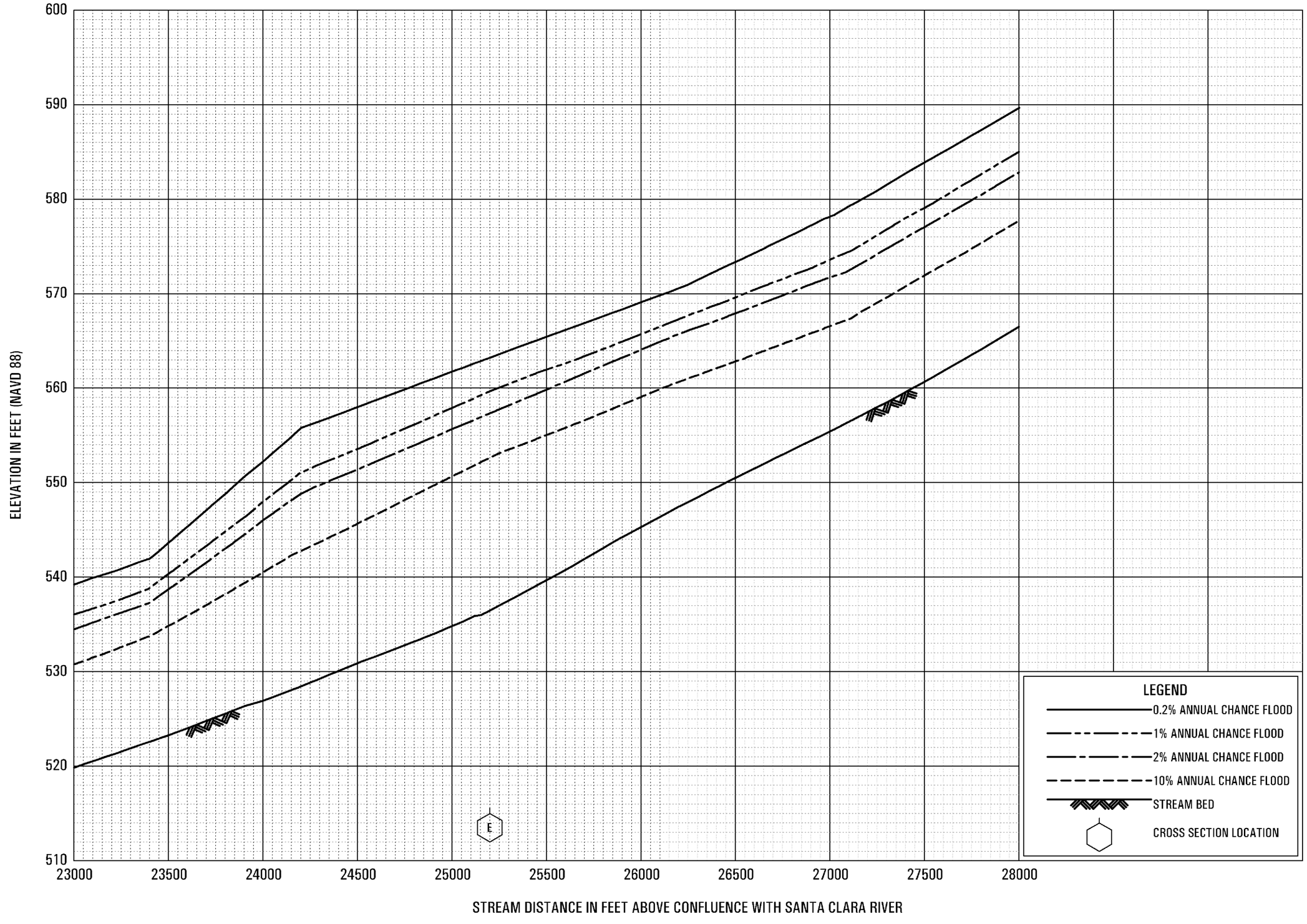
FLOOD PROFILES

SESPE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



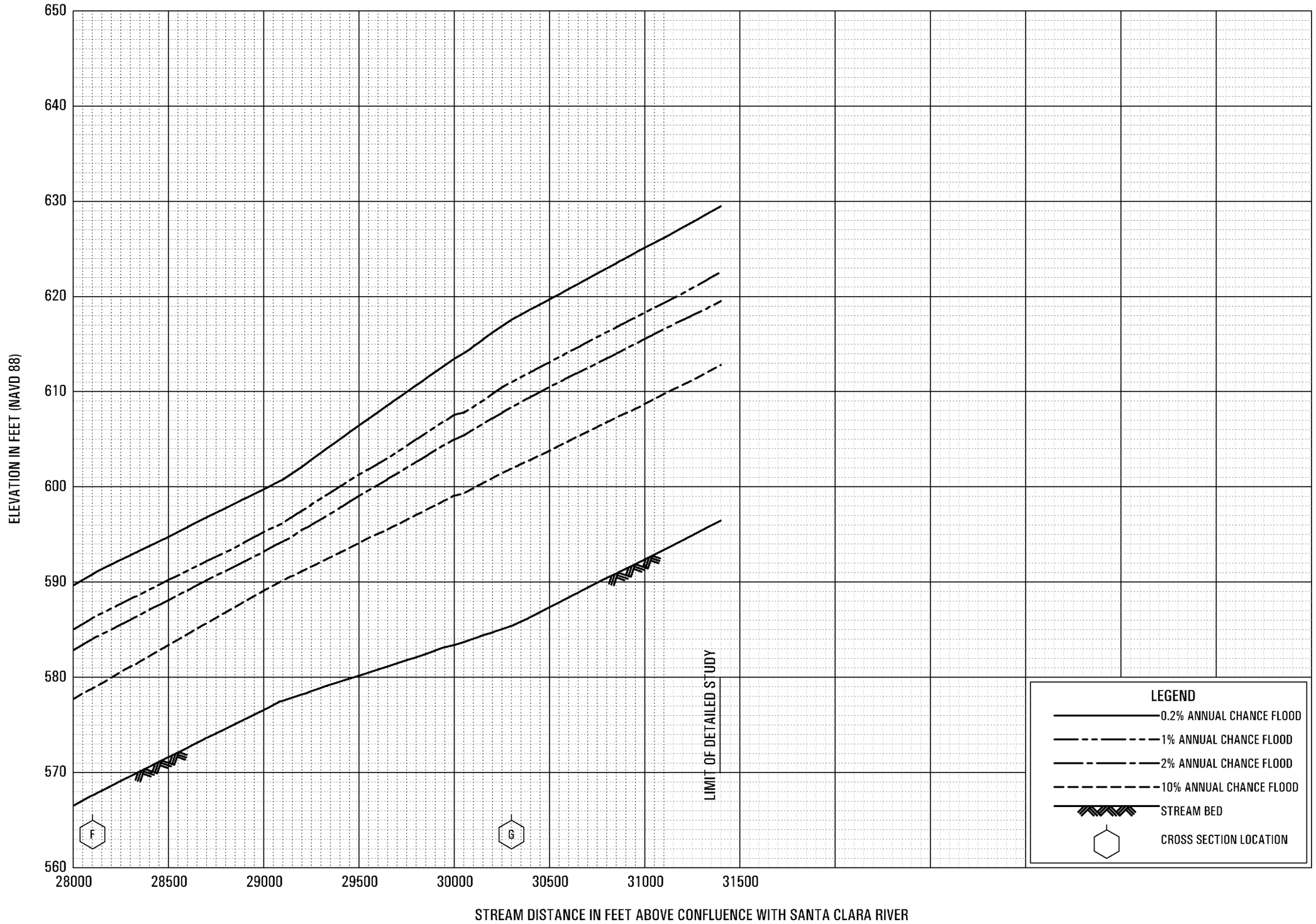
FLOOD PROFILES

SESPE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



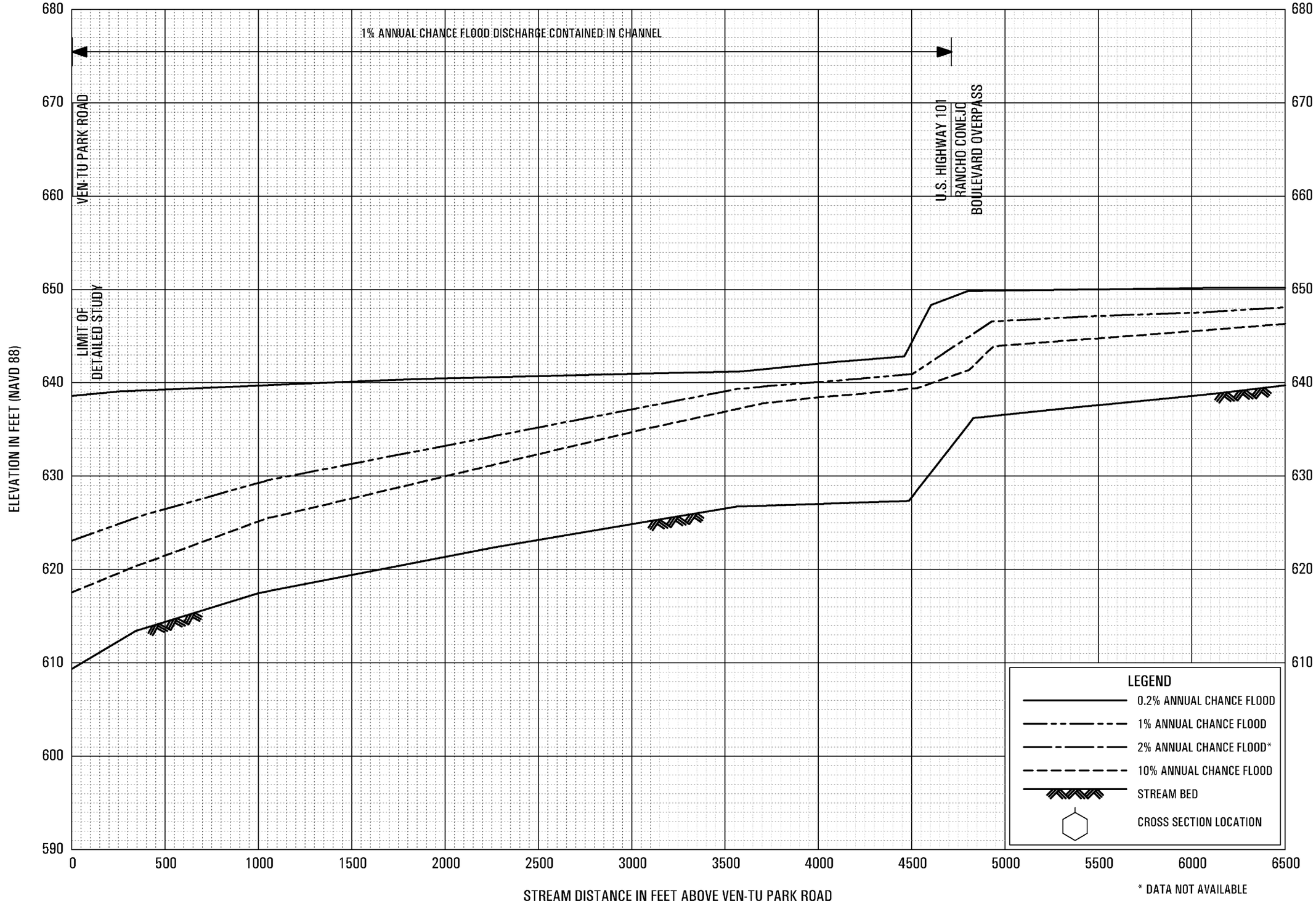
FLOOD PROFILES

SESPE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

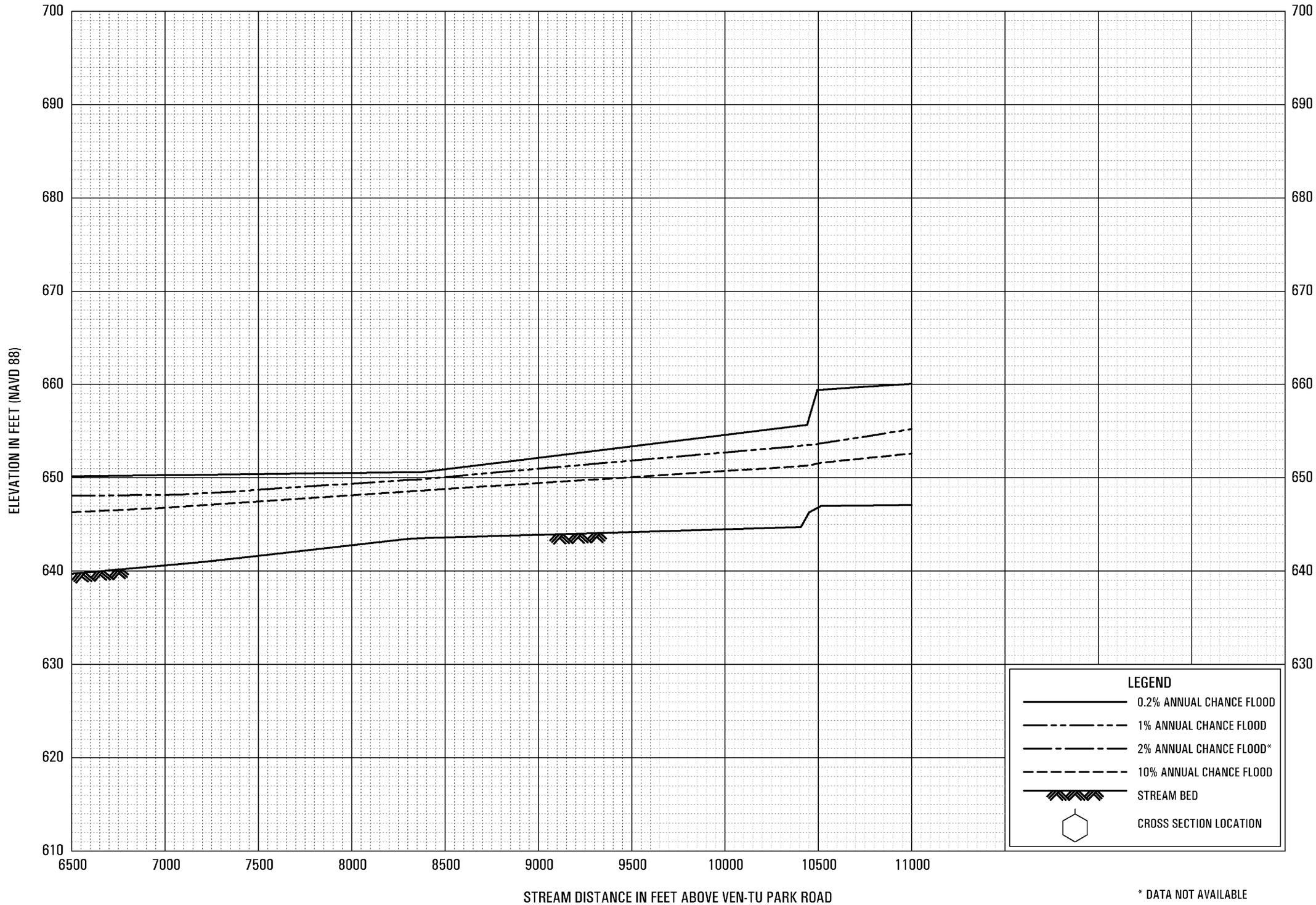
SOUTH BRANCH ARROYO CONEJO

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

146P



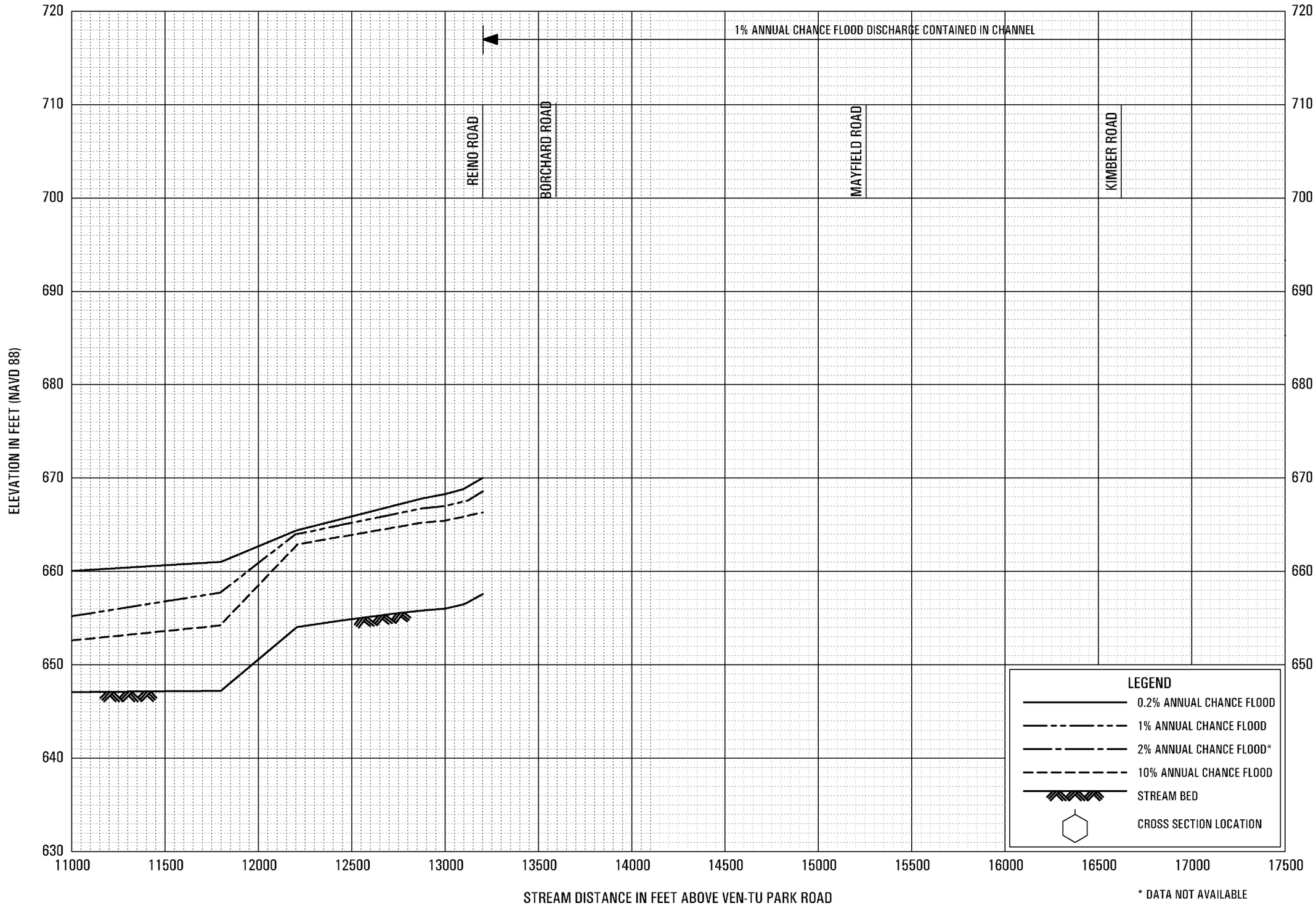
FLOOD PROFILES

SOUTH BRANCH ARROYO CONEJO

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



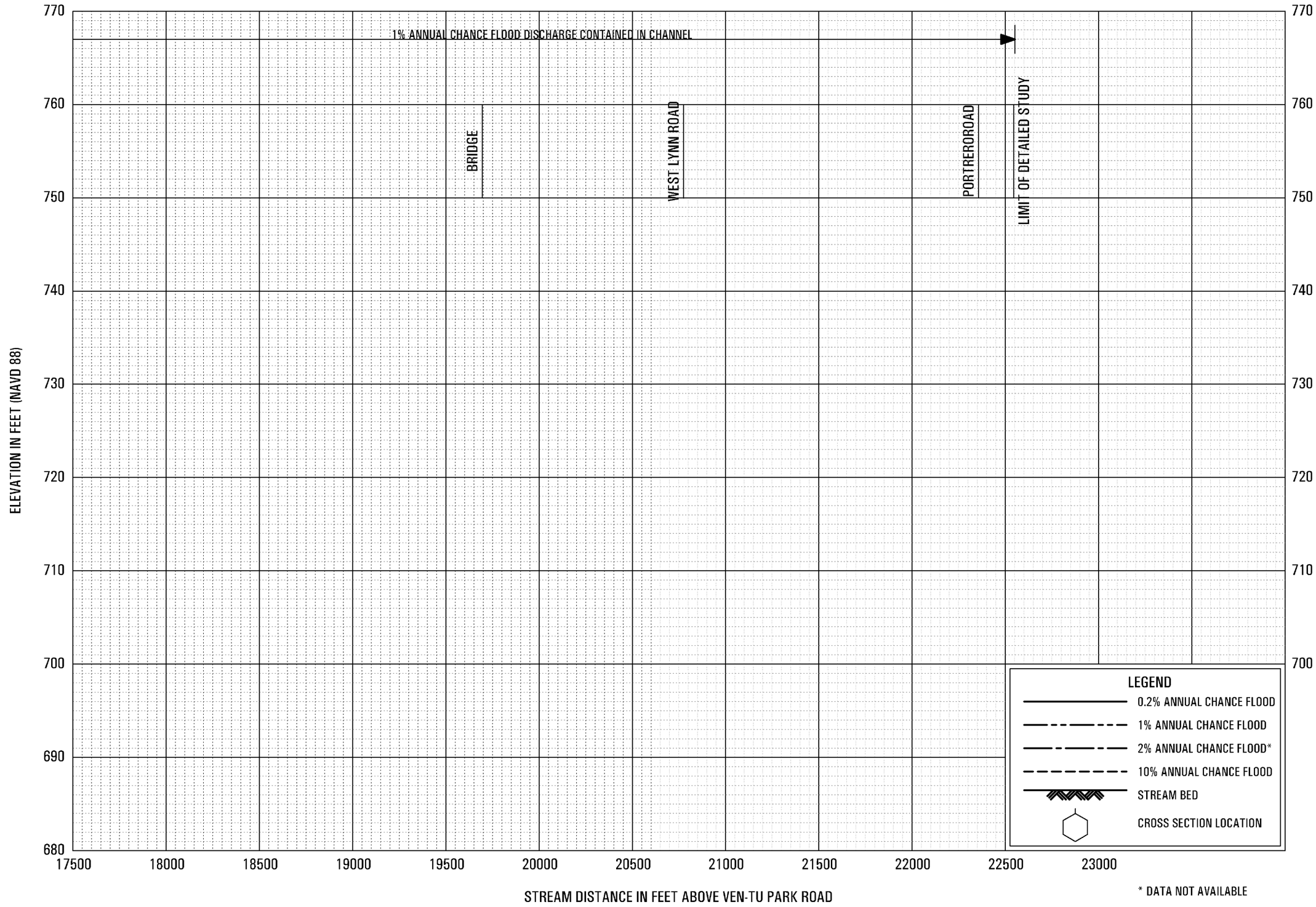
FLOOD PROFILES

SOUTH BRANCH ARROYO CONEJO

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



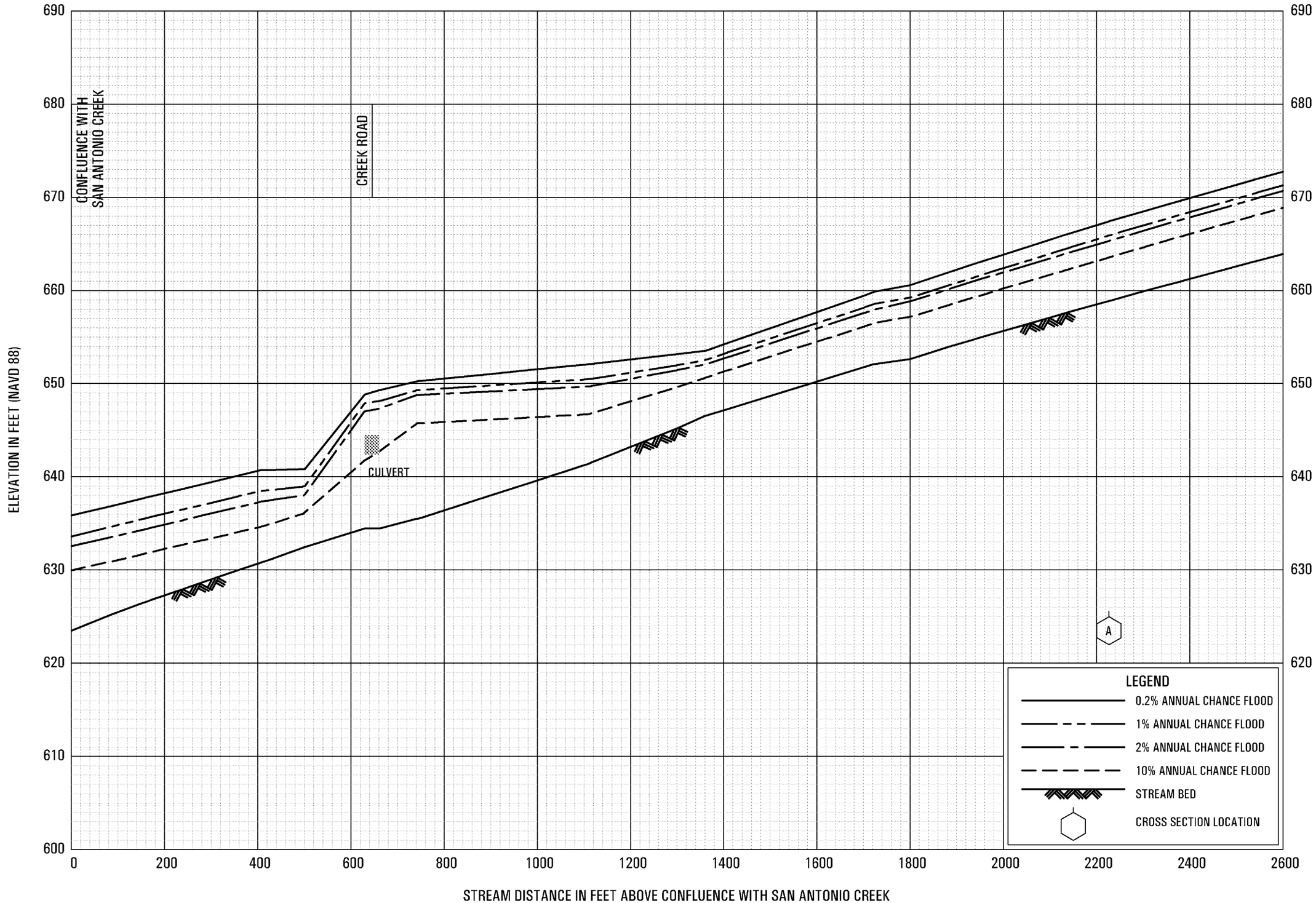
FLOOD PROFILES

SOUTH BRANCH ARROYO CONEJO

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

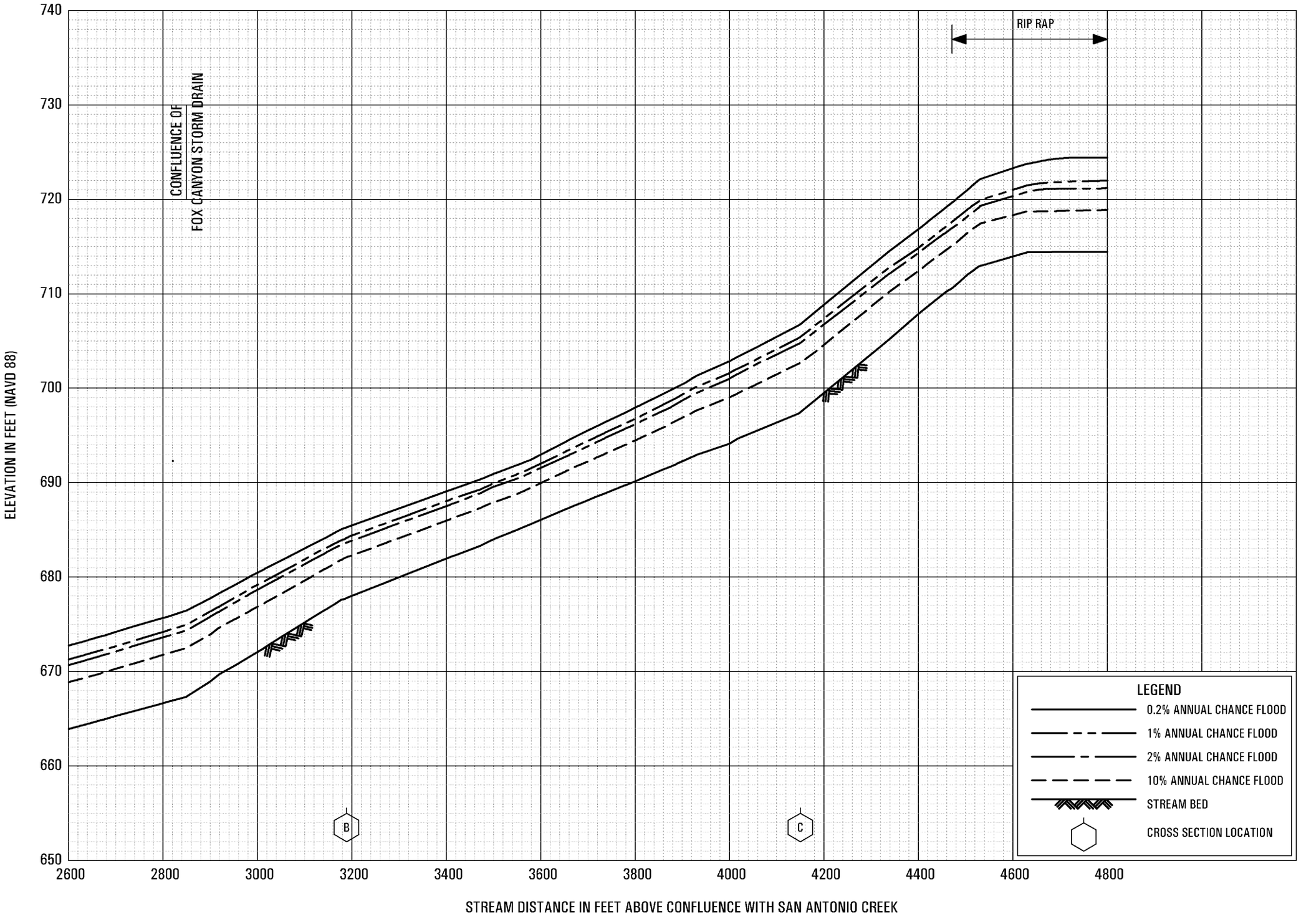
STEWART CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

150P



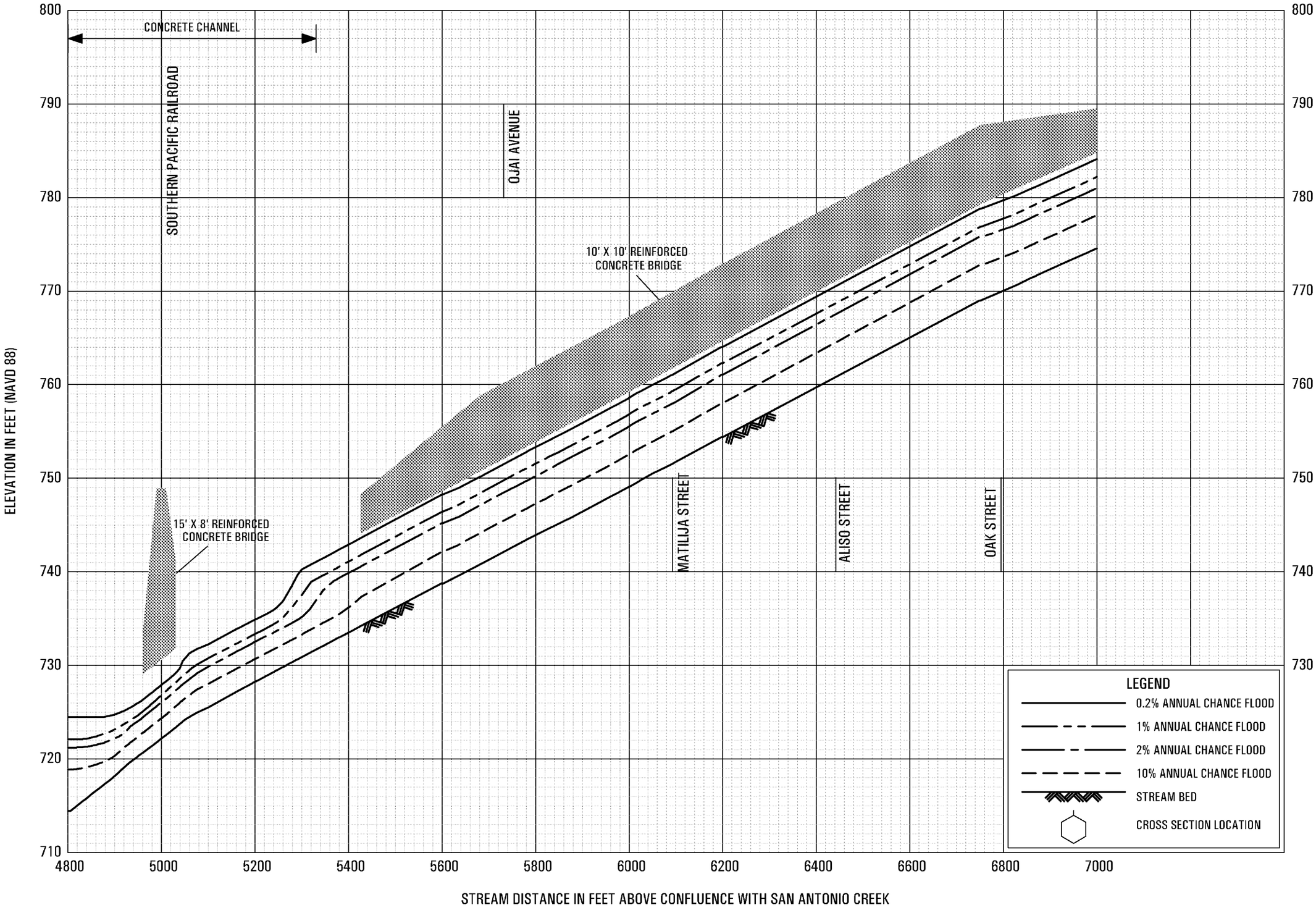
FLOOD PROFILES

STEWART CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



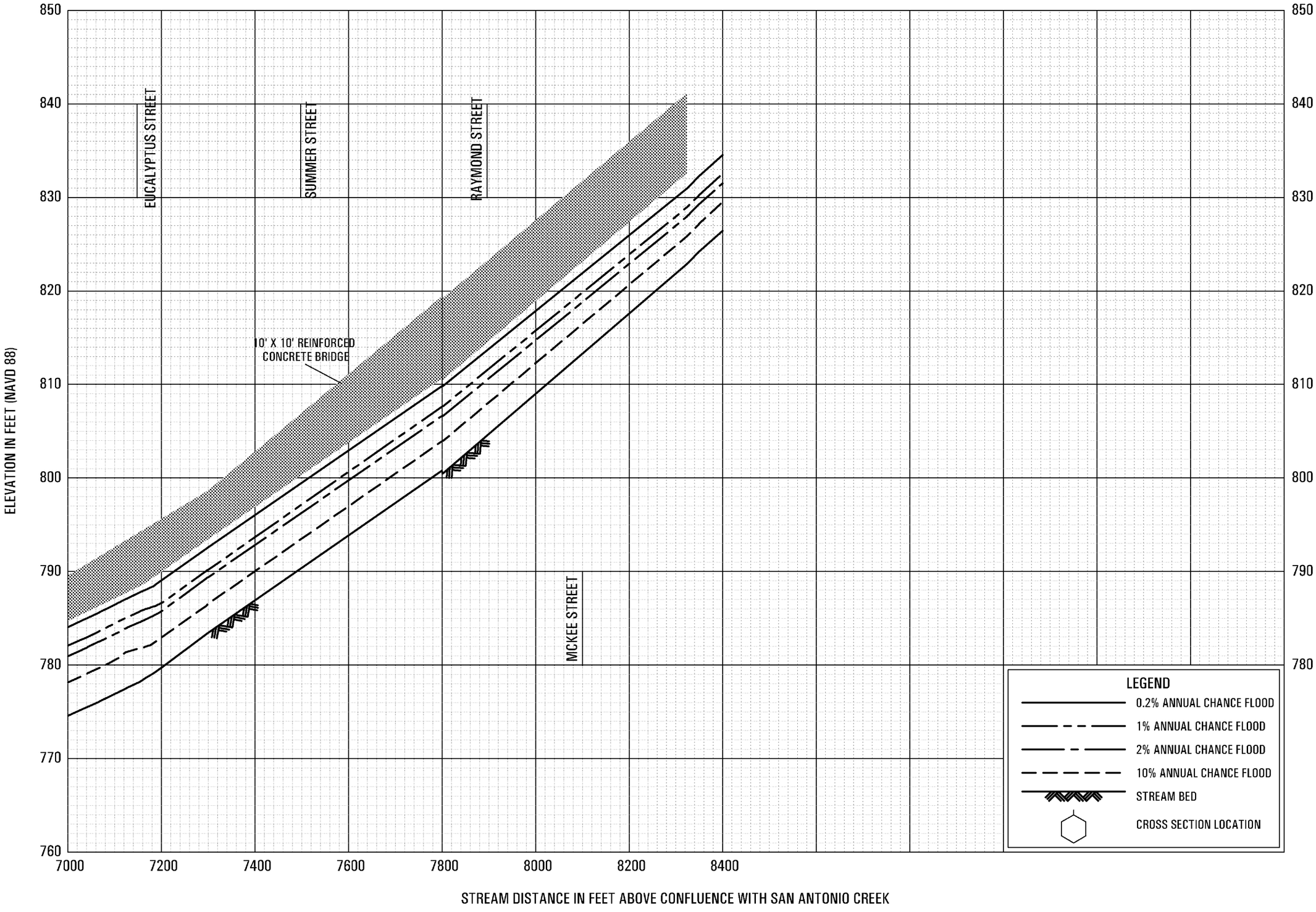
FLOOD PROFILES

STEWART CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



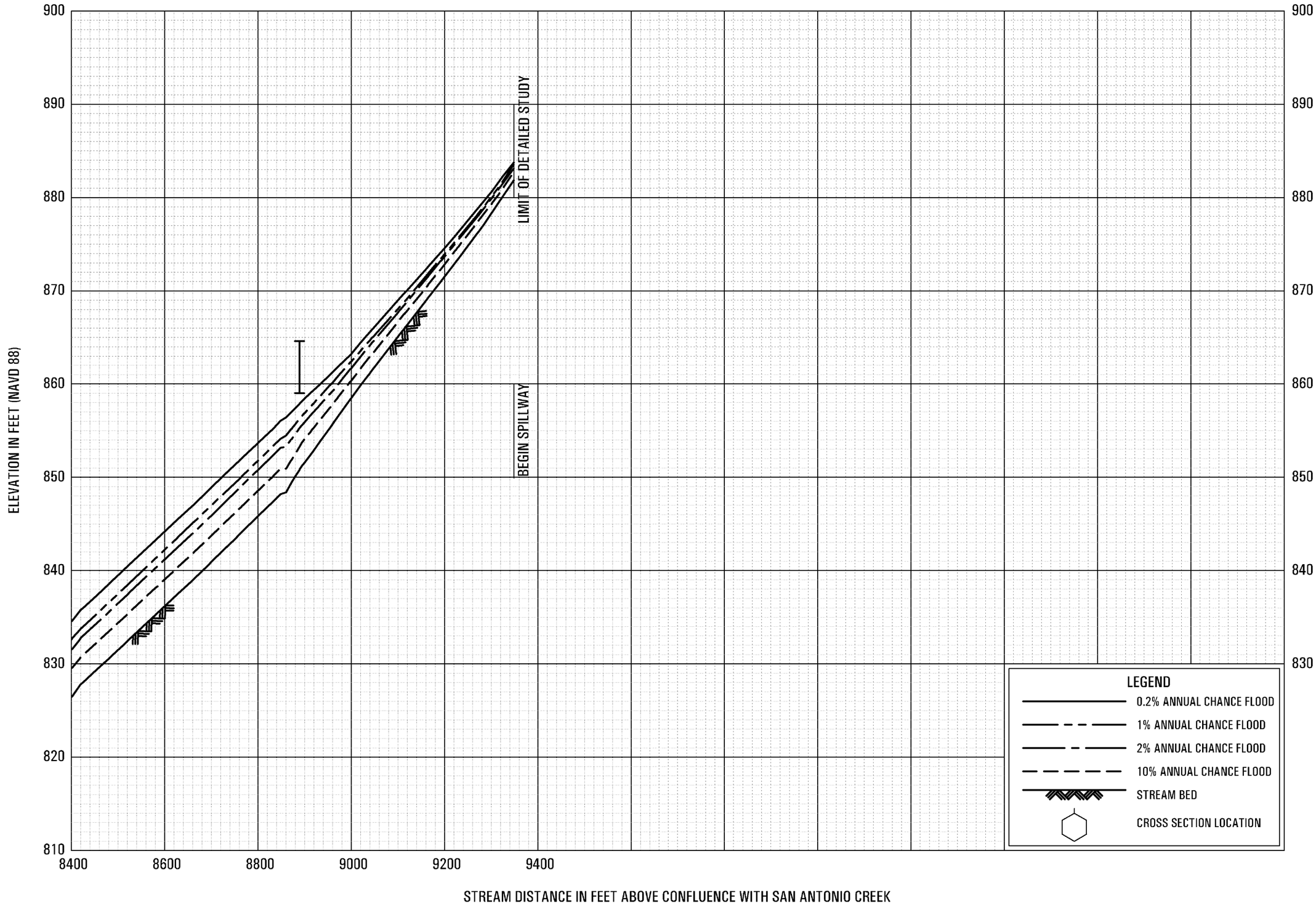
FLOOD PROFILES

STEWART CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



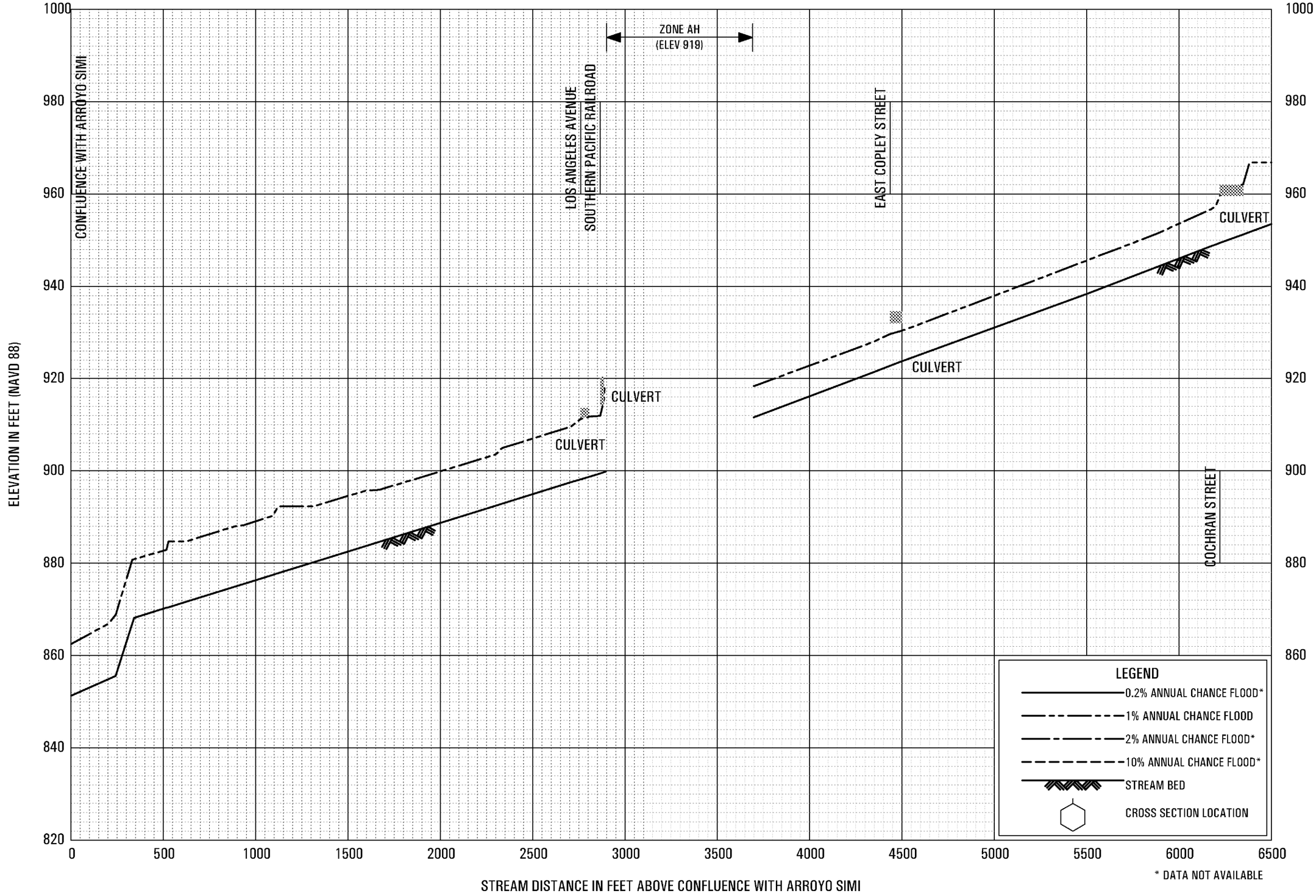
FLOOD PROFILES

STEWART CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

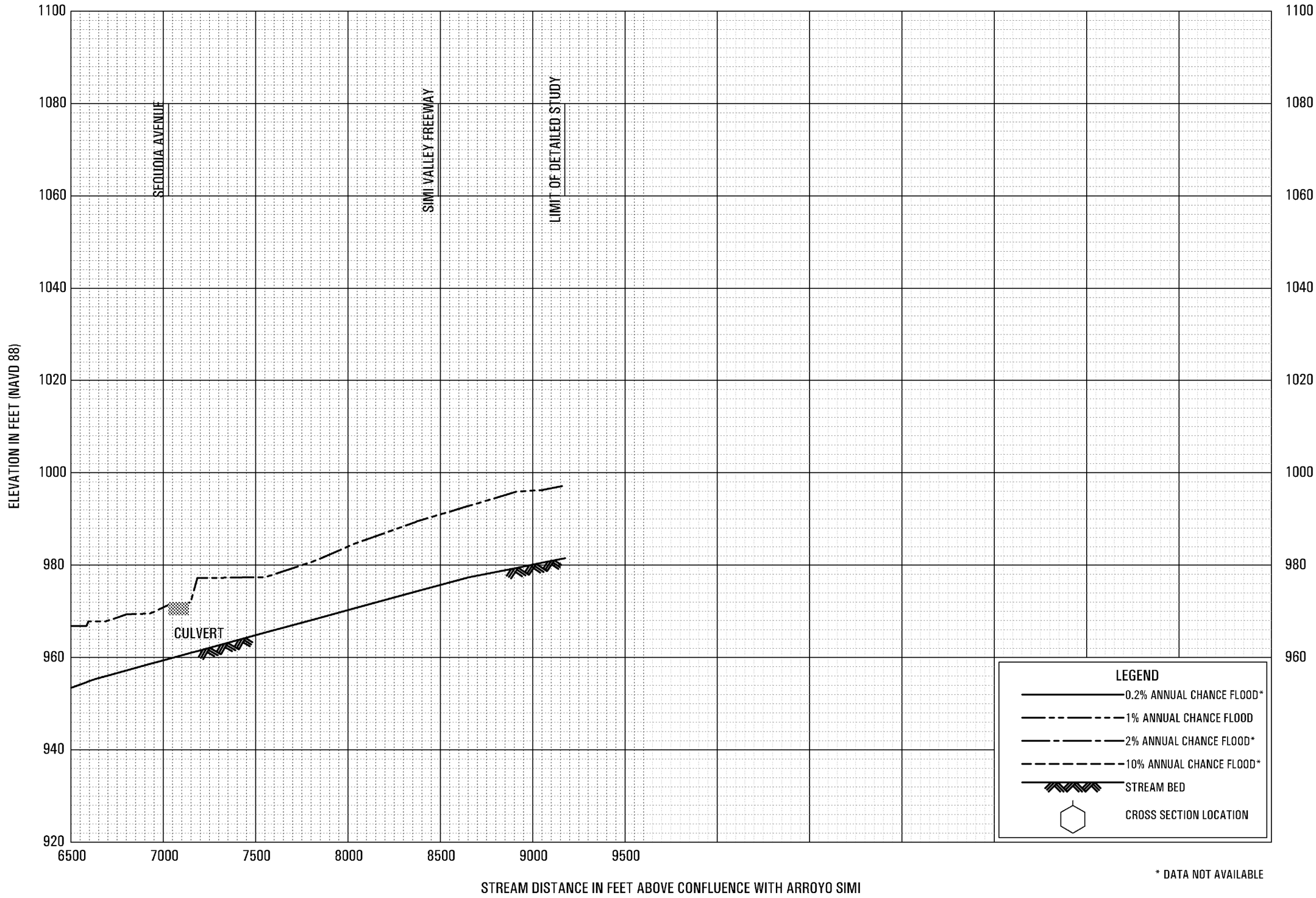
TAPO CANYON CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

155P



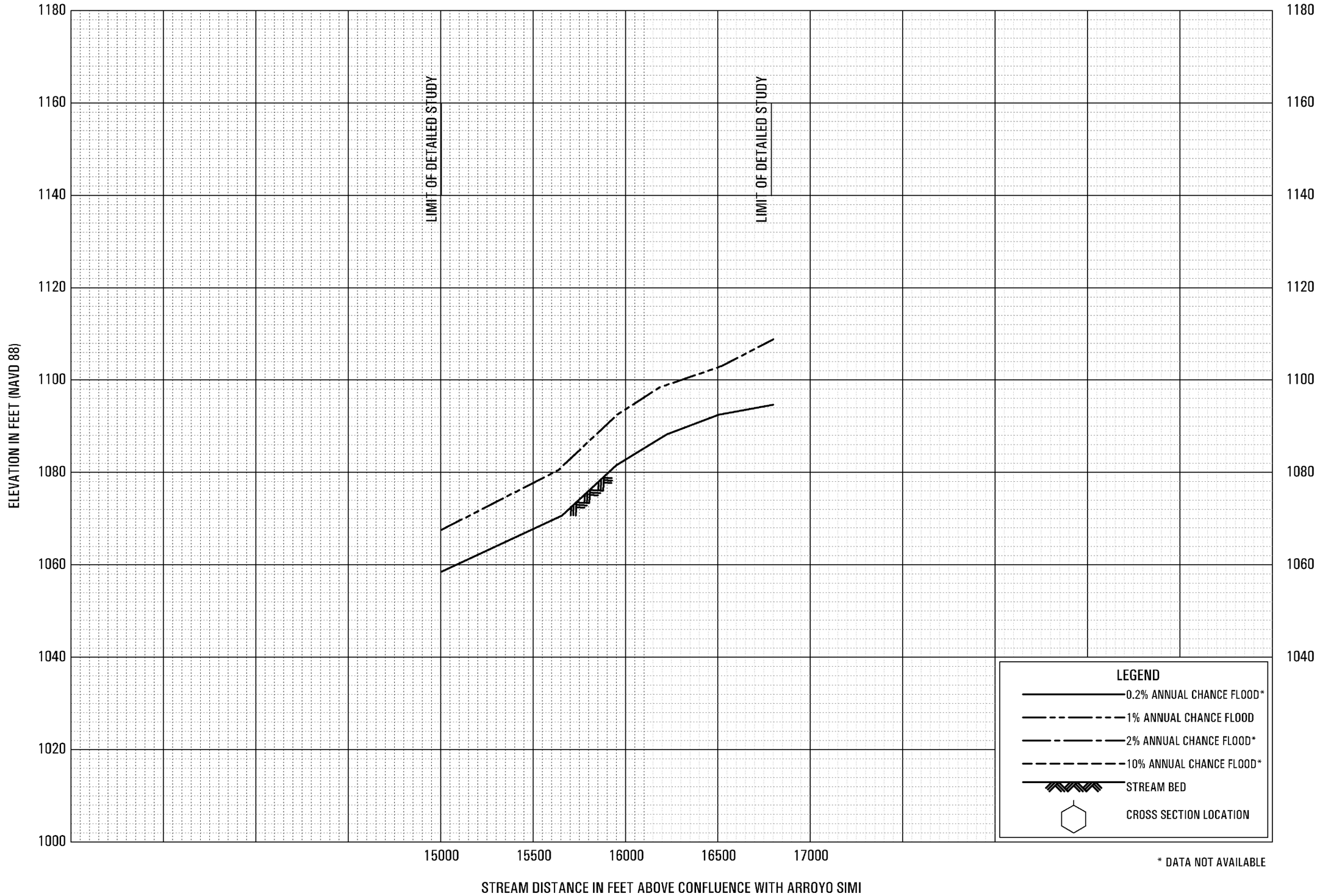
FLOOD PROFILES

TAPO CANYON CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



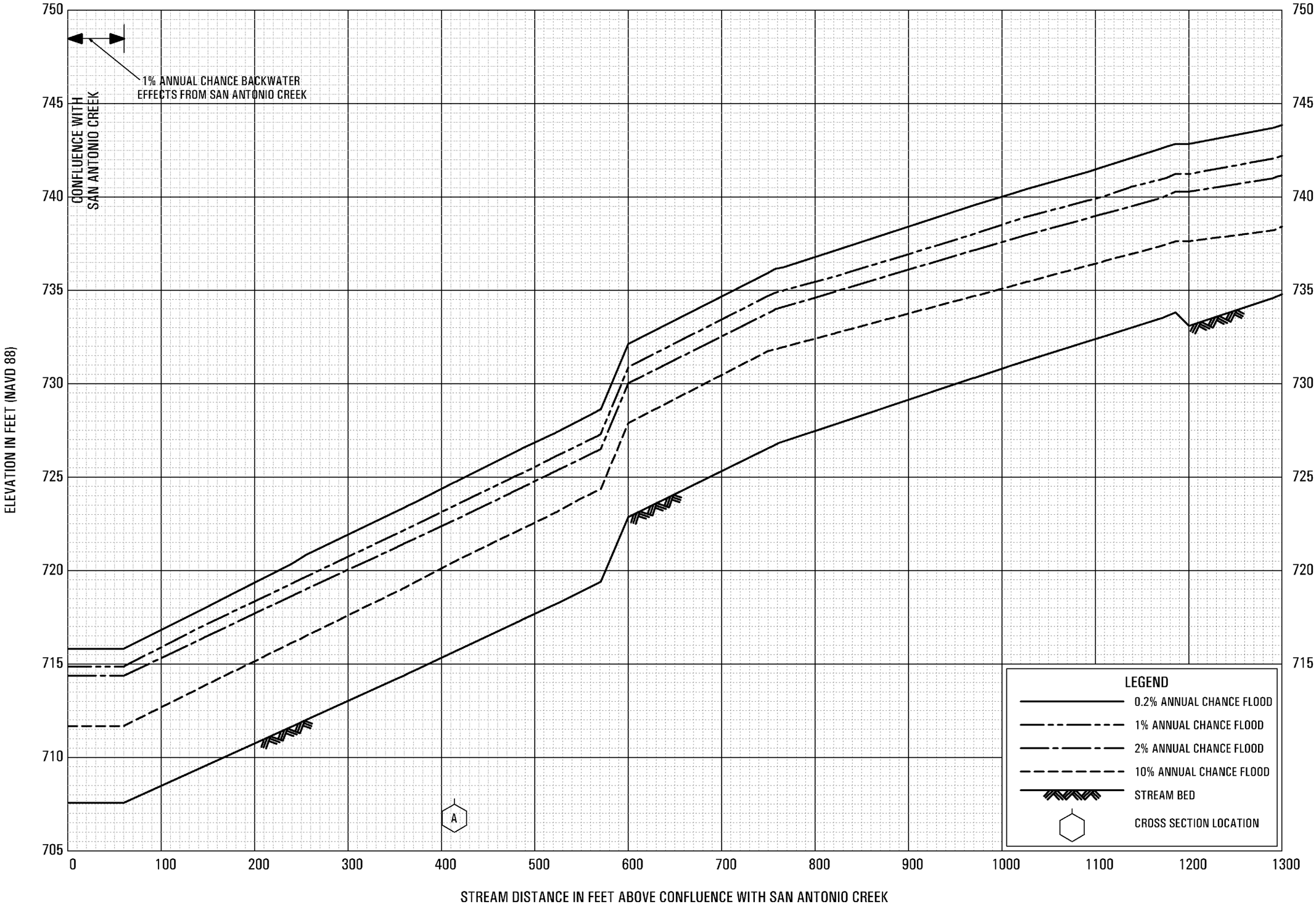
FLOOD PROFILES

TAPO CANYON CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



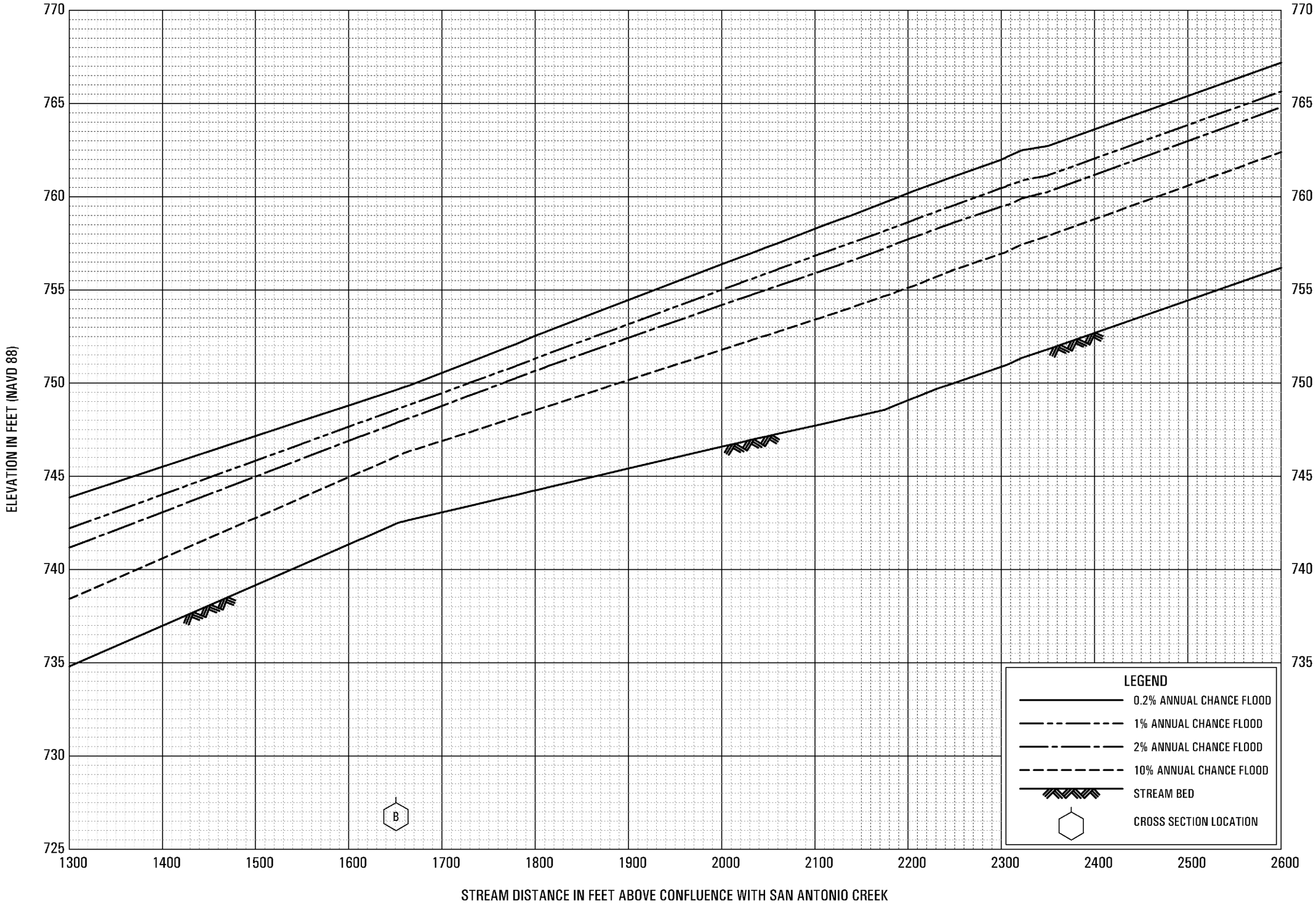
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



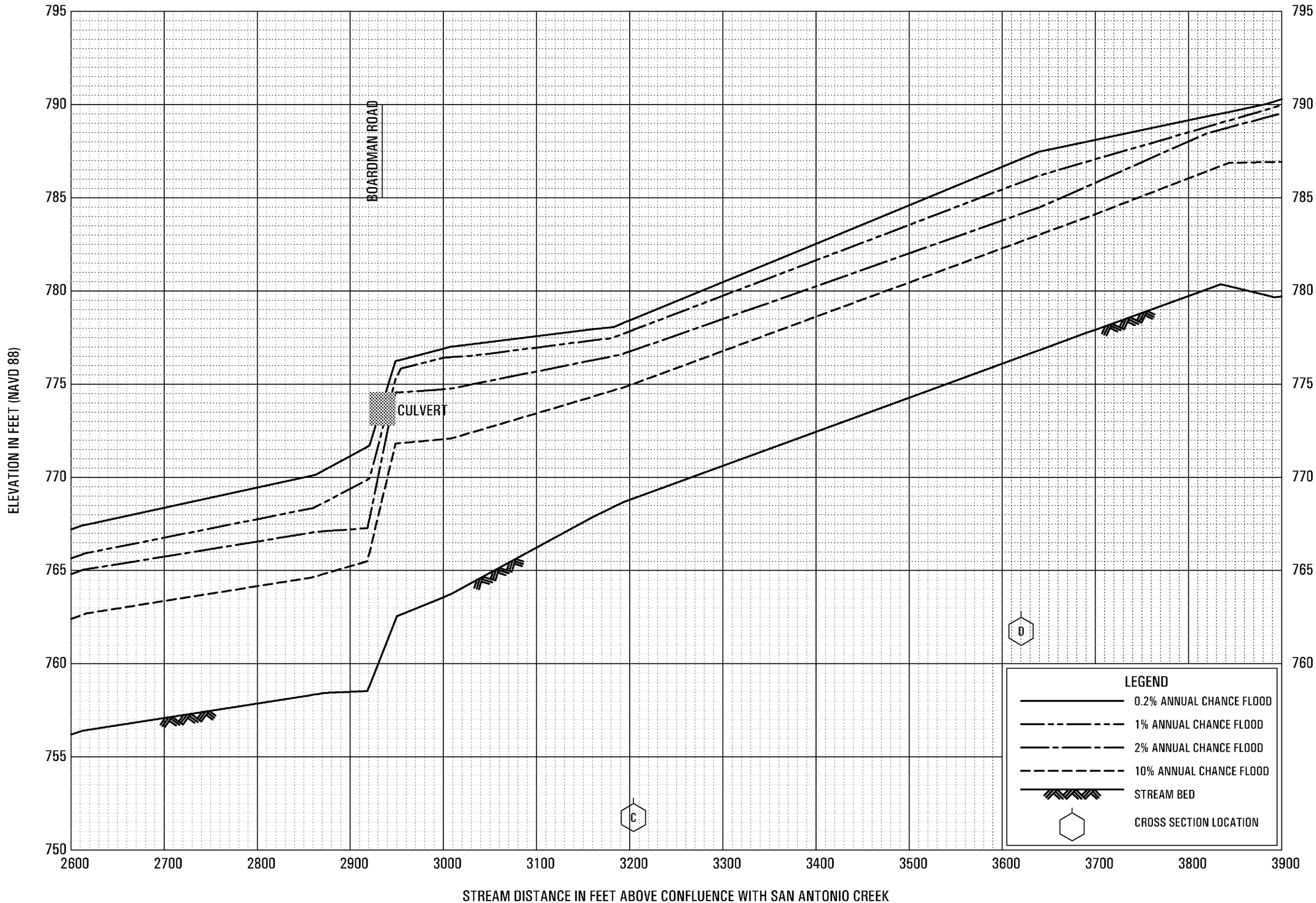
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

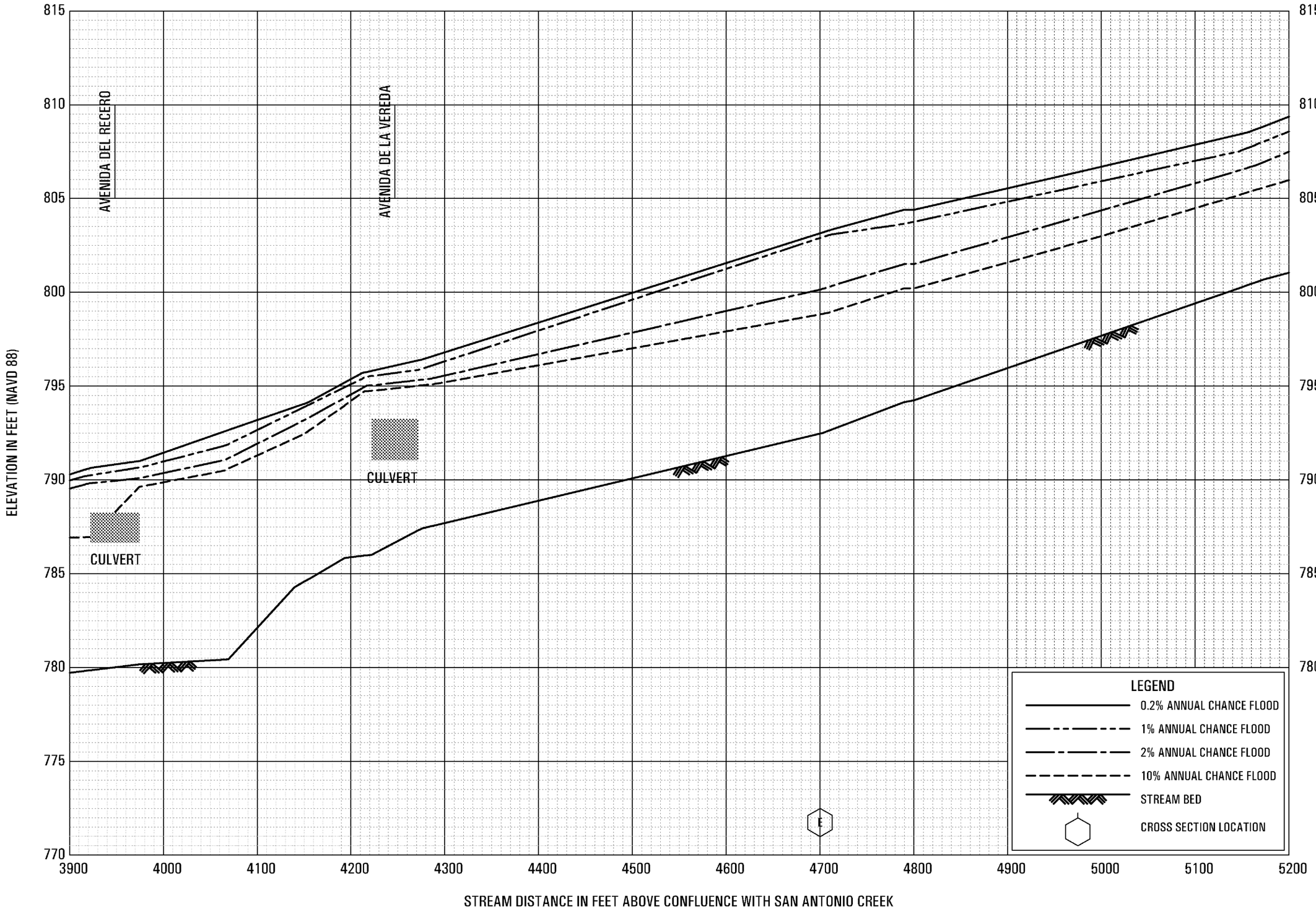
THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

160P



FLOOD PROFILES

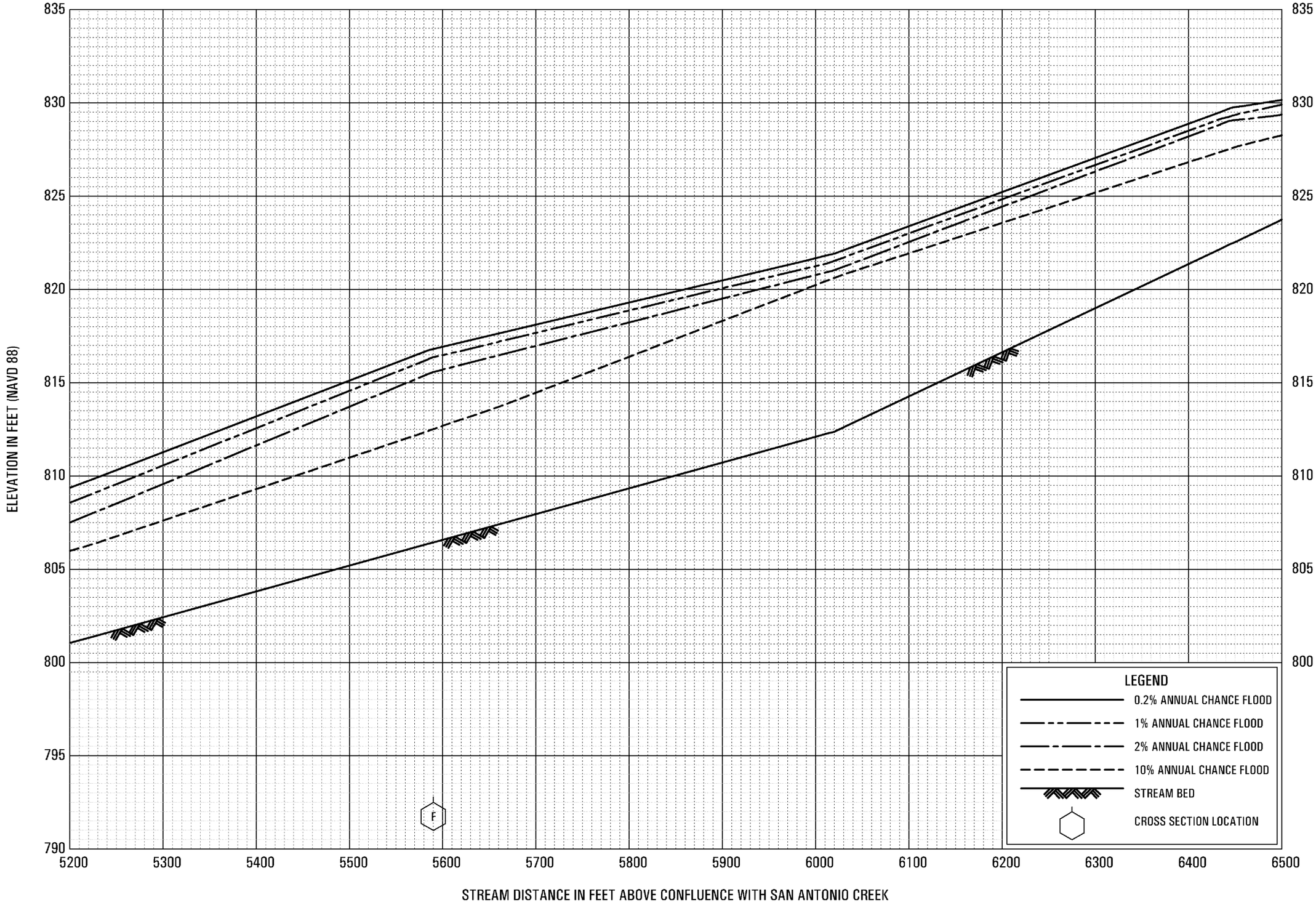
THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

161P



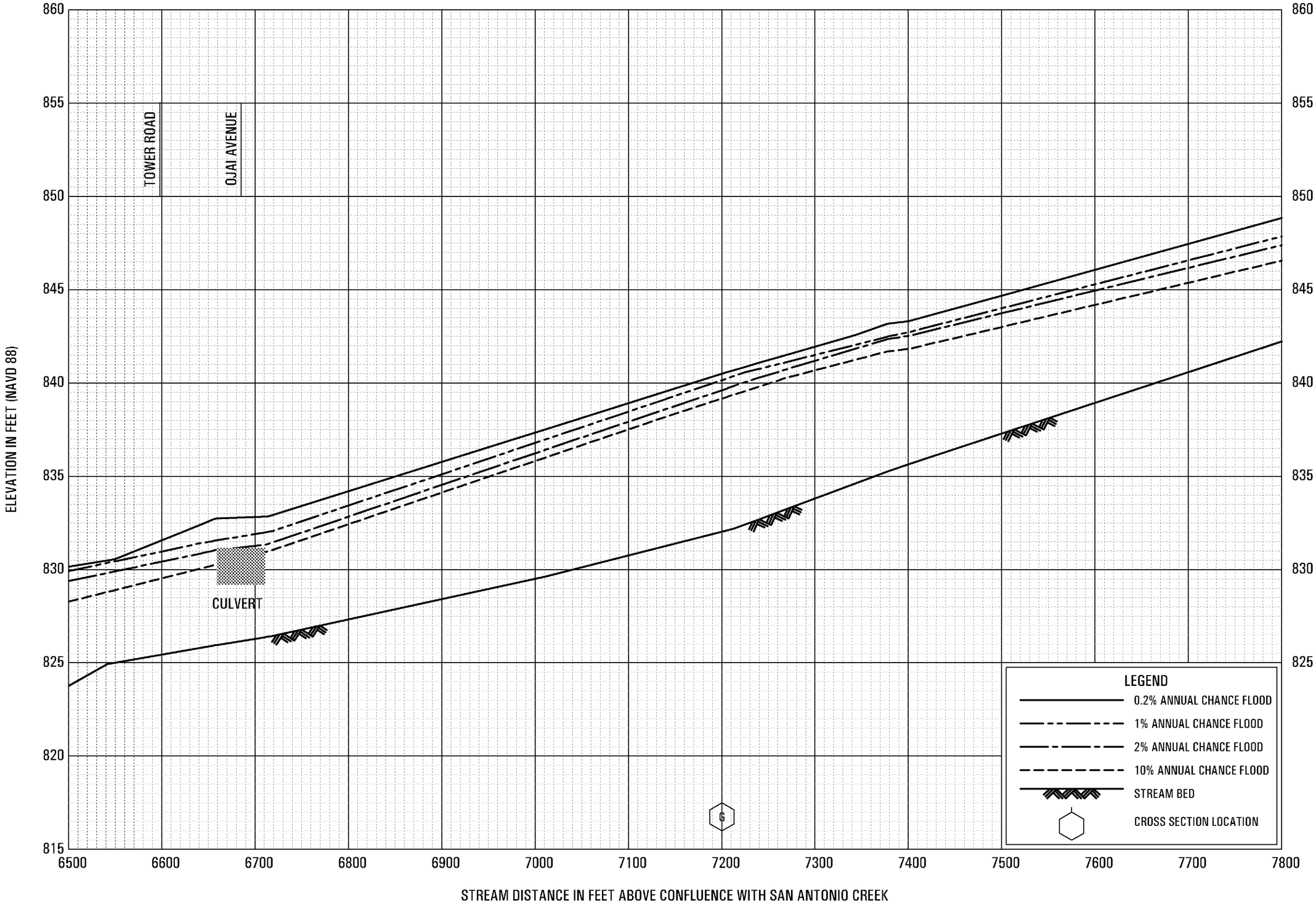
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



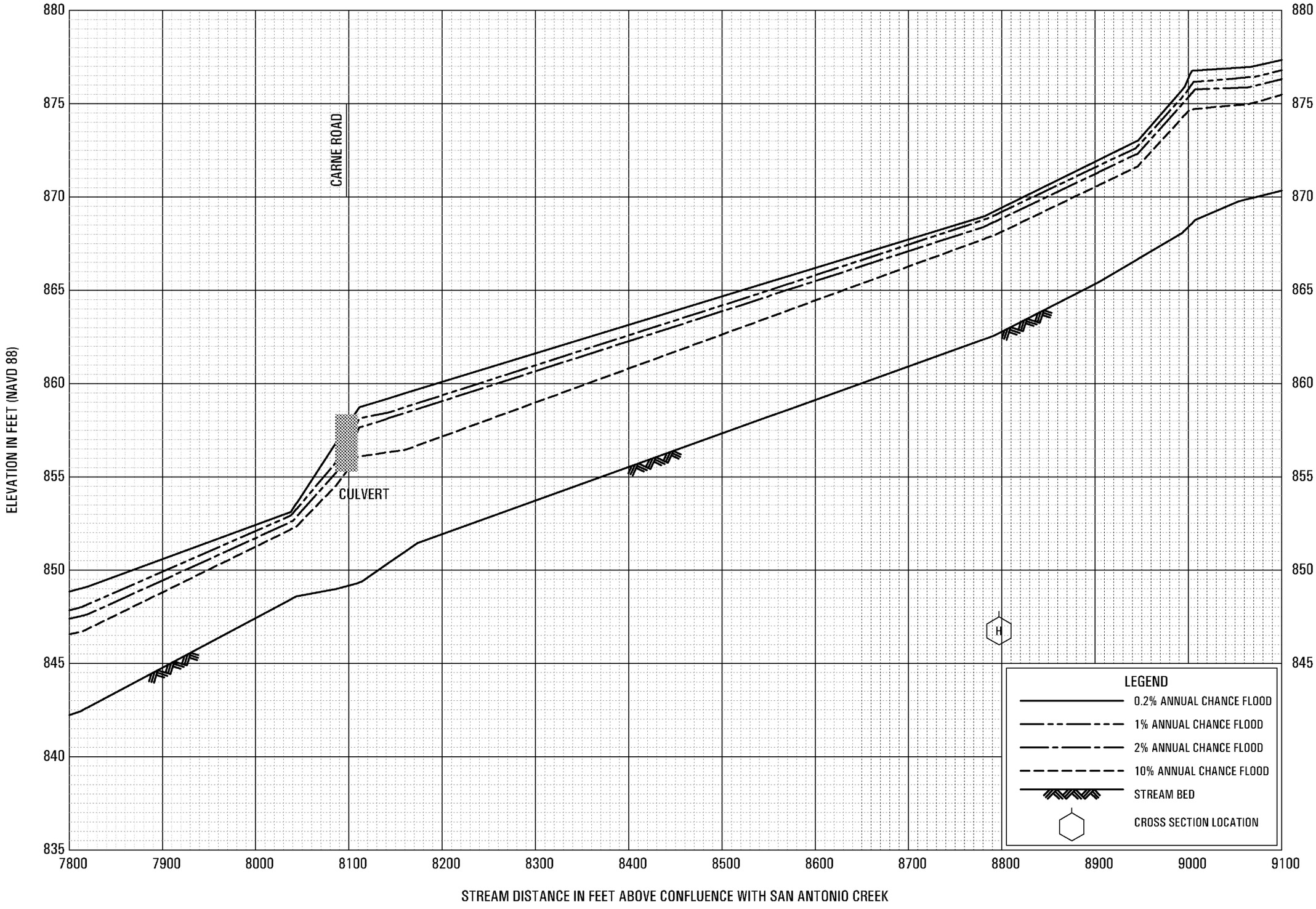
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



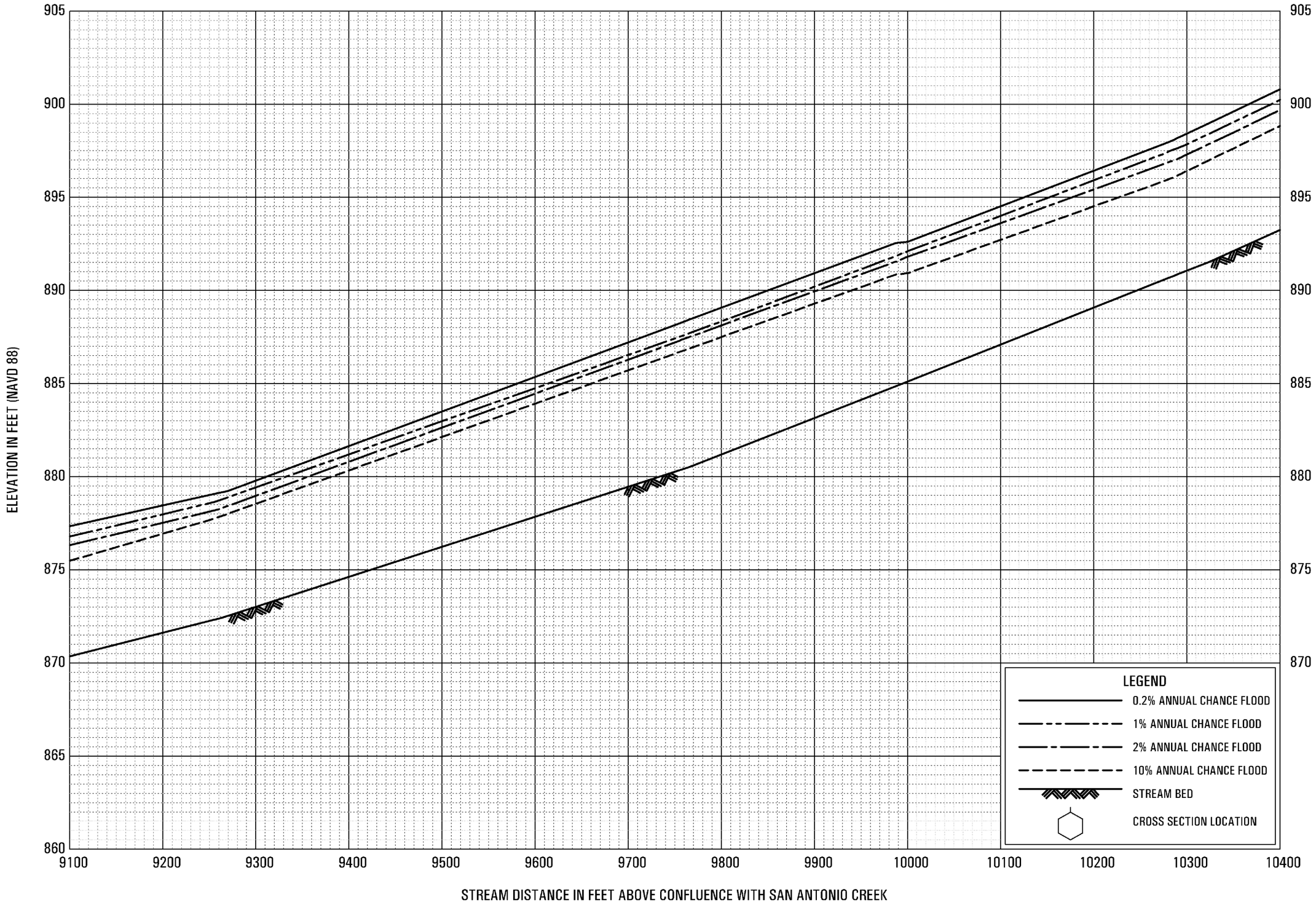
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

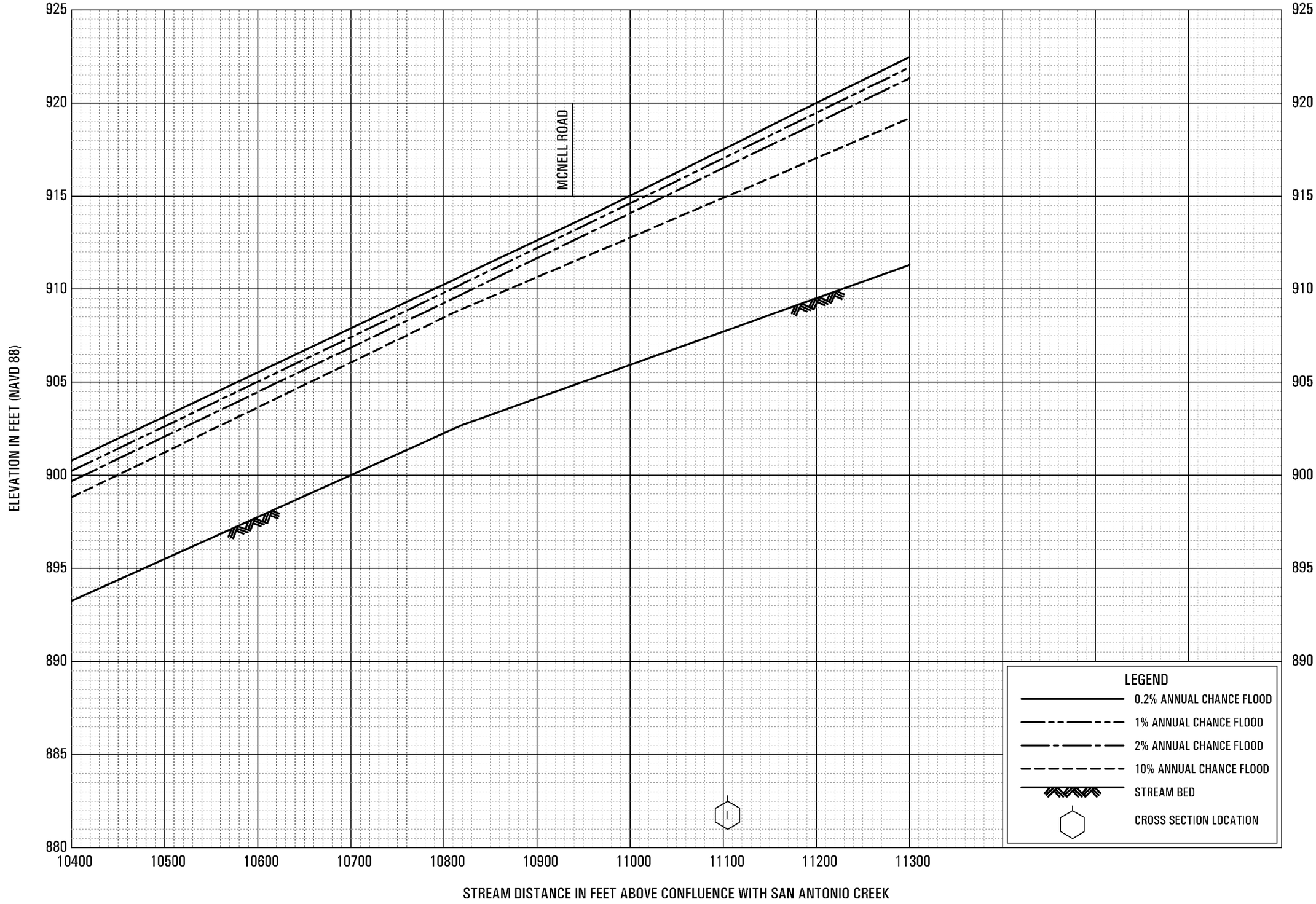
THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

165P



FLOOD PROFILES

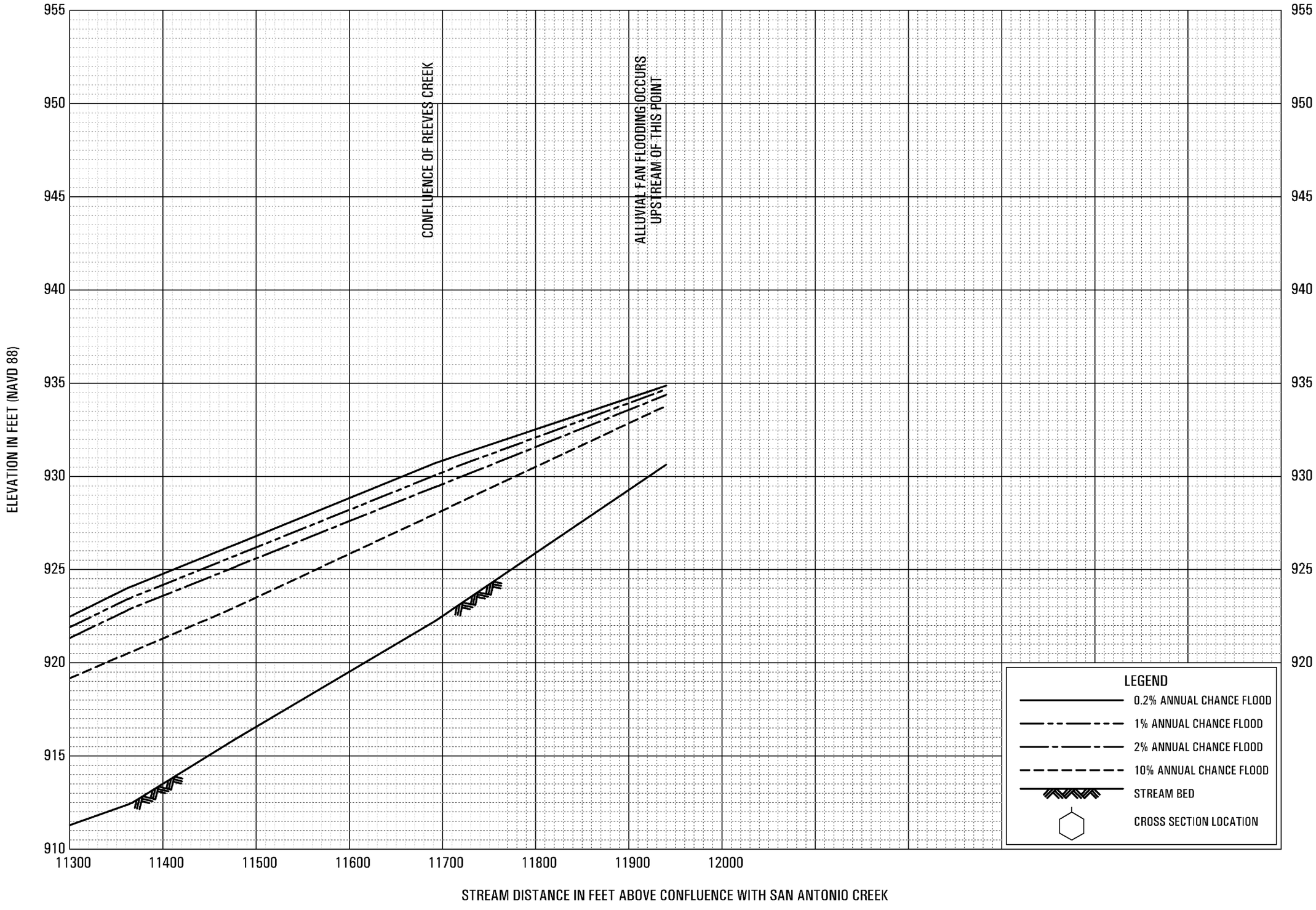
THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

166P



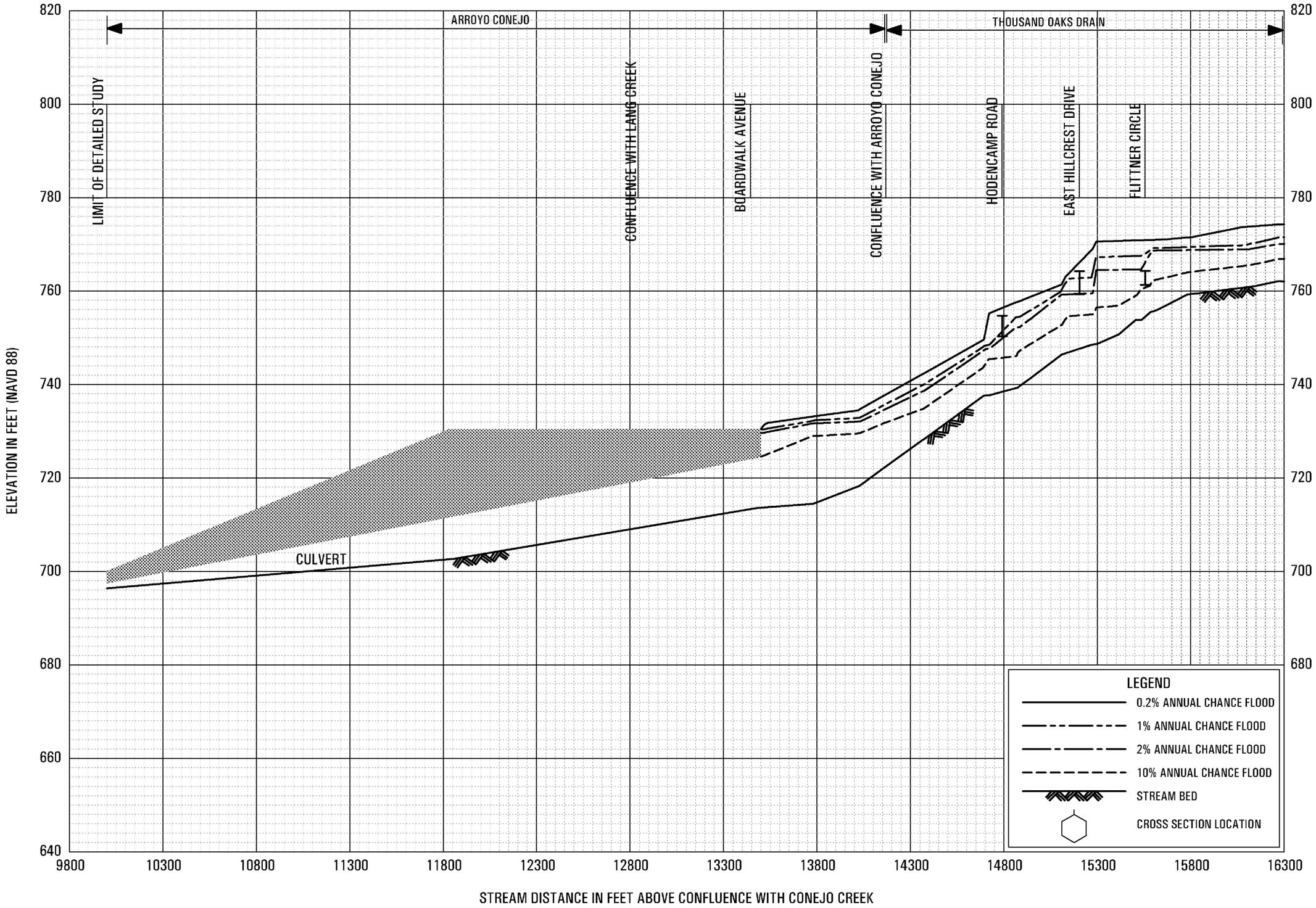
FLOOD PROFILES

THACHER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

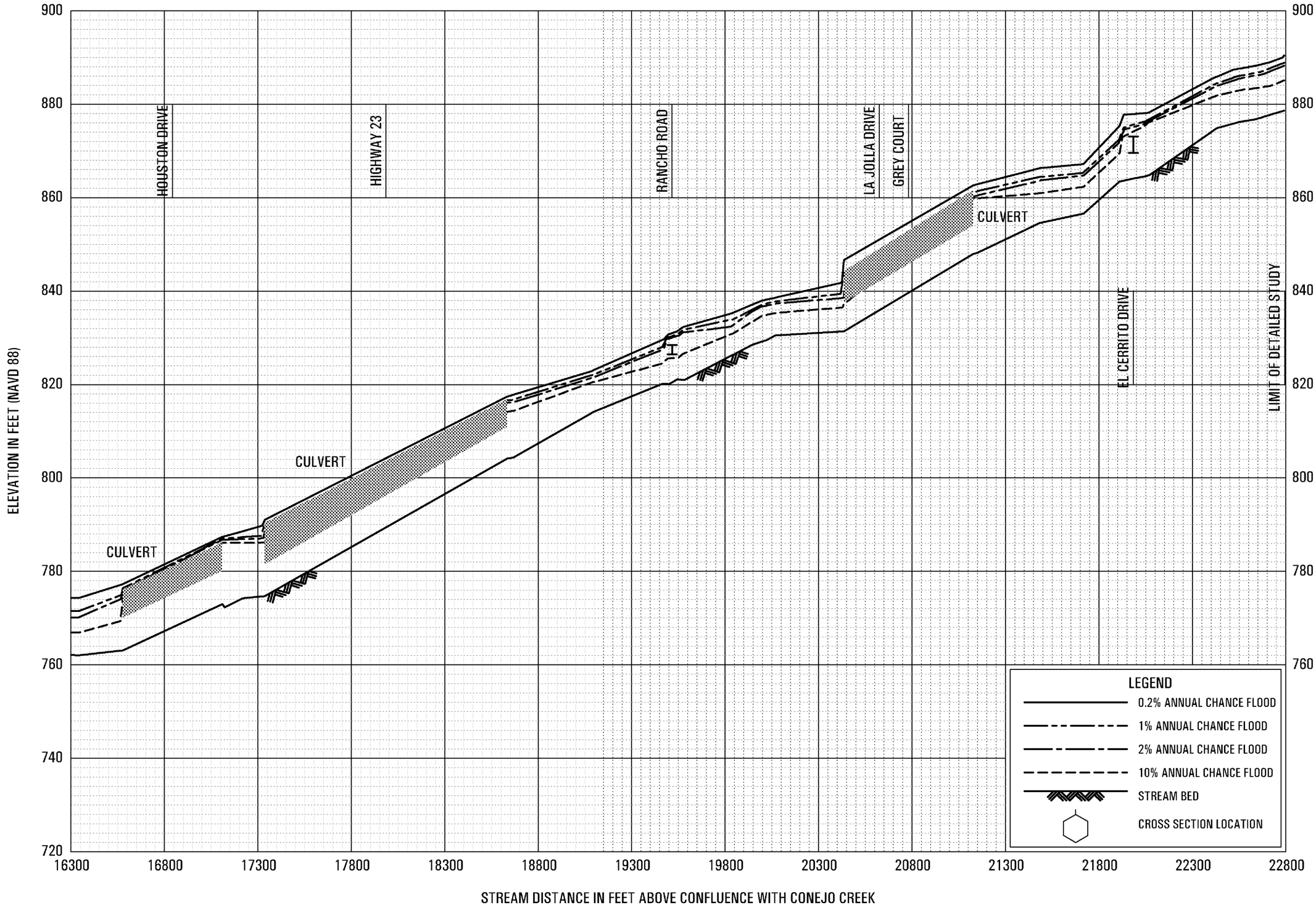
ARROYO CONEJO / THOUSAND OAKS NORTH DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

168P



FLOOD PROFILES

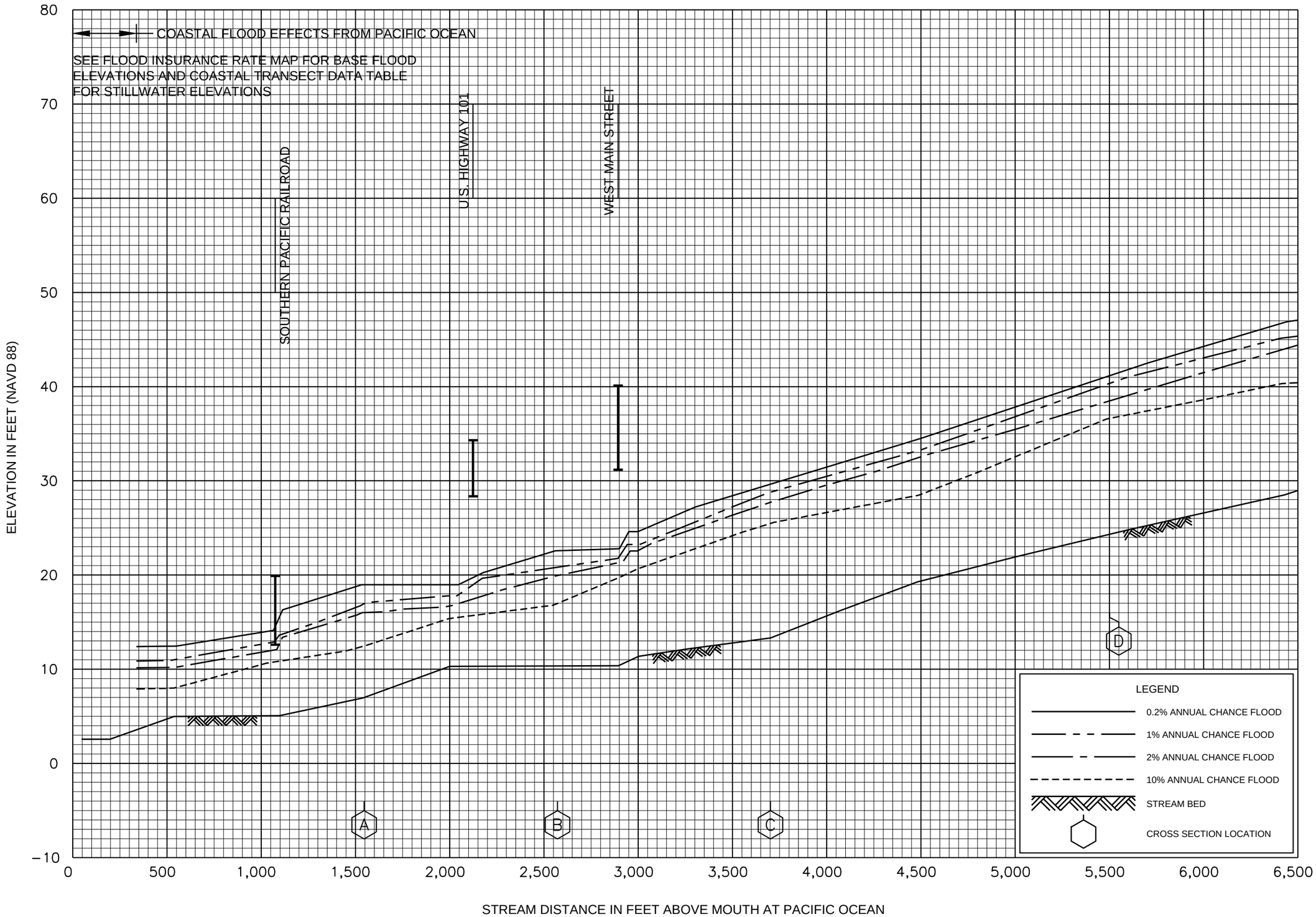
ARROYO CONEJO / THOUSAND OAKS NORTH DRAIN

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

169P



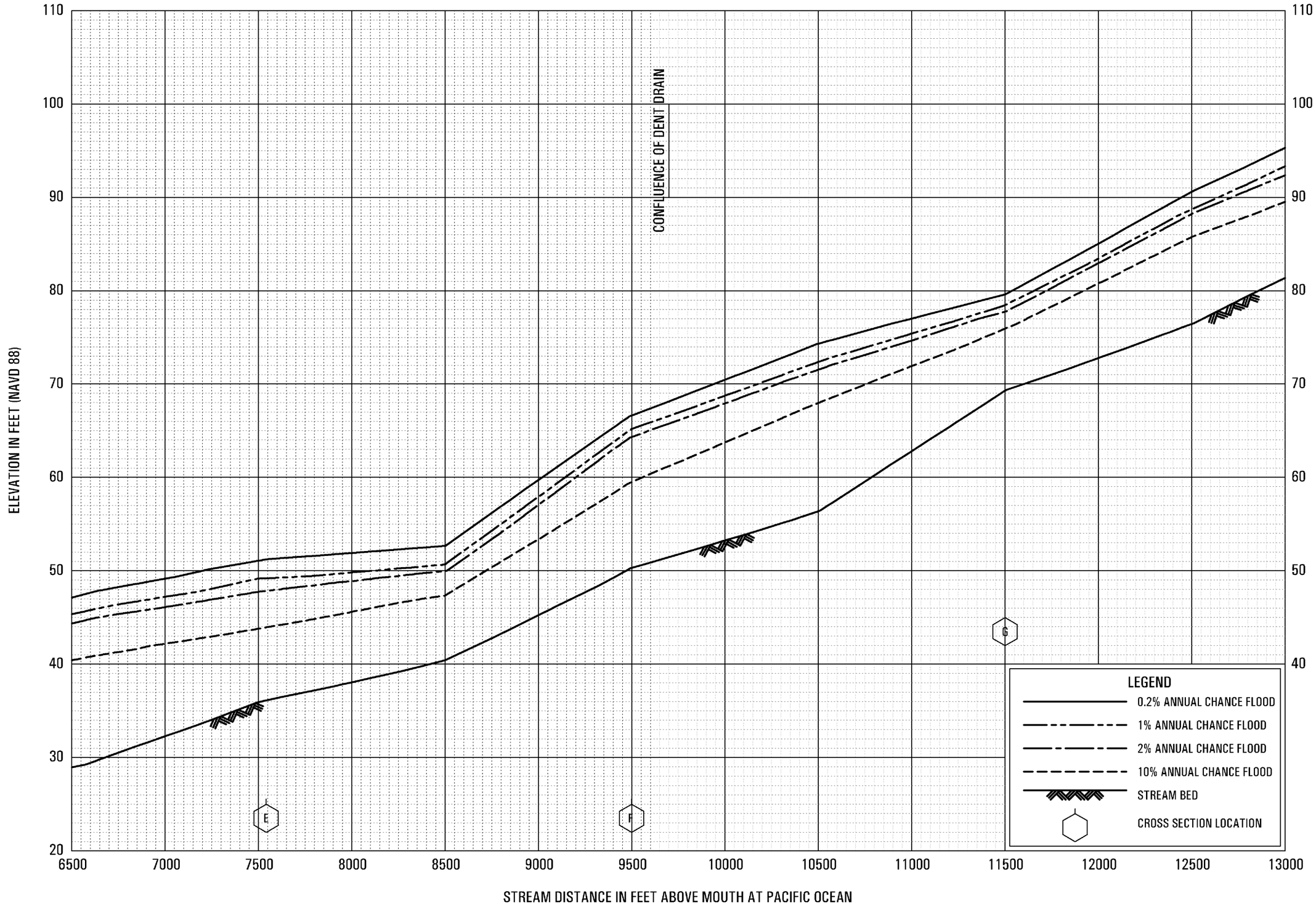
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

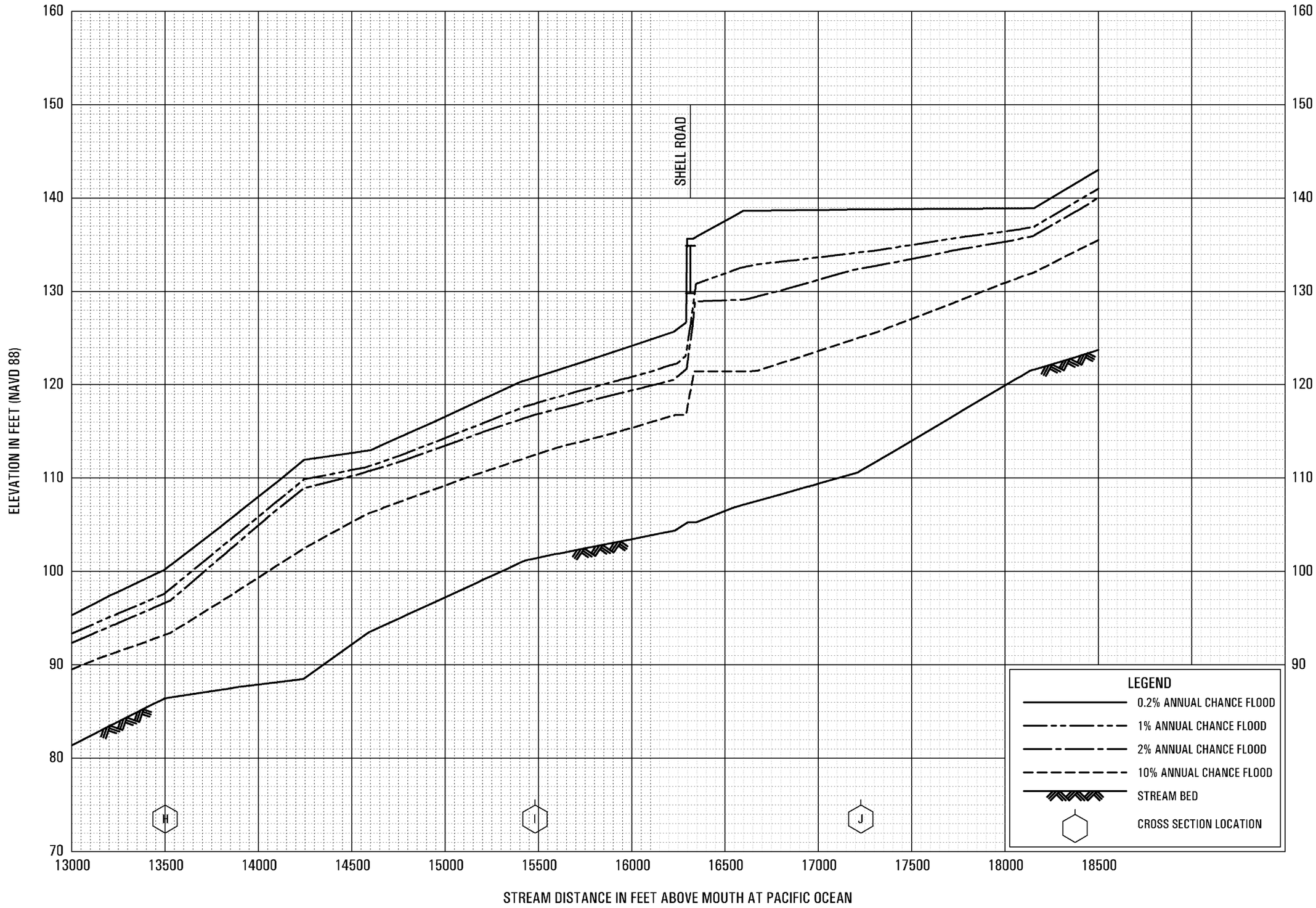
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

171P



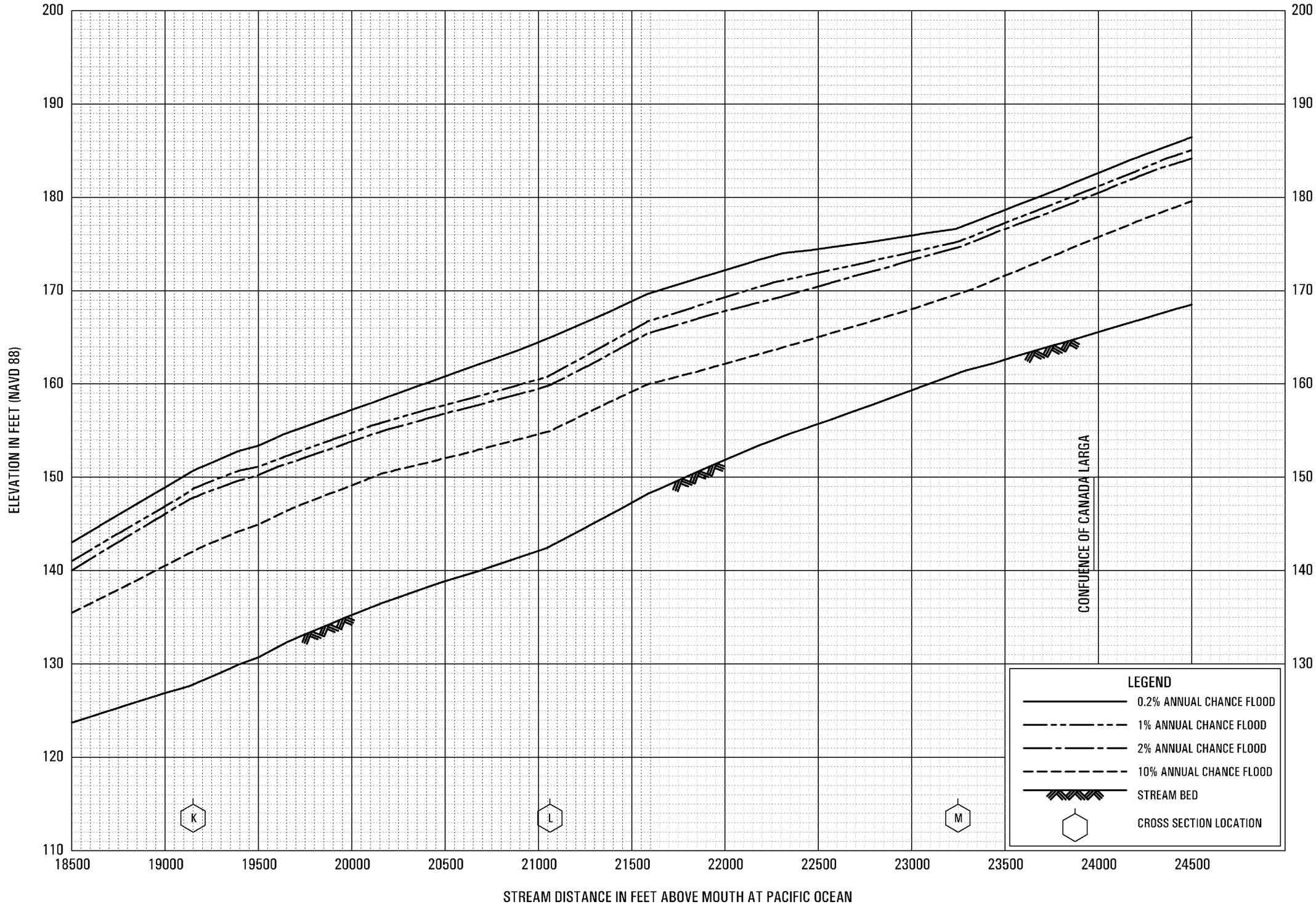
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



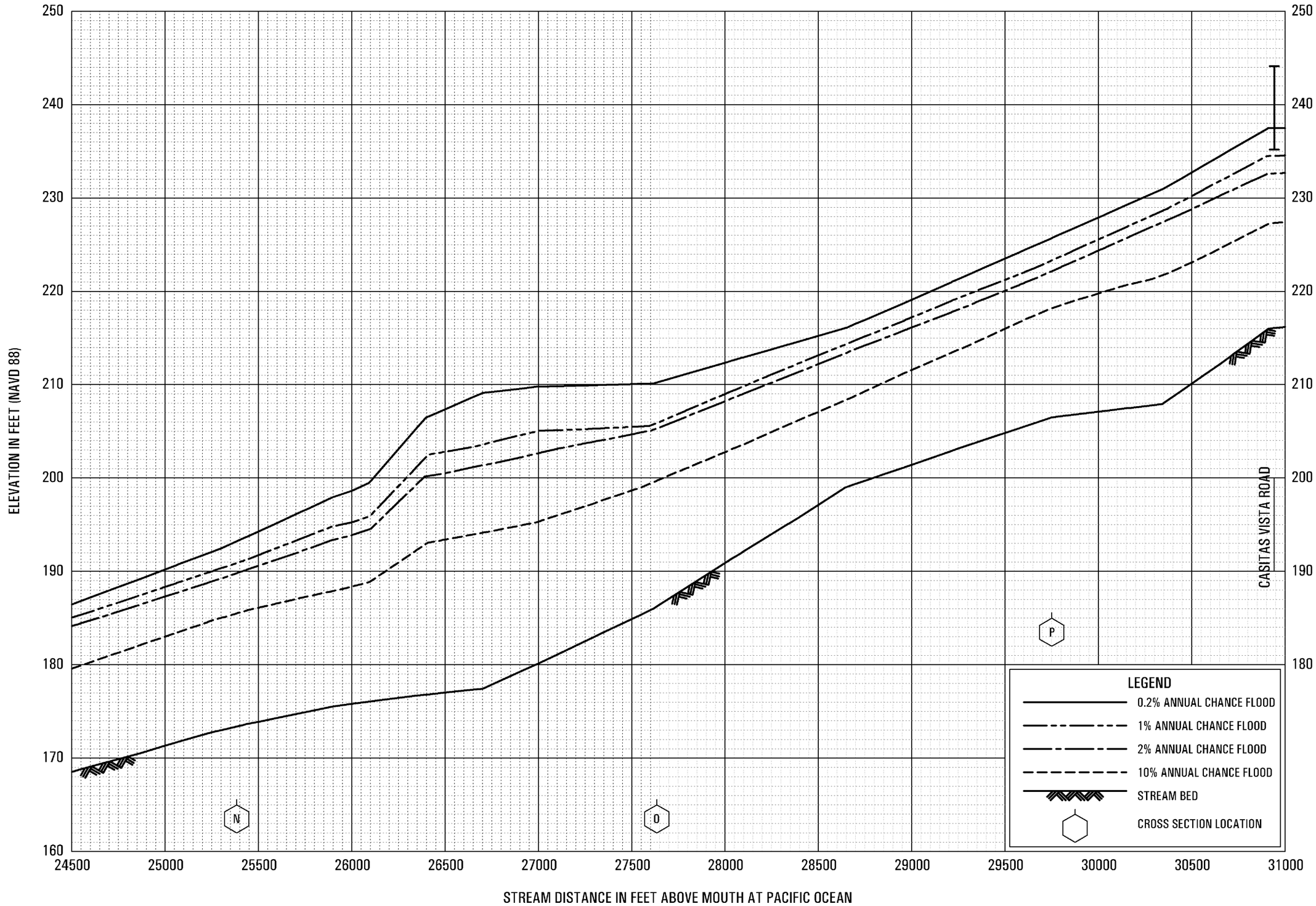
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



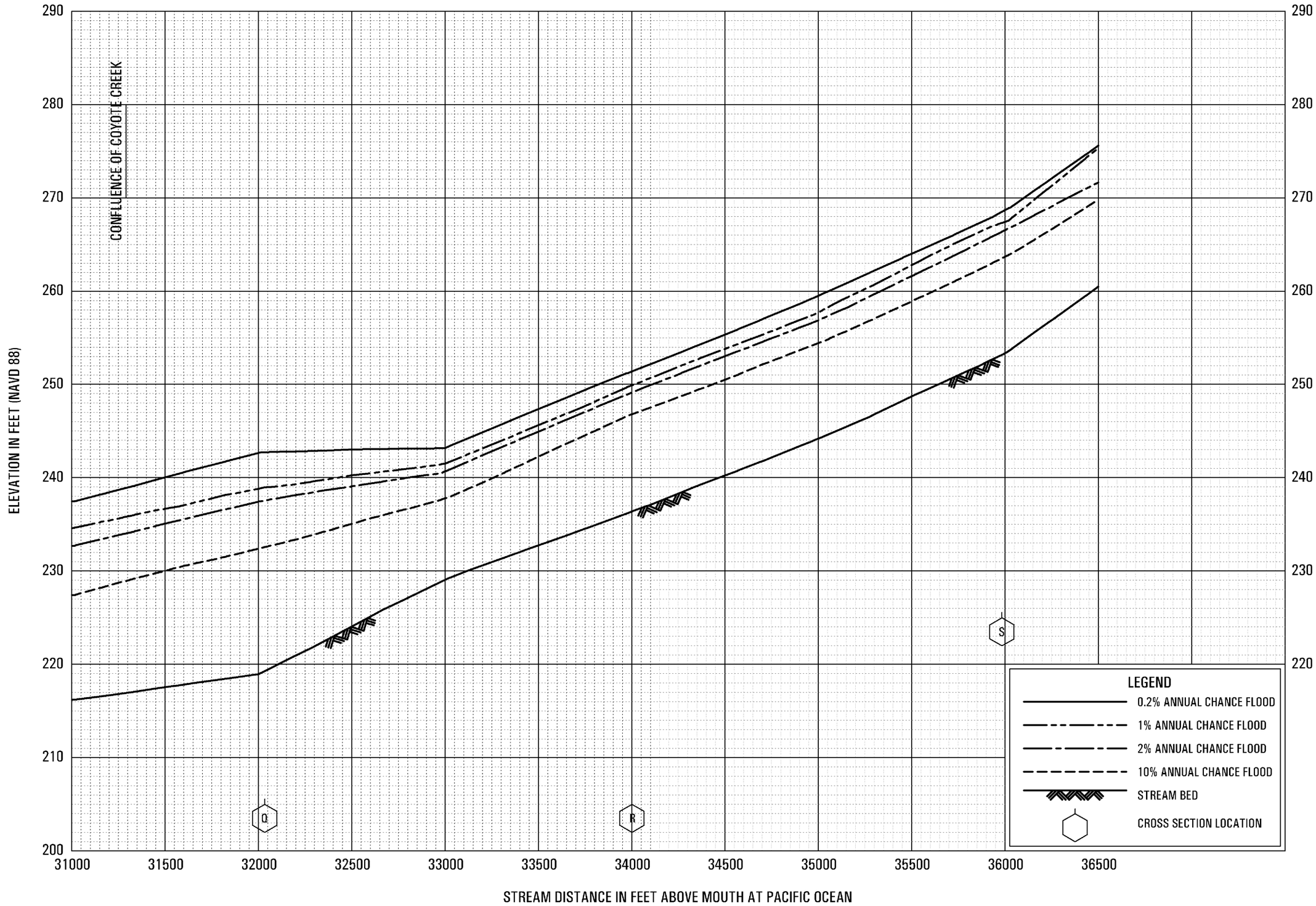
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



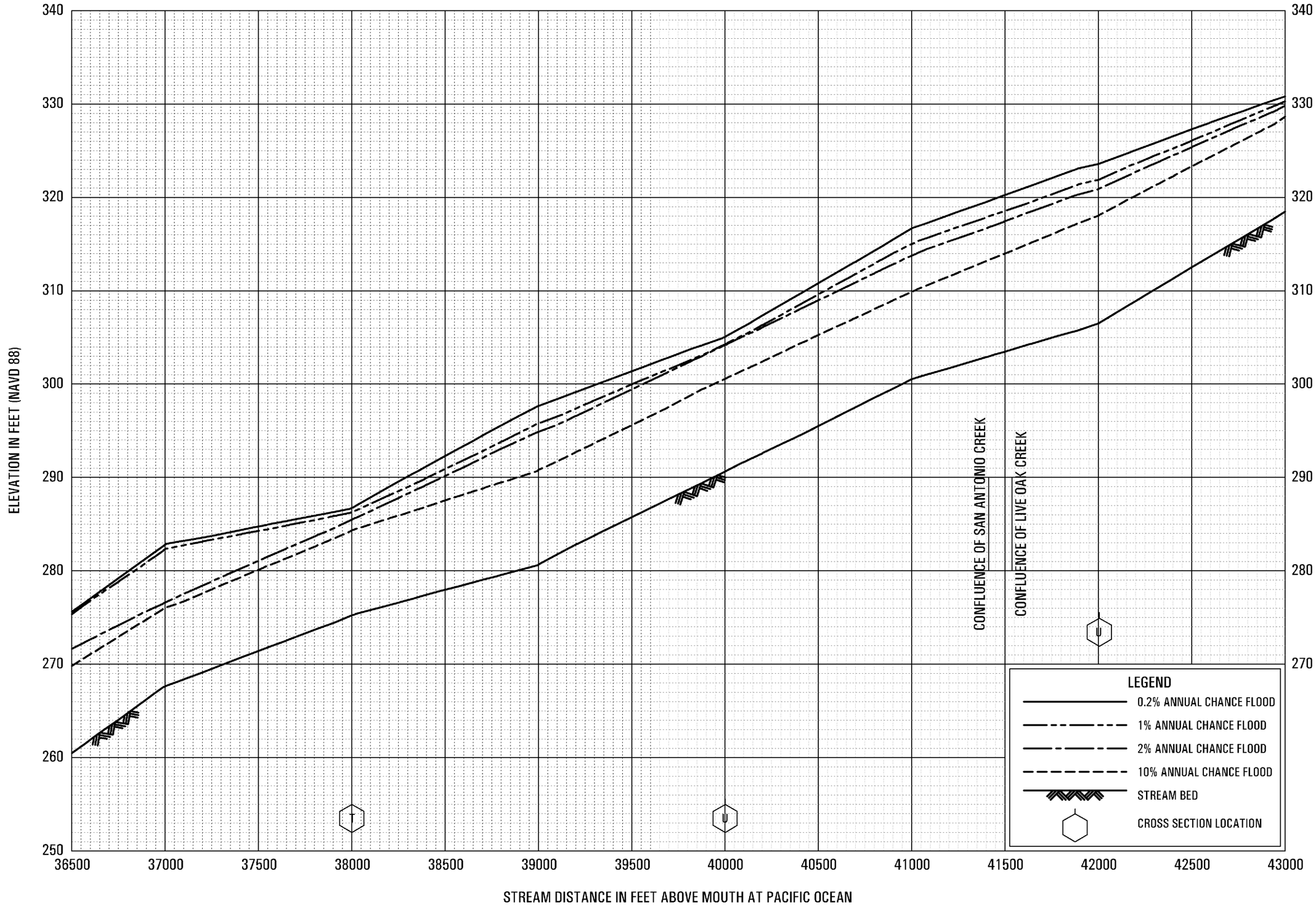
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

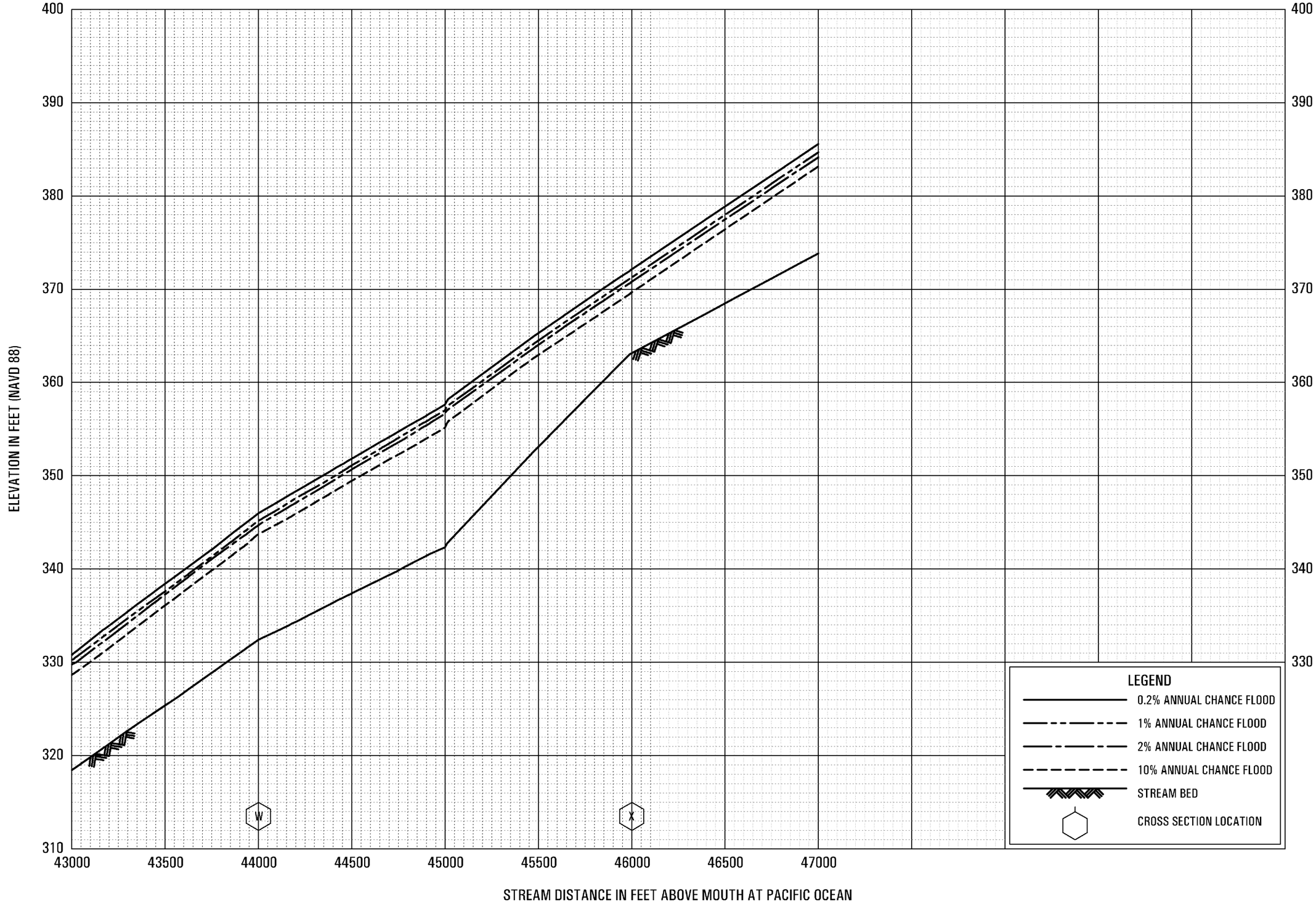
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

176P



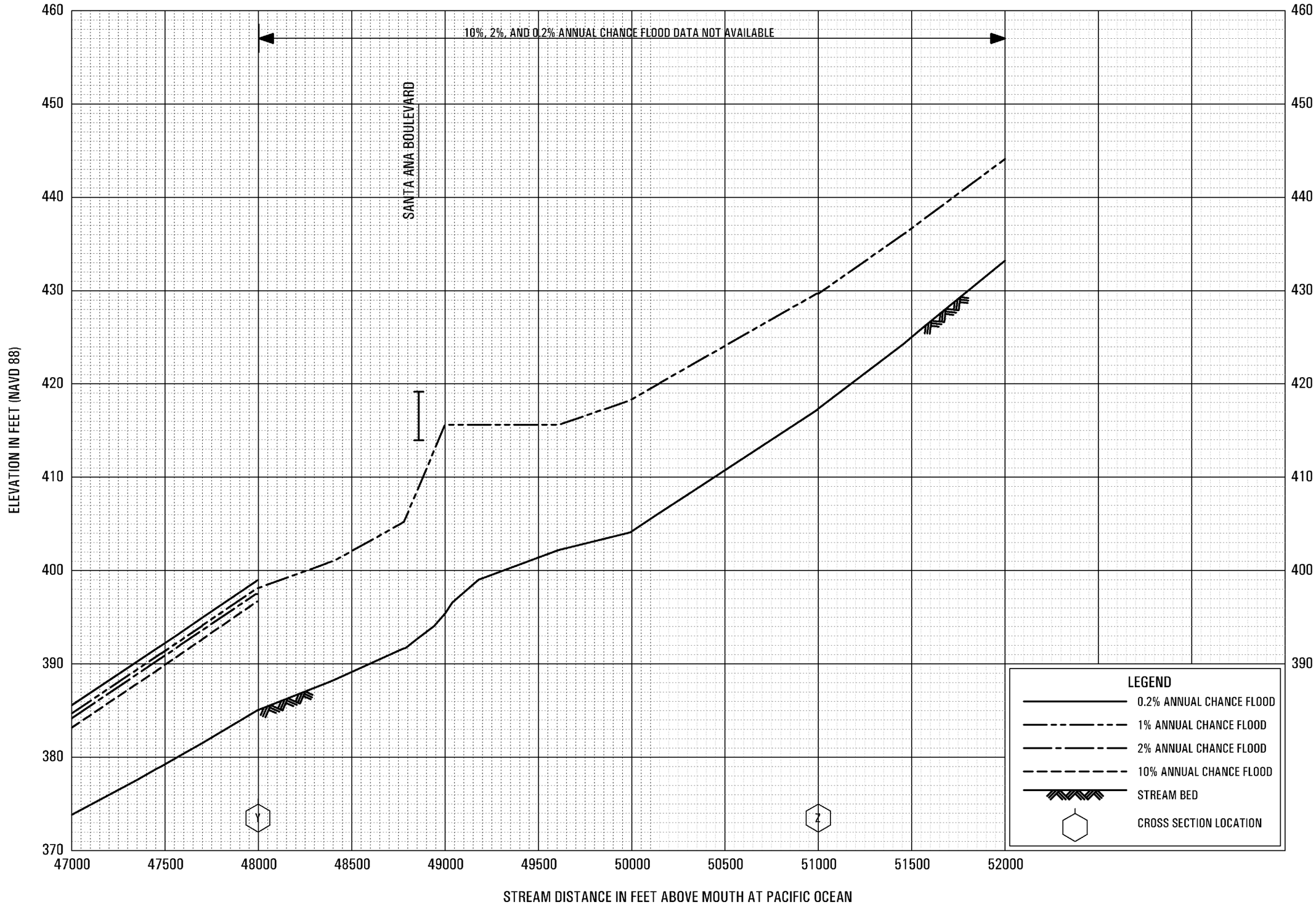
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



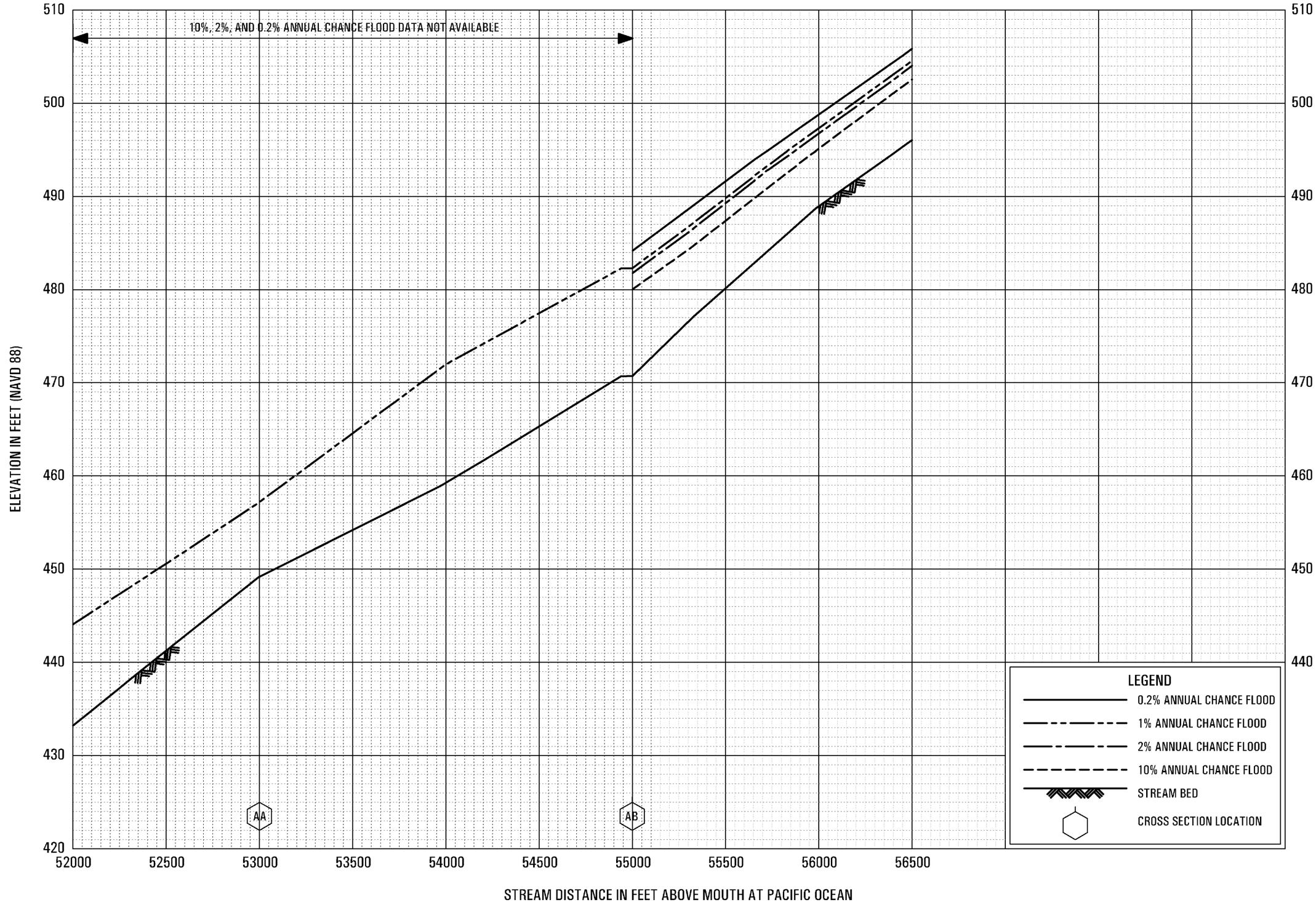
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



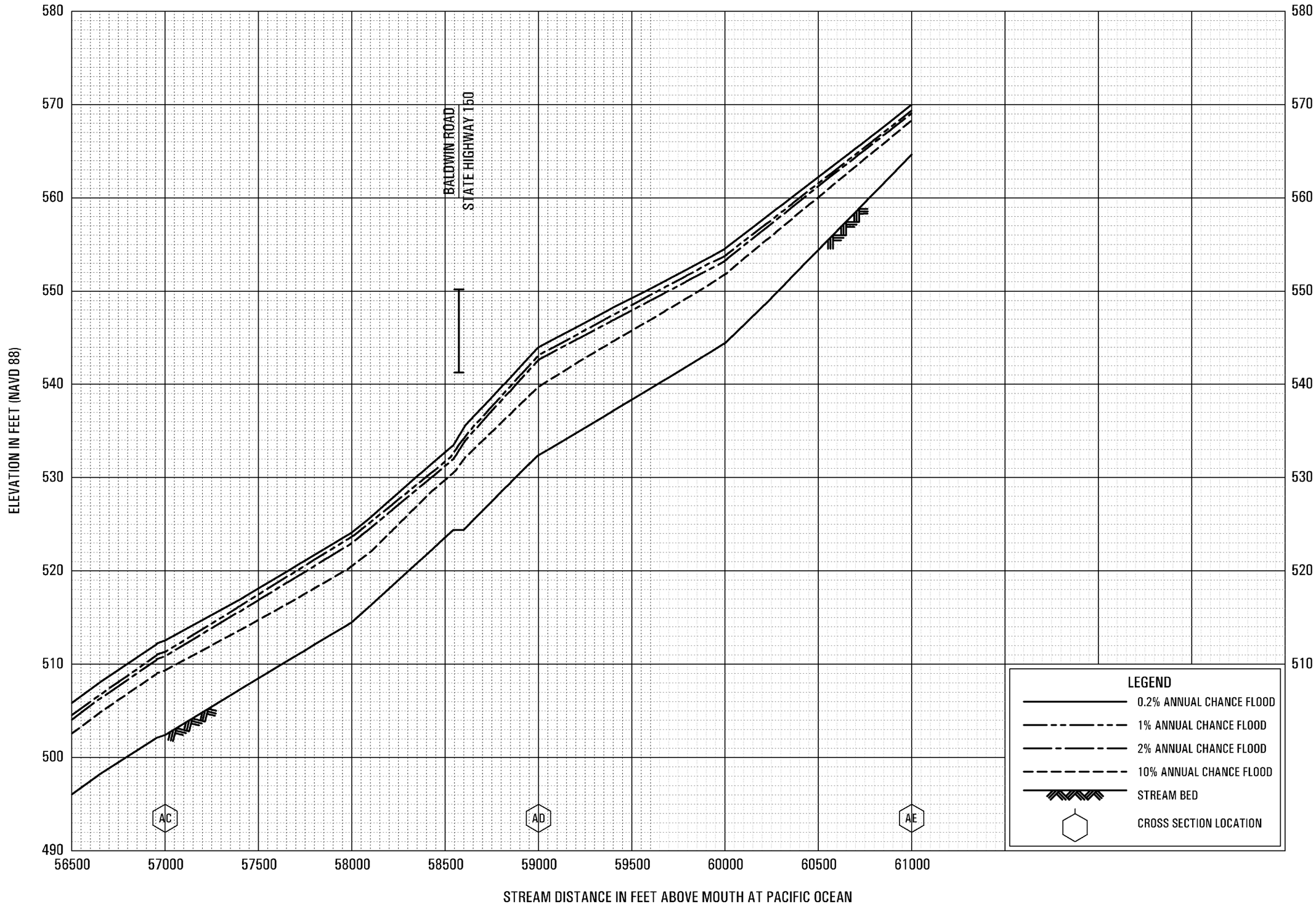
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



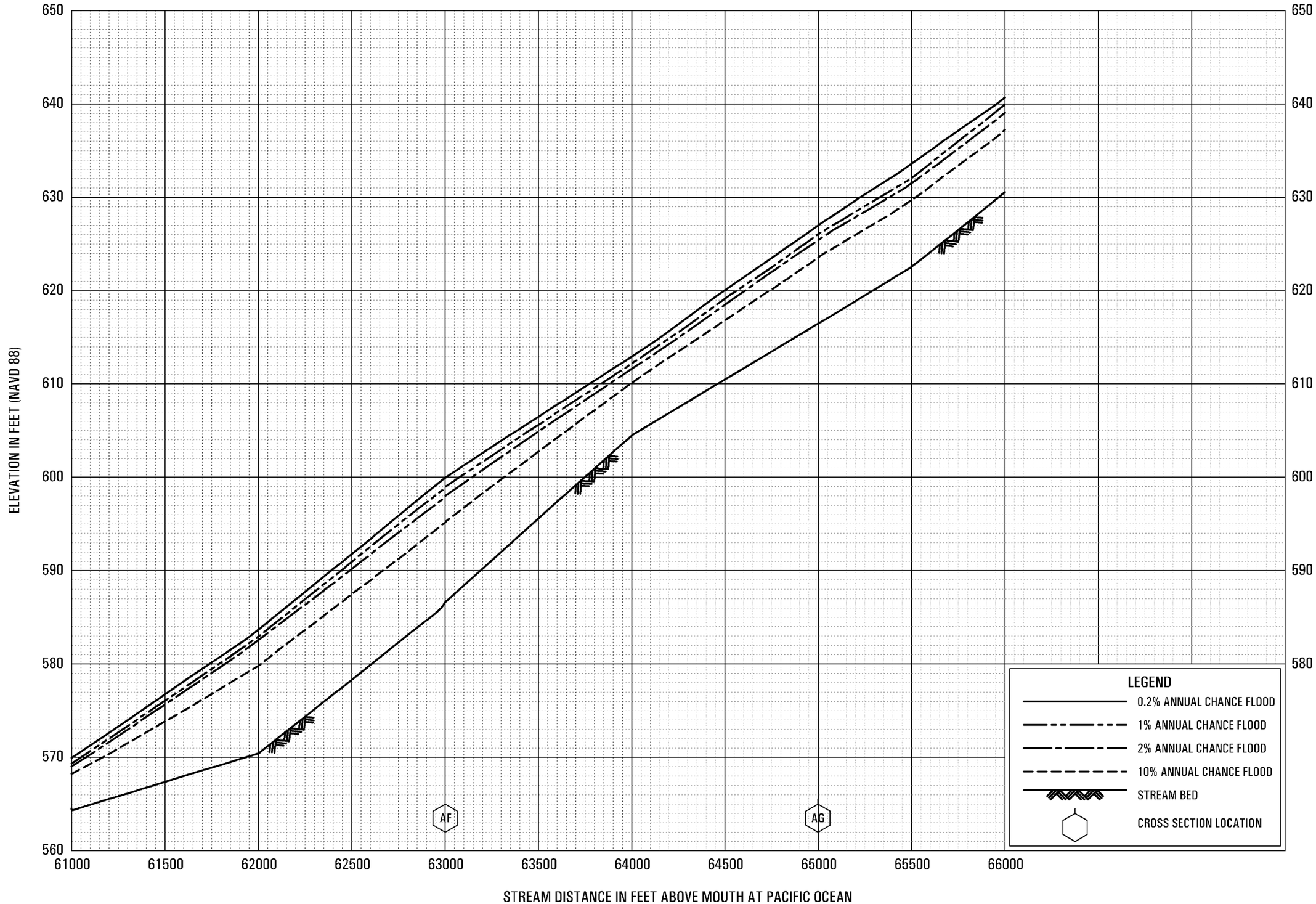
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

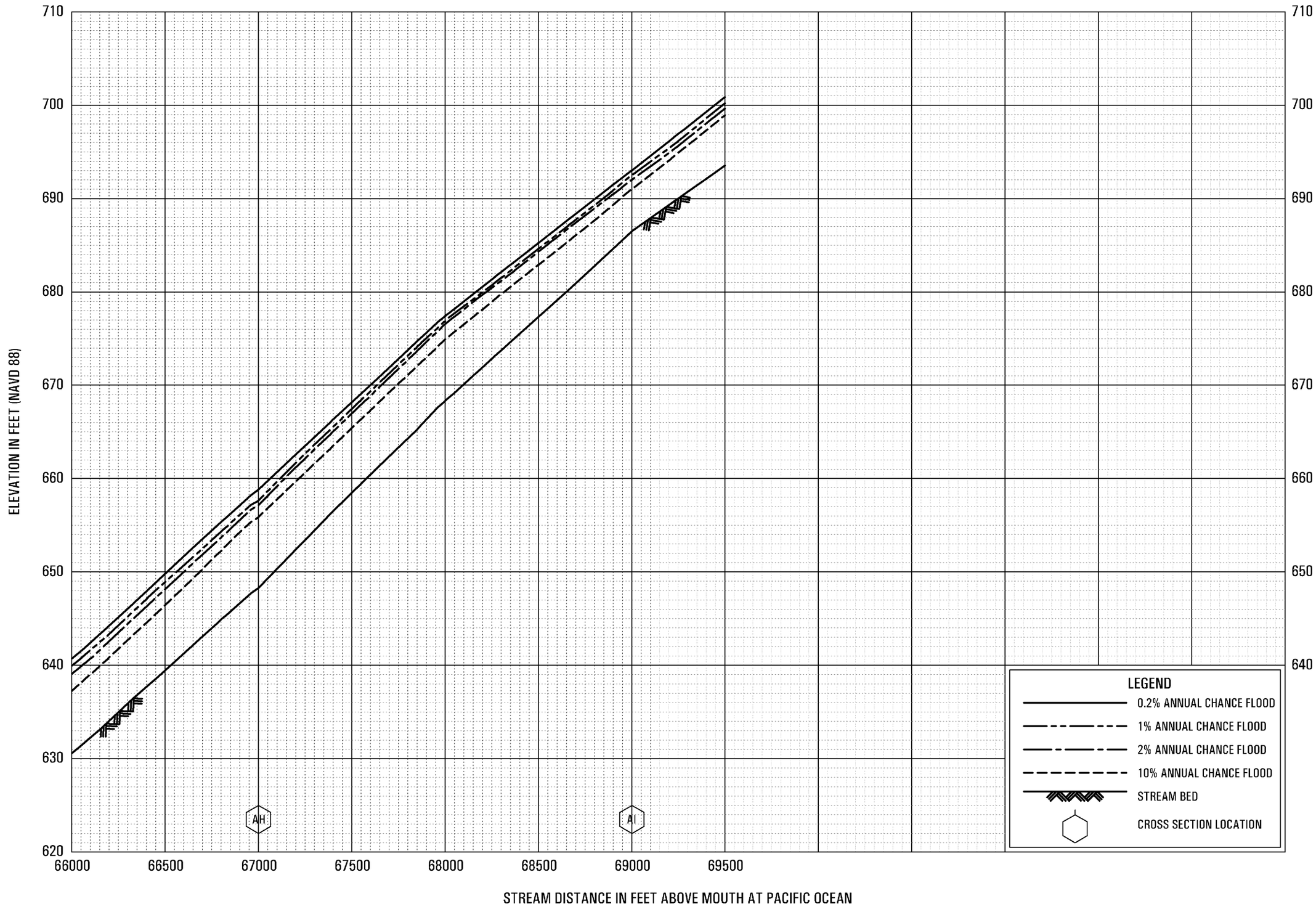
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

181P



FLOOD PROFILES

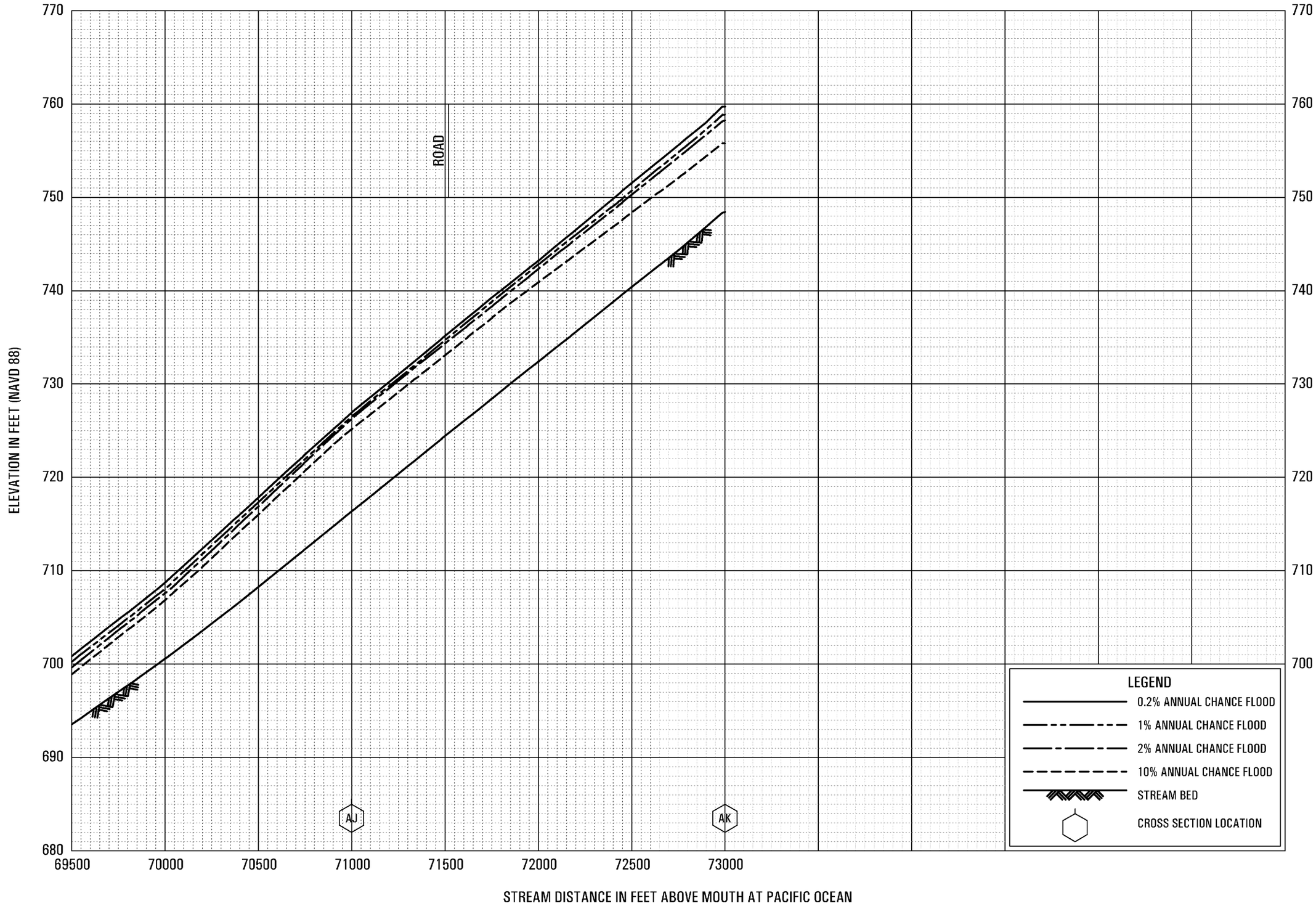
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

182P



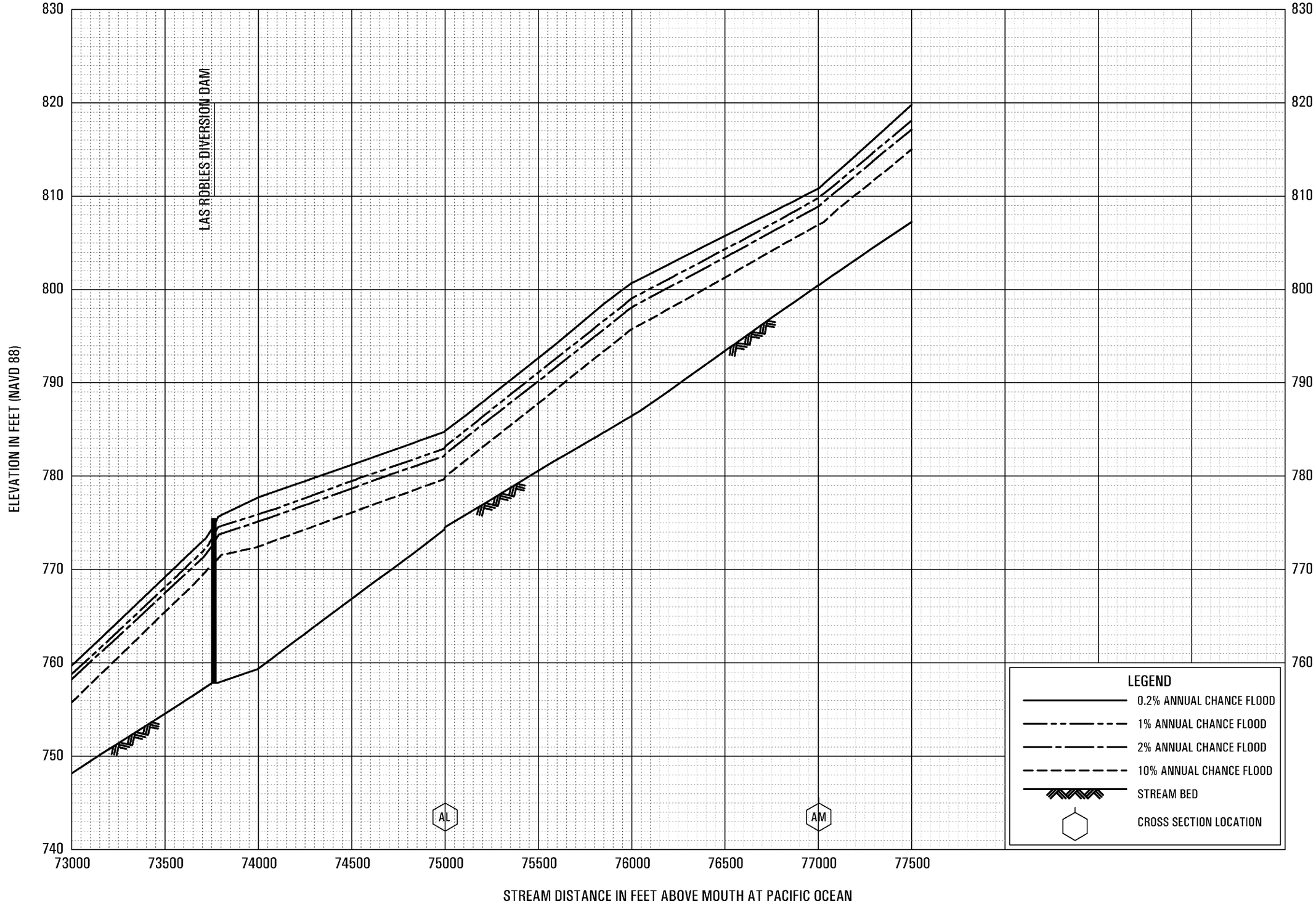
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

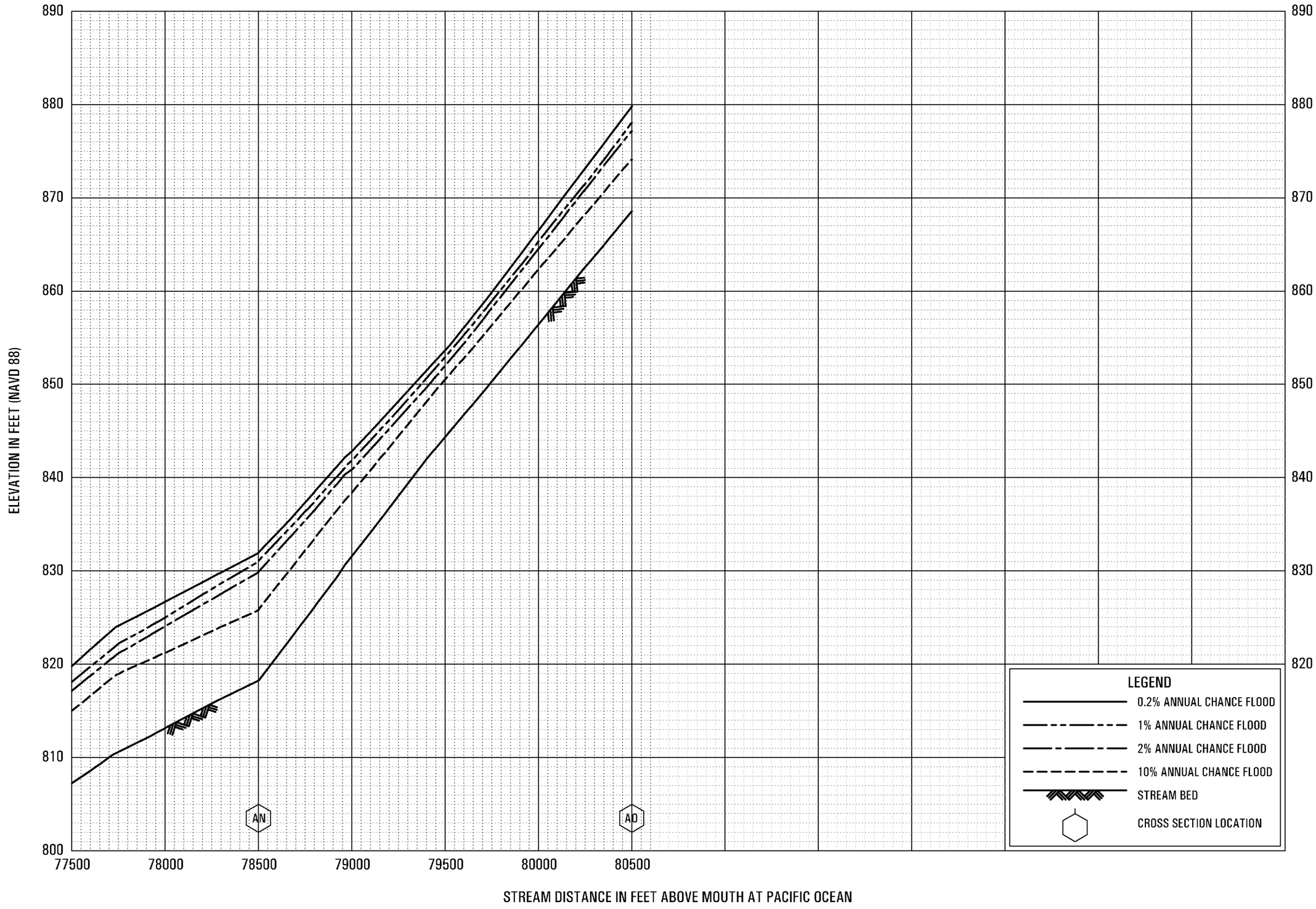
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

184P



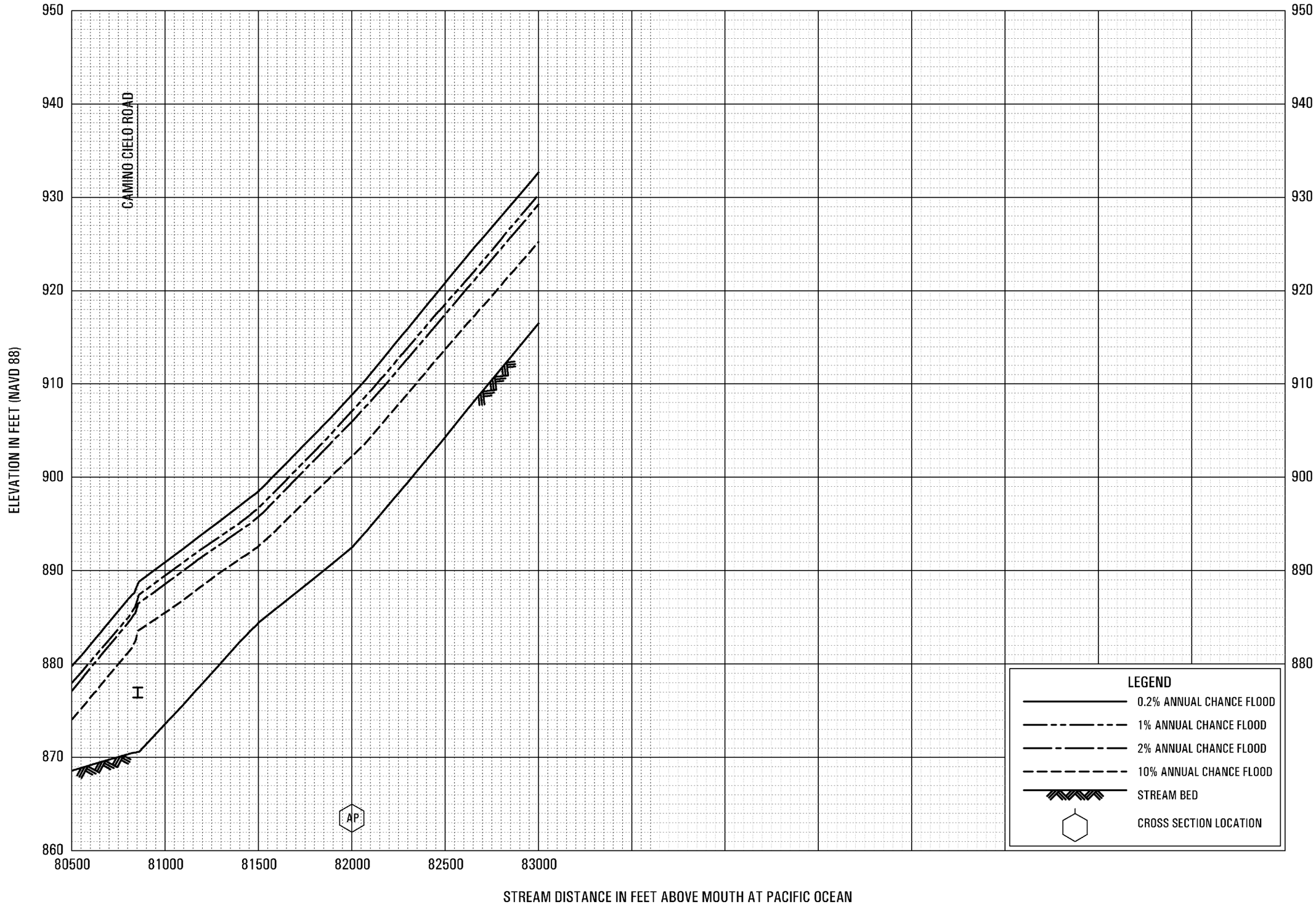
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

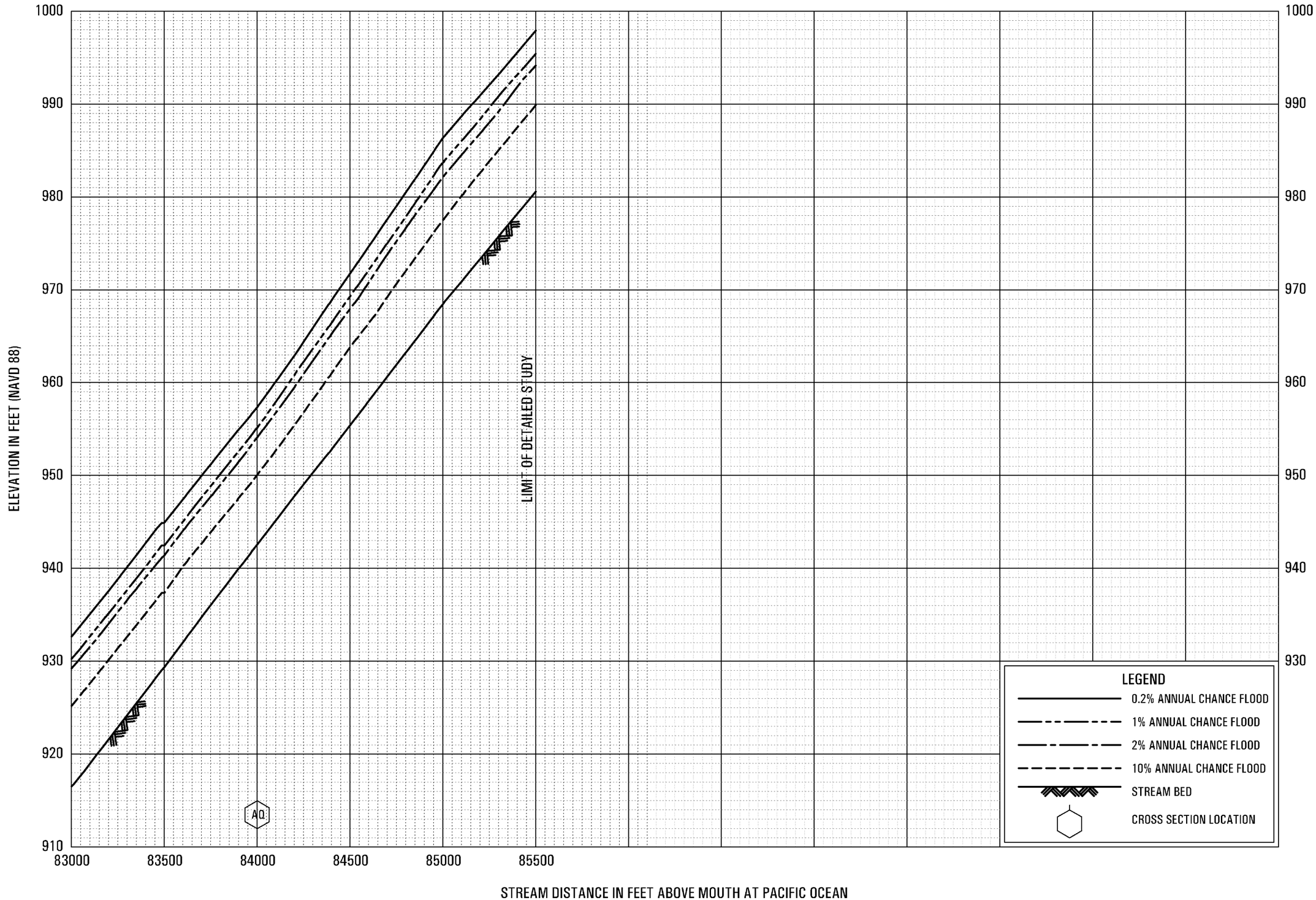
VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

186P



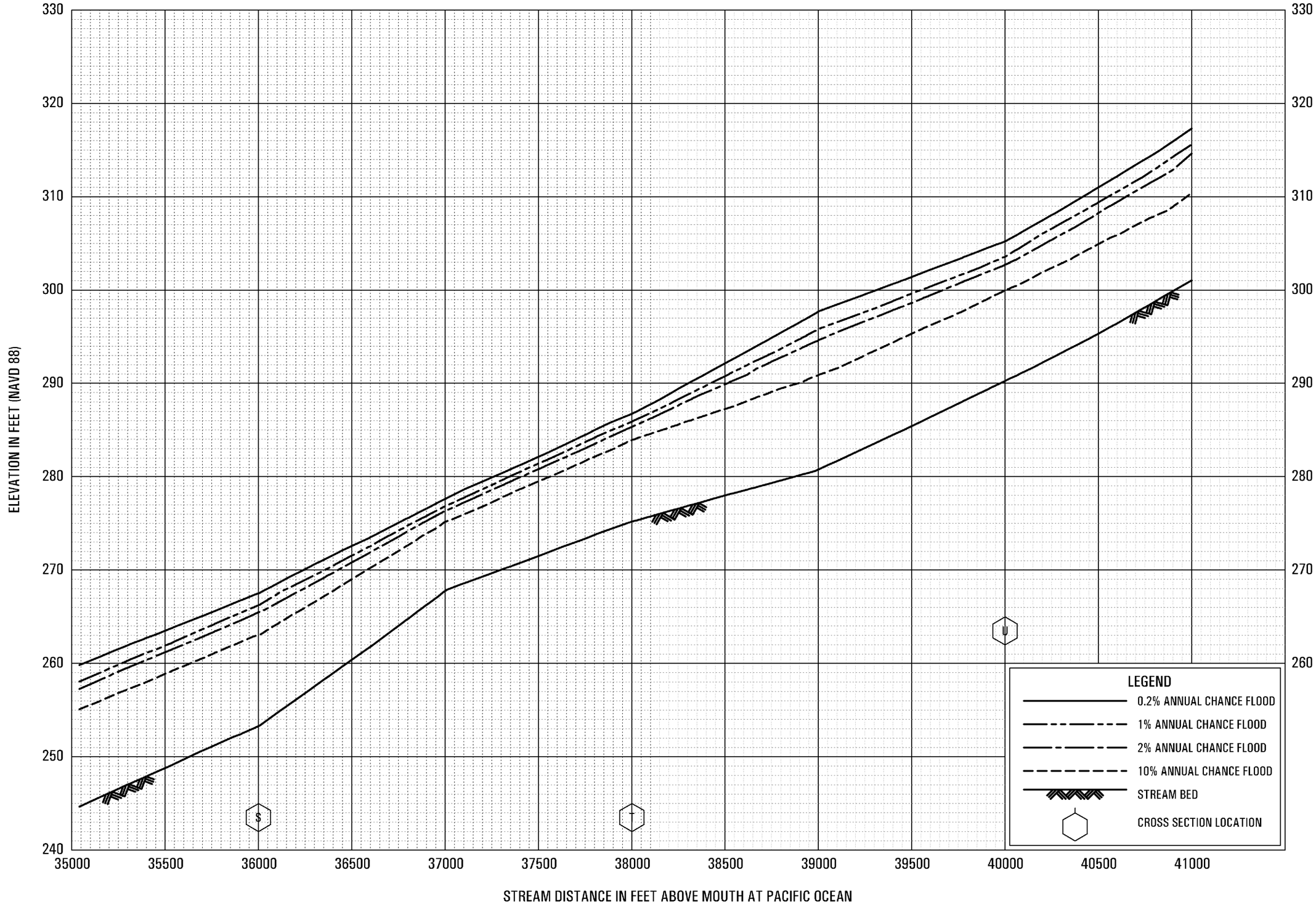
FLOOD PROFILES

VENTURA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

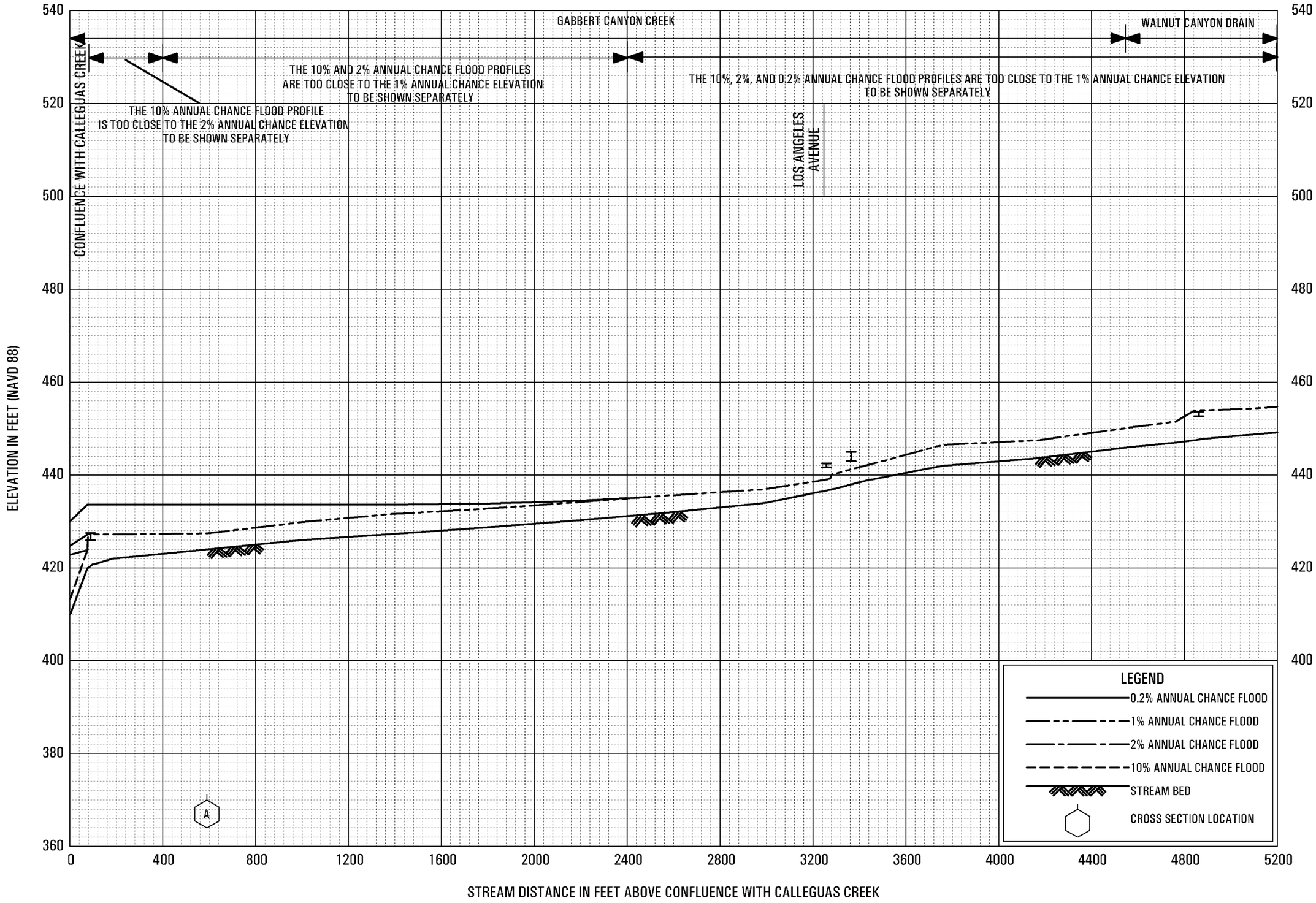
VENTURA RIVER WITHOUT CONSIDERATION OF LEVEE

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

188P



FLOOD PROFILES

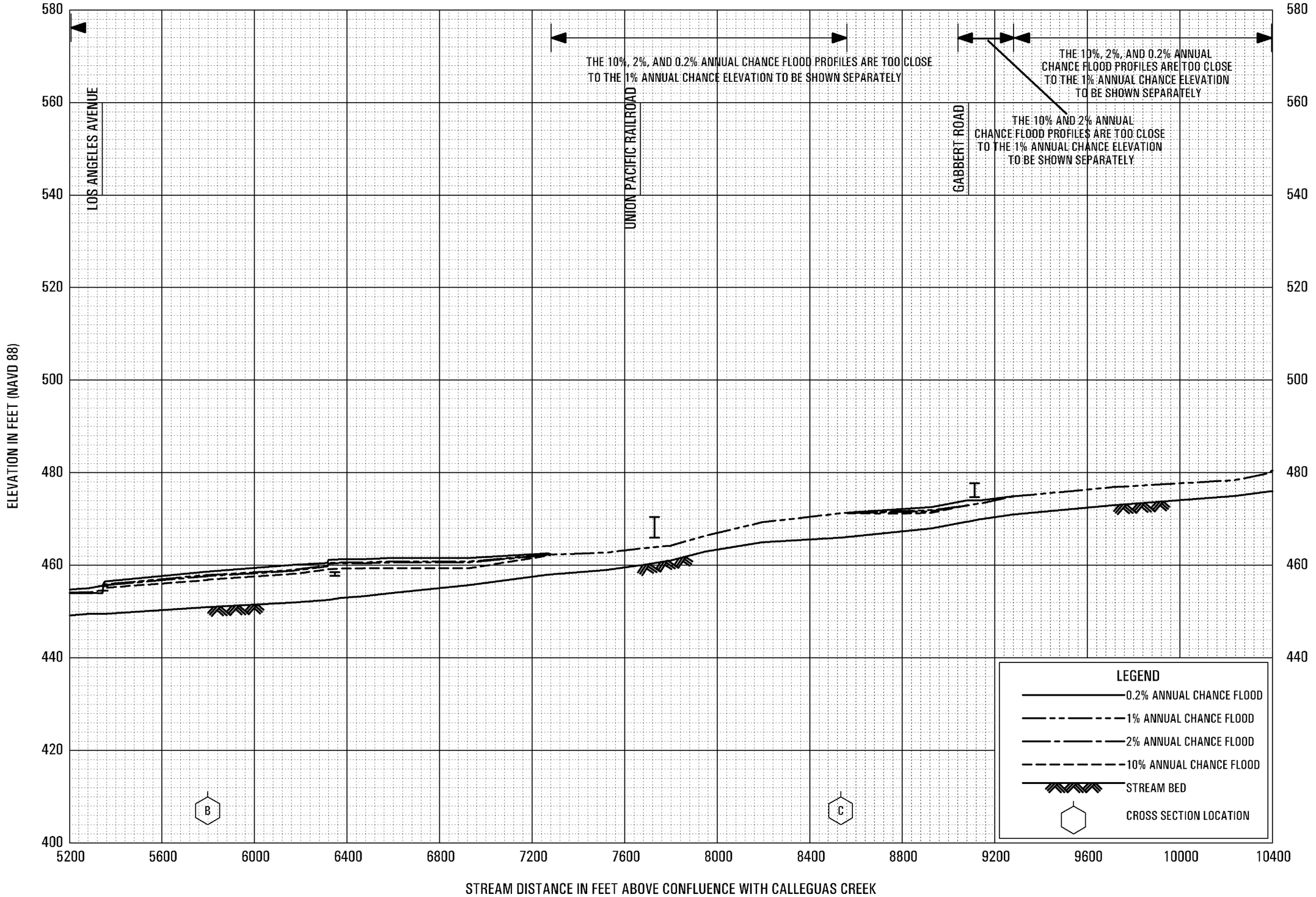
WALNUT CANYON DRAIN/GABBERT CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

189P



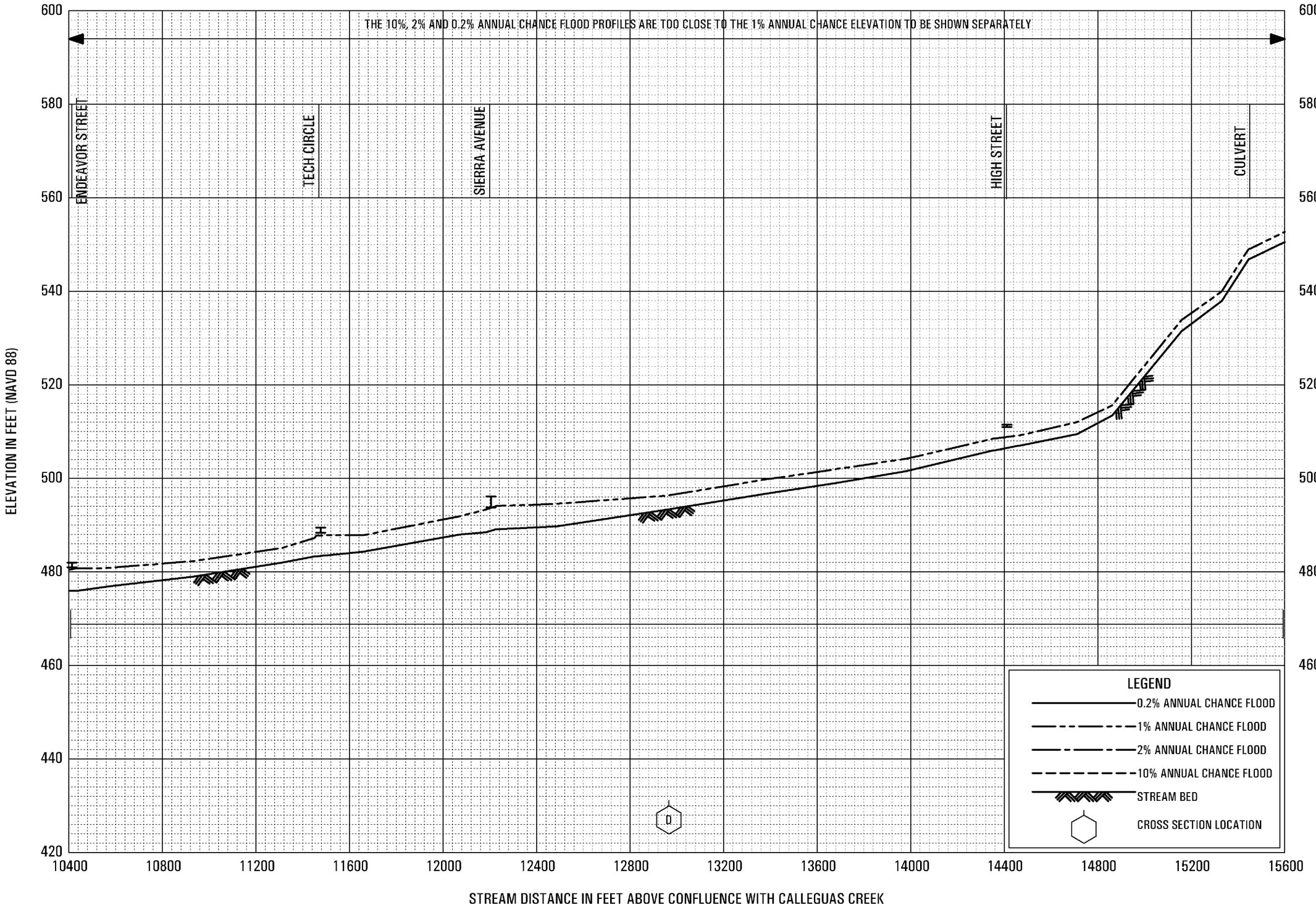
FLOOD PROFILES

WALNUT CANYON DRAIN/GABBERT CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS



FLOOD PROFILES

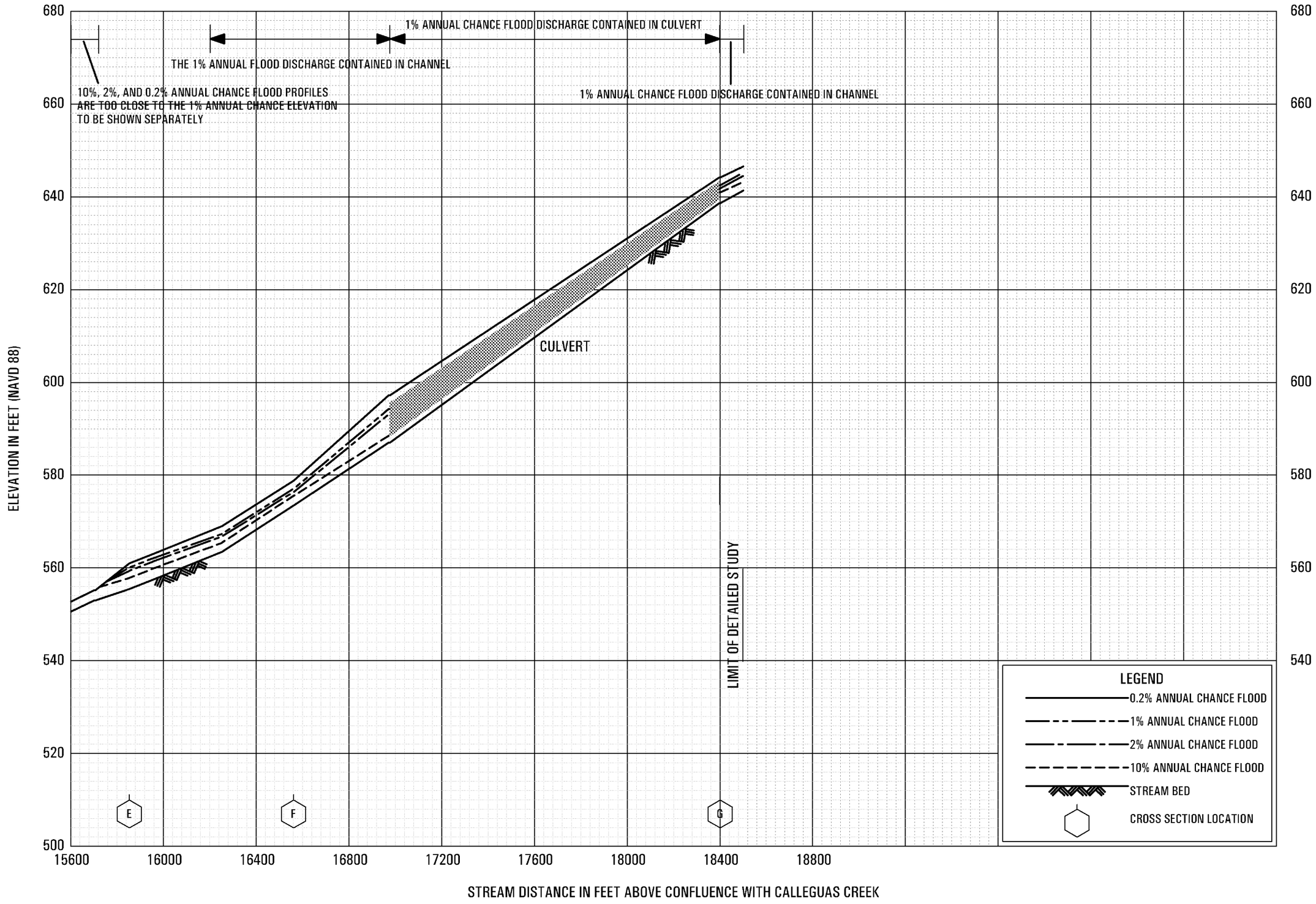
WALNUT CANYON DRAIN/GABBERT CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

191P



FLOOD PROFILES

WALNUT CANYON DRAIN/GABBERT CANYON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VENTURA COUNTY, CA

AND INCORPORATED AREAS

192P