

# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 3



## SANTA CRUZ COUNTY, CALIFORNIA AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CAPITOLA, CITY OF	060354
SANTA CRUZ, CITY OF	060355
SANTA CRUZ COUNTY UNINCORPORATED AREAS	060353
SCOTTS VALLEY, CITY OF	060356
WATSONVILLE, CITY OF	060357



# FEMA

**REVISED  
PRELIMINARY**

**OCT 31, 2016**

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**Volume 2**  
Exhibits

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Corralitos Creek	16-19 P
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Harkins Slough	22-23 P
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**Volume 3**  
Exhibits

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**Published Separately**

Flood Insurance Rate Map (FIRM)

## 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](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

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](http://www.ngs.noaa.gov).

The datum conversion locations and values that were calculated for Santa Cruz County are provided in Table 20.

**Table 20: Countywide Vertical Datum Conversion**

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
*	*	*	*	2.75
Average Conversion from NGVD29 to NAVD88 = 2.75 feet				

\*Data not available

**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*, [www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping](http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping).

Base map information shown on the FIRM was derived from the sources described in Table 22.

**Table 22: Base Map Sources**

Data Type	Data Provider	Data Date	Data Scale	Data Description
Digital Orthophoto	US Department of Agriculture	2010		Digital ortho imagery
Digital Orthophoto	Coastal Services Center	2011		Coastal California LiDAR and digital imagery
Political boundaries	Santa Cruz County	2003		Municipal and county boundaries
Transportation Features	US Census Bureau	2009		2009 TIGER/Line shapefiles for Santa Cruz
Public Land Survey System (PLSS)	United States Geological Survey	1991		Public Lands Survey System linear features

**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 23. For each coastal flooding source studied as part of this FIS Report, the mapped floodplain boundaries on the FIRM have been delineated using the flood and wave elevations determined at each transect; between transects, boundaries were delineated using land use and land cover data, the

topographic elevation data described in Table 23, and knowledge of coastal flood processes. In ponding areas, flood elevations were determined at each junction of the model; between junctions, boundaries were interpolated using the topographic elevation data described in Table 23.

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 2 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 24, “Floodway Data.”

Certain flooding sources may have been studied that do not have published BFEs on the FIRMs, or for which there is a need to report the 1% annual chance flood elevations at selected cross sections because a published Flood Profile does not exist in this FIS Report. These streams may have also been studied using methods to determine non-encroachment zones rather than floodways. For these flooding sources, the 1% annual chance floodplain boundaries 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 23. All topographic data used for modeling or mapping has been converted as necessary to NAVD 88. The 1% annual chance elevations for selected cross sections along these flooding sources, along with their non-encroachment widths, if calculated, are shown in Table 25, “Flood Hazard and Non-Encroachment Data for Selected Streams.”

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

Community	Flooding Source	Source for Topographic Elevation Data					
		Description	Scale	Contour Interval	RMSE <sub>z</sub>	Accuracy <sub>z</sub>	Citation
Santa Cruz County	Pacific Ocean	LiDAR OPC / USGS 2009-2011 & BATH NOAA	N/A	2 ft	N/A	N/A	11-09-853S

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.

**Table 24: Floodway Data**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	300	299 <sup>2</sup>	903	9.1	14.8	14.8	15.0	0.2
B	1,120	350	2,240	3.7	19.5	19.5	20.2	0.7
C	1,580	305	1,360	6.0	20.3	20.3	21.2	0.9
D	1,980	168	1,343	6.1	22.0	22.0	22.4	0.4
E	2,115	143	1,445	5.7	24.1	24.1	24.1	0.0
F	2,750	61	657	12.5	24.9	24.9	25.2	0.3
G	2,910	61	771	10.7	27.0	27.0	27.7	0.7
H	3,110	90	1,083	5.1	28.6	28.6	30.4	0.8
I	3,610	58	481	11.4	29.0	29.0	30.0	1.0
J	3,660	22	272	20.1	31.6	31.6	31.6	0.0
K	5,340	65	858	6.4	44.8	44.8	45.3	0.5

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>Width includes area of coastal velocity hazards

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: APTOS CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	4,520	136	1,281	1.2	16.1	16.1	16.1	0.0
B	4,160	150	1,447	1.1	16.1	16.1	16.1	0.0
C	6,245	150	307	5.1	16.1	16.5	16.5	0.4
D	7,108	150	383	4.1	23.1	23.1	23.5	0.4
E	7,590	55	297	5.3	29.0	29.0	29.2	0.2
F	7,960	70	449	3.5	30.2	30.2	30.4	0.2
G	8,248	75	338	4.6	35.4	35.4	36.0	0.6
H	8,353	12	143	11.0	35.4	35.4	36.0	0.6
I	8,458	10	91	17.2	35.4	35.4	36.0	0.6
J	9,146	48	383	3.1	44.6	44.6	44.6	0.0
K	10,467	70	465	2.6	45.7	45.7	46.1	0.4
L	10,564	70	645	1.9	48.3	48.3	48.6	0.3
M	10,688	70	484	2.5	48.4	48.4	48.9	0.5
N	10,922	100	2,641	0.5	67.9	67.9	68.8	0.9
O	11,640	150	3,259	0.4	67.9	67.9	68.8	0.9

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: ARANA GULCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	50	56	479	9.0	34.4	34.4	34.4	0.0
B	115	102	550	7.9	34.7	34.7	34.7	0.0
C	980	86	652	6.6	38.2	38.2	38.2	0.0
D	1,200	112	501	8.7	38.2	38.2	38.2	0.0
E	2,540	75	744	5.8	42.8	42.8	42.8	0.0
F	3,870	66	495	8.8	46.3	46.3	46.3	0.0
G	4,970	65	373	11.6	55.6	55.6	55.6	0.0
H	6,020	81	468	9.3	68.8	68.8	68.8	0.0
I	6,170	92	518	8.4	70.0	70.0	70.0	0.0
J	6,400	118	1,694	2.6	89.3	89.3	89.3	0.0
K	20,420	32	286	11.6	448.0	448.0	448.5	0.5
L	21,530	35	280	11.9	465.8	465.8	466.1	0.3
M	22,055	40	682	4.9	481.0	481.0	481.0	0.0
N	22,430	50	512	5.3	481.3	481.3	481.4	0.1
O	22,660	50	449	6.0	482.4	482.4	483.4	1.0
P	23,685	33	194	13.9	492.9	492.9	492.9	0.0
Q	25,125	40	291	9.3	515.4	515.4	515.6	0.2
R	26,595	54	261	10.3	542.9	542.9	542.9	0.0
S	26,745	59	460	5.9	548.6	548.6	548.6	0.0
T	27,720	130	642	3.8	552.8	552.8	553.4	0.6
U	28,050	223	946	2.6	553.6	553.6	554.4	0.8

<sup>1</sup>Feet above confluence with Branciforte Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: CARBONERA CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	29,055	60	488	5.0	555.9	555.9	556.1	0.2
W	30,065	37	196	11.2	561.8	561.8	561.8	0.0
X	30,265	56	466	4.7	568.7	568.7	568.7	0.0
Y	31,995	42	131	10.2	581.4	581.4	581.4	0.0
Z	32,305	59	538	2.5	591.0	591.0	591.0	0.0
AA	33,790	14	92	14.4	619.5	619.5	619.5	0.0
AB	34,070	82	442	3.0	623.9	623.9	624.3	0.4
AC	35,785	60	177	7.4	639.6	639.6	639.6	0.0
AD	36,395	22	127	7.8	646.4	646.4	646.7	0.3
AE	36,570	29	378	2.6	659.4	659.4	659.7	0.3
AF	37,060	26	160	6.2	659.6	659.6	659.8	0.2
AG	37,560	24	265	2.7	672.5	672.5	672.5	0.0
AH	39,018	20	84	11.7	678.4	678.4	678.4	0.0
AI	40,082	14	83	11.9	710.7	710.7	711.2	0.5
AJ	41,375	24	113	8.8	738.6	738.6	738.0	0.6

<sup>1</sup>Feet above confluence with Branciforte Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: CARBONERA CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A <sup>2</sup>	13,680	*	*	*	70.7	*	*	*
B <sup>2</sup>	15,050	*	*	*	75.6	*	*	*
C	16,410	144	834	9.5	81.3	81.3	81.8	0.5
D	17,410	149	1,196	6.6	85.5	85.5	86.2	0.7
E	18,610	142	1,167	6.8	88.2	88.2	88.2	1.0
F	21,090	109	765	10.4	99.6	99.6	99.6	0.0
G	23,540	99	833	9.5	108.5	108.5	109.1	0.6
H	23,680	97	853	9.3	110.3	110.3	110.9	0.6
I	24,740	100	981	8.1	114.6	114.6	115.3	0.7
J	24,880	88	997	8.0	115.4	115.4	115.8	0.4
K	28,310	215	1,377	5.8	127.4	127.4	127.4	0.0
L	28,430	212	1,475	5.4	128.0	128.0	128.0	0.0
M	29,450	128	889	8.9	130.8	130.8	131.5	0.7
N	31,850	98	820	9.7	142.2	142.2	143.2	1.0
O	33,360	200	950	8.4	152.5	152.5	152.8	0.3
P	33,480	200	1,046	7.6	153.0	153.0	153.6	0.6
Q	35,910	144	982	8.1	161.0	161.0	161.3	0.3
R	37,630	80	894	8.9	169.3	169.3	169.9	0.6
S	40,310	96	750	10.6	185.3	185.3	185.4	0.1
T	40,480	139	1,546	5.1	193.6	193.6	193.6	0.0
U	41,830	85	790	10.0	195.5	195.5	196.0	0.5
V	43,910	107	1,065	7.5	206.9	206.9	207.4	0.5

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Floodway not computed/shown for this cross section

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: CORRALITOS CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	45,970	102	1,019	7.8	218.8	218.8	219.8	1.0
X	47,610	80	537	14.8	225.2	225.2	225.2	0.0
Y	48,250	100	862	9.2	233.6	233.6	234.1	0.5
Z	49,430	113	860	9.2	241.0	241.0	241.4	0.4
AA	49,560	119	655	12.1	243.0	243.0	243.0	0.0
AB	51,650	87	564	14.1	256.4	256.4	256.5	0.1
AC	52,550	93	829	9.6	267.3	267.3	267.3	0.0

<sup>1</sup>Feet above confluence with Pajaro River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: CORRALITOS CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A <sup>2</sup>	1,314	*	*	*	42.3	*	*	*
B <sup>2</sup>	1,446	*	*	*	42.3	*	*	*
C <sup>2</sup>	2,590	*	*	*	42.7	*	*	*
D <sup>2</sup>	4,869	*	*	*	44.5	*	*	*
E <sup>2</sup>	4,992	*	*	*	44.6	*	*	*
F <sup>2</sup>	5,460	*	*	*	44.7	*	*	*

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>No floodway computed for this stream

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: COWARD CREEK/LAKE TYNAN**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	780	706	2,889	0.8	16.8	8.7 <sup>2</sup>	9.5 <sup>2</sup>	0.8
B	3,040	120	864	2.7	16.8	9.0 <sup>2</sup>	9.7 <sup>2</sup>	0.7
C	3,460	201	1,733	1.3	16.8	10.4 <sup>2</sup>	11.2 <sup>2</sup>	0.8
D	5,320	350	2,847	0.8	16.8	10.4 <sup>2</sup>	11.3 <sup>2</sup>	0.9
E	7,970	411	2,729	0.7	16.8	10.4 <sup>2</sup>	11.3 <sup>2</sup>	0.9
F	8,360	422	2,954	0.6	16.8	10.4 <sup>2</sup>	11.3 <sup>2</sup>	0.9
G	11,220	401	2,566	0.7	16.8	10.5 <sup>2</sup>	11.5 <sup>2</sup>	1.0
H	13,360	139	397	4.5	16.8	11.7 <sup>2</sup>	12.4 <sup>2</sup>	0.7
I	13,640	150	631	2.8	16.8	13.5 <sup>2</sup>	14.0 <sup>2</sup>	0.5
J	13,850	100	379	4.7	16.8	13.6 <sup>2</sup>	14.1 <sup>2</sup>	0.5
K	14,540	108	1,586	1.1	28.5	28.5	28.5	0.0
L	16,580	125	1,187	1.5	28.6	28.6	28.7	0.1
M	17,530	101	638	2.8	28.7	28.7	29.0	0.3
N	18,670	81	242	7.3	34.1	34.1	34.1	0.0

<sup>1</sup>Feet above confluence with Watsonville Slough

<sup>2</sup>Elevation computed without consideration of backwater effects from Pajaro River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: HARKINS SLOUGH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	410	90	128	5.0	10.9	10.9	11.1	0.2
B	1,310	80	330	1.9	12.5	12.5	13.5	1.0
C	1,610	70	100	6.3	14.2	14.2	14.4	0.2
D	2,250	60	236	2.7	20.9	20.9	21.9	1.0
E	4,657	50	170	3.7	43.5	43.5	44.5	1.0
F	4,854	109	1,278	0.5	57.6	57.6	57.6	0.0
G	5,059	8	92	6.9	57.6	57.6	57.6	0.0
H	5,424	30	335	1.9	61.1	61.1	61.1	0.0
I	6,077	30	173	3.7	61.1	61.1	62.0	0.9

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: MOORE CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,700	89	861	0.6	51.6	51.6	52.6	1.0
B	2,820	30	295	1.9	51.6	51.6	52.6	1.0
C	2,820	30	321	1.7	56.7	56.7	57.7	1.0
D	4,137	17	55	10.2	64.7	64.7	64.7	0.0
E	4,374	30	188	3.0	72.6	72.6	72.6	0.0
F	5,014	22	59	9.4	77.8	77.8	77.8	0.0

<sup>1</sup>Feet above confluence with Soquel Creek

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: NOBEL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	1,535 <sup>2</sup>	4,419	9.9	*	11.4	11.4	0.0
B	2,840	4,570 <sub>3</sub>	27,409 <sub>3</sub>	1.6 <sub>3</sub>	15.1	15.1	15.1 <sub>3</sub>	0.0 <sub>3</sub>
C	7,680	3	3	3	18.3	18.3	3	3
D	10,440	3	3	3	20.6	20.6	3	3
E	13,101	3	3	3	22.5	22.5	3	3
F	13,219	3	3	3	22.5	22.5	3	3
G	15,760	3	3	3	24.2	24.2	3	3
H <sup>4</sup>	18,120	*	*	*	26.1	*	*	*
I <sup>4</sup>	20,278	*	*	*	29.5	*	*	*
J <sup>4</sup>	20,883	*	*	*	30.1	*	*	*
K <sup>4</sup>	23,020	*	*	*	30.6	*	*	*
L <sup>4</sup>	26,940	*	*	*	35.8	*	*	*
M <sup>4</sup>	28,500	*	*	*	37.0	*	*	*
N <sup>4</sup>	29,899	*	*	*	38.4	*	*	*
O <sup>4</sup>	30,031	*	*	*	38.4	*	*	*
P <sup>4</sup>	31,095	*	*	*	38.4	*	*	*

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>Width includes area of coastal velocity hazards

<sup>3</sup>Floodway computed without consideration of levee

<sup>4</sup>Floodway not computed/shown for this cross section

\*Controlled by coastal flooding – see Flood Insurance Rate map for regulatory base flood elevation

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: PAJARO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Q <sup>3</sup>	31,285	*	*	*	38.8	*	*	*
R <sup>3</sup>	34,575	*	*	*	40.3	*	*	*
S <sup>3</sup>	36,240	*	*	*	42.2	*	*	*
T <sup>3</sup>	38,560	*	*	*	44.5	*	*	*
U <sup>3</sup>	39,440	*	*	*	44.9	*	*	*
V <sup>3</sup>	43,100	*	*	*	47.2	*	*	*
W	46,145	2	2	2	50.5	50.5	2	2
X	48,395	2	2	2	53.0	53.0	2	2
Y	52,015	2	2	2	57.0	57.0	2	2
Z	54,105	2	2	2	59.6	59.6	2	2
AA	57,665	2	2	2	62.5	62.5	2	2
AB	60,610	2	2	2	64.9	64.9	2	2
AC	60,850	2	2	2	64.9	64.9	2	2
AD	62,270	1,340 <sup>4</sup>	7,784	5.5	65.5	65.5	65.5	0.0
AE	66,110	300 <sup>4</sup>	4,152	10.4	68.2	68.2	68.7	0.5
AF	68,240	300 <sup>4</sup>	4,099	10.5	71.3	71.3	72.0	0.7

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>Floodway computed without consideration of levee

<sup>3</sup>Floodway not computed/shown for this cross section

<sup>4</sup>Width extends beyond county boundary

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: PARAJO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AG	71,020	304 <sup>2</sup>	6,052	7.1	77.2	77.2	77.5	0.3
AH	73,820	271 <sup>2</sup>	5,392	7.6	80.6	80.6	80.9	0.3
AI	76,380	500 <sup>2</sup>	6,064	7.1	82.7	82.7	83.2	0.5
AJ	79,237	393 <sup>2</sup>	6,471	6.6	85.5	85.5	86.1	0.6
AK	79,362	447 <sup>2</sup>	6,155	7.0	85.6	85.6	86.1	0.5
AL	82,020	500 <sup>2</sup>	4,337	9.5	87.5	87.5	88.5	1.0
AM	84,440	203 <sup>2</sup>	3,756	11.4	91.9	91.9	92.5	0.6

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>Width extends beyond county boundary

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: PARAJO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,840	4,570	27,409	1.6	15.1	15.1	15.1	0.0
B	7,680	5,116	21,892	2.0	15.7	15.7	15.9	0.2
C	10,440	5,488	28,165	1.5	16.2	16.2	16.8	0.6
D	13,101	5,350	28,665	1.5	16.6	16.6	17.4	0.8
E	13,219	5,315	29,269	1.5	16.7	16.7	17.5	0.8
F	15,760	5,422	30,289	1.4	17.1	17.1	17.9	0.8
G <sup>2</sup>	18,120	*	*	*	17.3	*	*	*
H <sup>2</sup>	20,278	*	*	*	17.4	*	*	*
I <sup>2</sup>	20,883	*	*	*	22.6	*	*	*
J <sup>2</sup>	23,020	*	*	*	23.1	*	*	*
K <sup>2</sup>	26,940	*	*	*	25.7	*	*	*
L <sup>2</sup>	28,500	*	*	*	26.8	*	*	*
M	46,145	3,683	18,408	2.3	45.8	45.8	46.8	1.0
N	48,395	2,700	13,953	3.1	47.1	47.1	47.9	0.8
O	52,015	2,200	10,093	4.3	50.9	50.9	51.2	0.3
P	54,105	2,100	10,804	4.0	52.6	52.6	53.3	0.7
Q	57,665	2,400	11,024	3.9	55.6	55.6	56.4	0.8
R	60,610	1,375	8,709	4.9	59.6	59.6	59.9	0.3
S	60,850	1,320	9,916	4.3	60.9	60.9	60.9	0.0

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>Floodway not computed/shown for this cross section

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

FLOODING SOURCE: PARAJO RIVER-WITHOUT LEVEE  
 CONSIDERATION

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	750	200	1,540	1.0	10.5	10.5	10.5	0.0
B	2,505	148	253	6.1	10.6	10.6	10.7	0.1
C	3,020	40	369	4.2	16.9	16.9	17.7	0.8
D	4,550	68	309	5.0	21.5	21.5	21.6	0.1
E	4,670	68	237	6.5	22.2	22.2	22.9	0.7
F	5,220	68	420	3.3	24.7	24.7	25.5	0.8
G	5,440	70	776	1.8	29.6	29.6	29.7	0.1
H	6,225	70	423	3.3	29.7	29.7	30.0	0.3
I	6,960	30	121	11.5	33.6	33.6	33.7	0.1
J	7,180	49	1,060	1.3	56.1	56.1	56.1	0.0
K	9,205	47	325	3.8	56.5	56.5	57.0	0.5
L	10,385	120	389	3.2	62.6	62.6	63.6	1.0
M	10,945	40	748	1.6	81.4	81.4	81.4	0.0
N	12,565	40	345	3.1	81.5	81.5	81.8	0.3
O	14,255	40	280	3.8	83.3	83.3	84.1	0.8

<sup>1</sup>Feet above mouth

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: RODEO CREEK GULCH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	870	95	962	6.2	39.8	35.7 <sup>2</sup>	35.7 <sup>2</sup>	0.0
B	1,070	96	995	6.0	39.8	36.1 <sup>2</sup>	36.1 <sup>2</sup>	0.0
C	3,170	213	1,230	4.8	41.7	41.7	42.1	0.4
D	5,592	139	990	6.0	47.0	47.0	47.4	0.4
E <sup>3</sup>	6,400	*	*	*	49.2	*	*	*
F <sup>3</sup>	7,820	*	*	*	51.9	*	*	*
G <sup>3</sup>	9,310	*	*	*	58.8	*	*	*
H <sup>3</sup>	12,010	*	*	*	64.8	*	*	*
I <sup>3</sup>	12,610	*	*	*	65.8	*	*	*
J <sup>3</sup>	13,480	*	*	*	70.7	*	*	*

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Elevation computed without consideration of backwater effects from Pajaro River

<sup>3</sup>No floodway computed

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SALSIPUEDES CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
C	3,170	*	2	2	41.7	41.7	2	2
D	5,592	*	2	2	46.1	46.1	2	2
E	6,400	*	2	2	46.4	46.4	2	2
F	7,820	*	2	2	49.9	49.9	2	2
G	9,310	*	2	2	58.8	58.8	2	2

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Floodway computed with consideration of levee

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SALSIPUEDES CREEK- WITHOUT  
 CONSIDERATION OF LEFT LEVEE**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	870	*	2	2	34.4	34.4	2	2
B	1,070	*	2	2	34.7	34.7	2	2
C	3,220	*	2	2	40.1	40.1	2	2
D	5,330	*	2	2	42.6	42.6	2	2

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Floodway computed with consideration of levee

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SALSIPUEDES CREEK- WITHOUT  
 CONSIDERATION OF RIGHT LEVEE**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	938	2	2	2	13.0	13.0	2	2
B	1,062	2	2	2	13.1	13.1	2	2
C	1,812	2	2	2	14.2	14.2	2	2
D	2,952	2	2	2	15.8	15.8	2	2
E	3,354	2	2	2	16.9	16.9	2	2
F	4,559	2	2	2	20.6	20.6	2	2
G	4,745	2	2	2	21.0	21.0	2	2
H	5,933	2	2	2	23.8	23.8	2	2
I	6,099	2	2	2	24.1	24.1	2	2
J	7,686	2	2	2	25.2	25.2	2	2
K	7,948	2	2	2	27.2	27.2	2	2
L	9,303	2	2	2	28.0	28.0	2	2
M	10,388	2	2	2	28.7	28.7	2	2
N	10,677	400	5,148	9.2	30.3	30.3	30.3	0.0
O	11,991	399	5,194	9.2	32.6	32.6	32.6	0.0
P	13,016	400	5,431	8.5	34.3	34.3	34.3	0.0
Q	16,428	260	3,184	14.6	39.9	39.9	40.6	0.7
R	17,903	237	3,347	13.9	45.5	45.5	45.7	0.2
S	18,578	246	5,248	8.8	51.6	51.6	51.6	0.0
T	19,558	234	3,133	14.8	51.8	51.8	52.0	0.2
U	20,898	240	3,097	13.0	57.4	57.4	58.0	0.6
V	21,828	233	4,326	10.7	63.6	62.8	64.2	1.4
W	23,088	234	3,963	11.7	65.8	65.8	66.8	1.0

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

<sup>2</sup>Floodway computed without consideration of levee

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
**SANTA CRUZ COUNTY, CALIFORNIA**  
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
X	23,408	157	3,817	12.2	68.8	68.8	69.4	0.6
Y	25,078	156	2,864	16.2	70.7	70.7	71.6	0.9
Z	43,599	452	6,592	6.5	259.2	259.2	259.2	0.0
AA	45,739	800	7,448	2.5	262.2	262.2	262.2	0.0
AB	48,726	1,000	11,078	3.9	262.9	262.9	263.5	0.6
AC	48,982	1,000	1,083	4.2	263.2	263.2	263.7	0.5
AD	49,281	1,000	11,673	3.7	263.7	263.7	264.4	0.7
AE	49,673	1,000	12,667	3.4	264.1	264.1	264.9	0.8
AF	52,365	786	8,666	4.2	265.8	265.8	266.7	0.9
AG	52,640	481	4,670	7.8	266.0	266.0	266.7	0.7
AH	53,321	241	4,353	8.4	267.3	267.3	268.3	1.0
AI	53,455	178	3,968	9.2	268.3	268.3	269.1	0.8
AJ	54,713	156	2,164	16.9	269.2	269.2	269.3	0.1
AK	55,783	137	3,033	12.0	278.0	278.0	278.0	0.0
AL	57,098	134	3,349	10.9	281.3	281.3	281.3	0.0
AM	60,048	205	4,801	7.1	286.7	286.7	286.7	0.0
AN	61,998	160	2,900	11.7	288.1	288.1	288.1	0.0
AO	62,128	174	3,203	10.6	291.1	291.1	291.1	0.0
AP	63,265	163	3,091	11.0	292.4	292.4	292.4	0.0
AQ	63,502	163	3,386	10.0	296.6	296.6	296.6	0.0
AR	65,308	159	3,127	10.9	298.4	298.4	298.4	0.0
AS	67,988	153	3,784	9.0	305.1	305.1	305.5	0.4

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
**SANTA CRUZ COUNTY, CALIFORNIA**  
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AT	68,095	153	3,835	8.9	305.4	305.4	305.8	0.4
AU	69,173	188	3,156	10.8	305.9	305.9	306.4	0.5
AV	70,113	309	6,000	5.7	310.0	310.0	310.0	0.0
AW	72,818	106	1,982	15.0	312.4	312.4	312.7	0.3
AX	75,455	258	4,380	6.3	321.8	321.8	321.9	0.1
AY	75,592	166	3,527	7.8	323.1	323.1	323.1	0.0
AZ	75,890	169	3,541	7.8	324.2	324.2	324.2	0.0
BA	76,087	186	2,478	11.0	324.2	324.2	324.3	0.1
BB	77,411	114	1,522	18.2	327.4	327.4	327.4	0.0
BC	77,548	124	1,949	14.2	334.1	334.1	334.1	0.0
BD	79,844	171	2,203	12.2	340.6	340.6	340.6	0.0
BE	81,084	183	1,898	14.2	348.0	348.0	348.2	0.2
BF	83,293	122	1,999	13.5	366.7	366.7	367.7	1.0
BG	83,515	124	2,103	12.8	370.0	370.0	370.0	0.0
BH	84,779	168	2,139	12.6	374.4	374.4	374.5	0.1
BI	86,227	110	1,806	14.3	384.1	384.1	384.1	0.0
BJ	86,342	114	1,958	13.2	387.0	387.0	387.0	0.0
BK	88,429	118	1,835	14.1	393.6	393.6	393.6	0.0
BL	89,273	121	1,338	19.3	400.0	400.0	400.2	0.2
BM	89,585	195	2,163	11.9	406.6	406.6	406.6	0.0
BN	92,159	181	3,225	7.5	418.2	418.2	418.2	0.0
BO	93,351	159	2,011	12.0	419.1	419.1	419.1	0.0
BP	93,517	151	2,355	10.2	423.7	423.7	423.7	0.0

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
**SANTA CRUZ COUNTY, CALIFORNIA**  
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BQ	95,354	168	1,851	13.0	427.7	426.8	427.8	1.0
BR	97,474	139	2,355	10.2	441.8	441.8	441.8	0.0
BS	99,559	146	1,708	14.1	447.4	447.4	447.6	0.2
BT	100,846	180	2,343	10.3	458.4	458.4	458.4	0.0
BU	100,976	180	3,339	7.4	462.7	462.7	462.7	0.0
BV	102,626	85	1,370	8.9	464.9	464.9	465.7	0.8
BW	103,736	99	1,825	6.7	468.2	468.2	468.6	0.4
BX	104,956	62	921	13.2	469.0	469.0	469.4	0.4
BY	105,176	64	1,062	11.5	471.3	471.3	471.8	0.5
BZ	108,646	67	729	16.7	482.4	482.4	482.4	0.0
CA	109,377	96	1,483	8.2	490.9	490.9	490.9	0.0
CB	109,595	103	1,577	7.7	494.5	494.5	494.5	0.0
CC	111,766	127	1,793	5.9	499.4	499.4	499.4	0.0
CD	112,766	58	670	15.7	500.2	500.2	500.2	0.0
CE	112,886	63	859	12.3	502.9	502.9	502.9	0.0
CF	113,526	140	2,062	5.1	506.5	506.5	506.5	0.0
CG	113,651	138	1,880	5.6	506.5	506.5	506.5	0.0
CH	114,573	103	1,025	10.3	508.6	508.6	508.7	0.1
CI	114,789	91	1,132	9.3	510.7	510.7	510.8	0.1
CJ	118,356	135	1,415	4.3	522.3	522.3	522.8	0.5
CK	121,138	96	861	7.1	536.3	536.3	536.3	0.0
CL	121,264	92	1,025	6.0	538.5	538.5	538.5	0.0
CM	122,516	97	621	9.9	543.9	543.9	543.9	0.0

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CN	123,862	95	1,139	5.4	550.2	550.2	550.2	0.0
CO	123,973	95	1,117	5.5	550.3	550.3	550.3	0.0
CP	125,349	56	480	12.8	554.0	554.0	553.8	0.2
CQ	125,495	58	560	11.0	556.0	556.0	556.0	0.0
CR	126,980	34	386	14.4	563.6	563.6	564.5	0.9
CS	127,145	56	535	10.4	567.6	567.6	567.6	0.0
CT	127,570	47	497	11.2	569.6	569.6	569.6	0.0
CU	127,735	52	542	10.3	571.0	571.0	571.0	0.0
CV	128,659	55	750	7.4	575.0	575.0	575.6	0.6
CW	128,825	74	741	7.5	575.0	575.0	575.8	0.8
CX	130,517	69	447	11.2	582.7	582.7	582.7	0.0
CY	131,197	51	347	14.5	594.5	594.5	594.5	0.0
CZ	132,261	40	511	8.3	603.4	603.4	603.9	0.5
DA	132,442	66	732	5.8	609.0	609.0	609.1	0.1
DB	133,499	63	344	12.3	612.8	612.8	612.9	0.1
DC	134,459	48	408	10.4	623.5	623.5	623.5	0.0
DD	137,442	49	318	13.3	644.1	644.1	644.1	0.0
DE	138,233	34	257	16.5	656.3	659.3	656.4	2.9
DF	138,355	50	343	12.3	661.2	661.2	661.2	0.0
DG	140,439	55	313	13.5	678.5	678.5	678.3	0.2
DH	141,389	42	330	12.8	690.6	690.6	691.3	0.7

<sup>1</sup>Feet above mouth at Pacific Ocean (Monterey Bay)

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	938	288	4,021	12.6	13.0	13.0	13.0	0.0
B	1,062	286	3,919	12.9	13.1	13.1	13.1	0.0
C	1,812	319	4,336	11.7	14.2	14.2	14.2	0.0
D	2,952	997	8,300	6.1	15.8	15.8	15.8	0.0
E	3,354	983	9,424	5.4	16.6	16.6	16.6	0.0
F	4,559	1,975	9,205	5.5	17.5	17.5	17.5	0.0
G	4,745	1,930	11,165	4.5	18.3	18.3	18.7	0.4
H	5,933	875	5,299	9.5	18.8	18.8	19.4	0.6
I	6,099	989	7,757	6.5	20.0	20.0	21.0	1.0
J	7,686	346	4,206	11.3	22.9	22.9	23.1	0.2
K	7,948	288	4,550	10.5	24.3	24.3	24.4	0.1
L	9,303	330	4,028	11.8	26.1	26.1	26.1	0.0
M	10,388	299	4,081	11.7	26.7	26.7	27.7	1.0

<sup>1</sup>Feet above mouth at Pacific Ocean

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SAN LORENZO RIVER- WITHOUT LEVEE  
 CONSIDERATION**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	300	36	212	13.5	*	12.4	12.4	0.0
B	675	15	219	13.1	21.6	21.6	21.6	0.0
C	1,035	63	1,132	2.5	31.0	31.0	31.0	0.0
D	1,735	70	517	5.5	31.1	31.1	31.3	0.2
E	1,975	83	535	5.3	31.6	31.6	32.3	0.7
F	2,475	359	526	5.4	36.8	36.8	36.8	0.0
G	2,955	152	412	6.9	43.9	43.9	43.9	0.0
H	3,575	129	384	7.4	55.0	55.0	55.0	0.0
I	4,475	205	517	5.5	69.0	69.0	69.0	0.0

<sup>1</sup>Feet above mouth at Pacific Ocean

\*Controlled by coastal flooding – see Flood Insurance Rate Map for regulatory base flood elevation

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SAN VICENTE CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A <sup>2</sup>	480	*	*	*	3	*	*	*
B <sup>2</sup>	540	*	*	*	3	*	*	*
C <sup>2</sup>	2,200	*	*	*	3	*	*	*

<sup>1</sup>Feet above mouth at Pacific Ocean

<sup>2</sup>No floodway computed for this stream

<sup>3</sup>Controlled by coastal flooding – see Flood Insurance Rate Map for regulatory base flood elevation

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SCHWANS LAGOON**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	220	591	1,882	9.3	14.5	14.5	14.5	0.0
B	470	372	2,536	6.9	17.0	17.0	17.0	0.0
C	720	340	3,007	5.8	18.9	18.9	18.9	0.0
D	1,120	300	3,614	4.8	19.5	19.5	19.6	0.1
E	2,330	105	1,170	14.8	19.6	19.6	19.6	0.0
F	3,250	142	1,940	8.9	25.7	25.7	25.7	0.0
G	4,720	162	2,290	7.6	30.6	30.6	30.7	0.1
H	5,100	171	2,130	8.1	33.9	33.9	34.5	0.6
I	5,970	355	3,140	5.5	36.9	36.9	37.8	0.9
J	6,115	487	4,200	4.1	39.5	39.5	40.1	0.6
K	8,140	600	4,770	3.6	42.6	42.6	43.3	0.7
L	8,385	623	6,770	2.6	44.4	44.4	45.3	0.9
M	9,355	106	1,190	14.6	44.4	44.4	45.3	0.9
N	11,235	236	3,050	5.7	54.9	54.9	55.1	0.2
O	13,915	301	2,520	6.5	59.7	59.7	60.6	0.9
P	18,435	179	2,060	8.0	81.9	81.9	82.4	0.5
Q	21,995	161	1,680	9.7	99.7	99.7	99.7	0.0
R	24,835	266	1,600	10.2	108.8	108.8	108.8	0.0
S	25,835	470	4,160	3.9	115.1	115.1	115.1	0.0
T	26,555	280	2,100	7.8	116.4	116.4	116.4	0.0
U	27,755	155	1,260	13.0	123.3	123.3	123.3	0.0
V	29,025	120	1,300	11.8	134.9	134.9	135.0	0.1
W	29,310	153	2,260	6.8	143.9	143.9	143.9	0.0

<sup>1</sup>Feet above mouth at Pacific Ocean

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
**SANTA CRUZ COUNTY, CALIFORNIA**  
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SOQUEL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
X	32,500	154	1,780	8.6	154.1	154.1	155.1	1.0
Y	32,970	93	1,070	14.2	157.4	157.4	157.4	0.0
Z	33,085	92	1,420	10.8	161.8	161.8	161.9	0.1
AA	34,825	132	2,290	6.7	171.7	171.7	172.7	1.0
AB	36,825	141	1,820	8.4	178.0	178.0	179.0	1.0
AC	38,025	108	1,390	11.0	189.0	189.0	189.0	0.0
AD	38,135	114	1,610	9.5	191.5	191.5	191.5	0.0
AE	39,735	110	1,742	8.8	199.0	199.0	199.4	0.4

<sup>1</sup>Feet above mouth at Pacific Ocean

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: SOQUEL CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	800	351	874	0.8	17.4	6.4 <sup>2</sup>	7.4	1.0
B	1,700	143	403	1.7	17.4	6.6 <sup>2</sup>	7.5	0.9
C	1,830	102	409	1.7	17.4	7.0 <sup>2</sup>	7.9	0.9
D	3,130	158	325	2.2	17.4	7.7 <sup>2</sup>	8.7	1.0
E	4,560	100	305	1.4	17.4	9.2 <sup>2</sup>	10.1	0.9
F	5,840	81	313	1.4	17.4	9.6 <sup>2</sup>	10.6	1.0
G	5,980	123	266	1.6	17.4	9.7 <sup>2</sup>	10.6	0.9
H	6,086	205	1,145	0.5	17.4	9.6 <sup>2</sup>	10.2	0.6
I	7,071	86	93	5.9	17.4	12.9 <sup>2</sup>	12.9	0.0
J	8,511	310	4,989	0.1	25.5	25.5	26.4	0.9
K	9,587	212	2,888	0.2	25.5	25.5	26.4	0.9
L	10,419	179	1,314	0.2	25.5	25.5	26.4	0.9
M	12,994	16	34	9.2	53.6	53.6	53.7	0.1
N	13,178	50	60	5.2	57.5	57.5	57.6	0.1

<sup>1</sup>Feet above confluence with Watsonville Slough

<sup>2</sup>Elevation computed without consideration of backwater effects from Pajaro River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: STRUVE SLOUGH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A <sup>2</sup>	1,040	*	*	49.5	*	*	*	*
B <sup>2</sup>	2,080	*	*	51.7	*	*	*	*
C <sup>2</sup>	3,038	*	*	52.7	*	*	*	*
D <sup>2</sup>	3,322	*	*	56.7	*	*	*	*
E <sup>2</sup>	4,260	*	*	56.7	*	*	*	*

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>No floodway computed for this stream

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: THOMASELLO CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A <sup>2</sup>	1,190	*	*	*	48.3	*	*	*
B <sup>2</sup>	2,610	*	*	*	48.3	*	*	*
C <sup>2</sup>	3,978	*	*	*	52.8	*	*	*
D <sup>2</sup>	4,121	*	*	*	53.8	*	*	*
E <sup>2</sup>	5,540	*	*	*	58.8	*	*	*
F <sup>2</sup>	7,208	*	*	*	73.5	*	*	*
G <sup>2</sup>	7,332	*	*	*	73.5	*	*	*
H <sup>2</sup>	8,460	*	*	*	83.6	*	*	*
I <sup>2</sup>	11,100	*	*	*	115.7	*	*	*

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>No floodway computed for this stream

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: THOMPSON CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY <sup>3</sup>	WITH FLOODWAY	INCREASE
A	400	626 <sup>2</sup>	2,725	1.4	13.0	11.5	11.5	0.0
B	1,680	791 <sup>2</sup>	3,813	1.0	13.6	11.7	11.7	0.0
C	2,880	1,050 <sup>2</sup>	4,230	0.9	14.0	11.8	11.8	0.0
D	3,920	847 <sup>2</sup>	4,076	0.9	14.4	11.8	11.9	0.1
E	5,120	1,306 <sup>2</sup>	662	0.6	14.8	11.9	12.0	0.1
F	6,220	800 <sup>2</sup>	4,147	0.9	15.2	12.0	12.1	0.1
G	6,375	800 <sup>2</sup>	2,862	1.4	15.5	12.0	12.1	0.1
H	7,680	1,150 <sup>2</sup>	2,307	1.7	15.6	12.0	12.6	0.6
I	7,980	950 <sup>2</sup>	5,869	0.7	15.7	12.0	12.6	0.6
J	9,090	942 <sup>2</sup>	4,582	0.8	15.8	12.0	12.7	0.7
K	10,290	959 <sup>2</sup>	4,343	0.9	15.9	12.1	12.8	0.7
L	11,770	950 <sup>2</sup>	4,833	0.8	16.0	12.1	12.9	0.8
M	12,940	900 <sup>2</sup>	4,268	0.9	16.2	12.2	13.0	0.8
N	14,220	900 <sup>2</sup>	4,289	0.9	16.3	12.3	13.1	0.8
O	14,940	900 <sup>2</sup>	4,103	0.9	16.6	12.3	13.1	0.8
P	15,180	750 <sup>2</sup>	4,406	0.9	16.7	14.1	14.2	0.1
Q	17,915	100 <sup>2</sup>	715	1.8	17.0	14.1	14.3	0.2
R	18,185	100 <sup>2</sup>	796	1.6	17.0	14.9	14.9	0.0
S	22,420	100	922	1.4	17.4	14.9	15.4	0.5
T	23,830	30	215	1.9	17.5	14.9	15.6	0.7
U	24,065	30	218	1.9	18.5	14.9	15.6	0.7
V	24,695	30	242	1.7	22.3	15.0	15.8	0.8

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Width of map may be greater due to combined floodway with Pajaro River

<sup>3</sup>Elevation computed without consideration of influence from Pajaro River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: WATSONVILLE SLOUGH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
W	25,340	30	274	1.5	23.2	15.1 <sup>2</sup>	15.9	0.8
X	26,190	30	159	2.6	24.0	15.3 <sup>2</sup>	16.1	0.8
Y	26,310	30	231	1.8	24.1	16.9 <sup>2</sup>	17.0	0.1
Z	27,150	30	194	2.1	25.7	17.0 <sup>2</sup>	17.4	0.4
AA	27,960	49	329	1.2	25.7	17.0 <sup>2</sup>	17.6	0.6
AB	28,080	50	392	1.0	25.7	17.0 <sup>2</sup>	16.8	0.2
AC	28,655	365	3,502	0.1	25.8	16.9 <sup>2</sup>	17.7	0.8
AD	29,519	350	2,863	0.1	25.8	16.9 <sup>2</sup>	17.7	0.8
AE	29,576	351	2,854	0.1	25.8	16.9 <sup>2</sup>	17.7	0.8
AF	30,379	359	3,056	0.1	25.8	16.9 <sup>2</sup>	17.7	0.8
AG	31,648	314	5,174	0.0	26.1	26.4	26.8	0.4
AH	32,647	271	3,265	0.1	26.1	26.4	26.8	0.4
AI	33,022	60	637	0.3	26.1	26.4	26.8	0.4
AJ	33,484	33	130	1.3	26.3	26.5	26.9	0.4
AK	34,246	28	127	1.4	39.7	39.7	40.4	0.7
AL	35,531	22	34	5.1	59.1	59.1	59.2	0.1

<sup>1</sup>Feet above confluence with Pajaro River

<sup>2</sup>Elevation computed without consideration of influence from Pajaro River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: WATSONVILLE SLOUGH**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	905	41	664	17.7	265.1	262.8 <sup>2</sup>	262.8 <sup>2</sup>	0.0
B	1,055	181	1,778	6.6	268.0	268.0	268.0	0.0
C	1,745	117	1,103	10.6	268.5	268.5	268.5	0.0
D	2,435	120	1,560	7.5	270.8	270.8	270.8	0.0
E	2,600	118	1,467	8.0	271.3	271.3	271.3	0.0
F	3,250	66	636	13.2	273.7	273.7	273.7	0.0
G	4,200	67	619	13.6	281.0	281.0	281.0	0.0
H	4,845	88	1,000	8.4	286.4	286.4	286.4	0.0
I	5,000	98	888	9.5	287.4	287.4	287.4	0.0
J	5,810	97	750	11.2	292.4	292.4	292.4	0.0
K	7,065	126	1,406	6.0	300.1	300.1	300.1	0.0
L	7,245	163	1,761	4.8	301.2	301.2	301.2	0.0
M	7,780	126	1,078	7.8	301.6	301.6	301.6	0.0
N	8,500	74	630	11.3	304.0	304.0	304.0	0.0
O	8,990	104	882	9.5	308.7	308.7	308.7	0.0
P	10,570	78	734	11.4	317.7	317.7	317.7	0.0
Q	11,150	86	899	9.3	322.3	322.3	322.3	0.0
R	11,730	70	811	10.3	324.5	324.5	324.5	0.0
S	12,080	64	636	12.3	325.7	325.7	325.7	0.0
T	12,790	64	528	14.9	331.4	331.4	331.4	0.0
U	13,140	89	612	12.8	335.8	335.8	335.8	0.0
V	13,260	83	714	11.0	338.9	338.9	338.9	0.0
W	14,830	92	741	10.6	348.5	348.5	348.5	0.0

<sup>1</sup>Feet above confluence with San Lorenzo River

<sup>2</sup>Elevation computed without consideration of backwater from San Lorenzo River

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
**SANTA CRUZ COUNTY, CALIFORNIA**  
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: ZAYANTE CREEK**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
X	16,250	88	745	10.5	356.4	356.4	356.4	0.0
Y	16,530	65	640	9.5	358.5	358.5	358.5	0.0
Z	16,840	53	390	15.5	359.8	359.8	359.8	0.0
AA	17,500	77	486	12.5	371.8	371.8	371.8	0.0
AB	18,040	76	449	13.5	378.1	378.1	378.1	0.0
AC	18,580	86	558	10.9	384.7	384.7	384.7	0.0
AD	18,700	117	1,174	5.2	392.0	392.0	392.0	0.0
AE	18,930	110	954	6.3	392.2	392.2	392.2	0.0
AF	19,190	40	357	17.0	398.0	398.0	398.0	0.0
AG	19,840	89	800	7.6	405.2	405.2	405.2	0.0
AH	20,240	69	438	13.8	407.6	407.6	407.6	0.0
AI	20,650	88	739	8.2	413.0	413.0	413.0	0.0
AJ	20,770	70	6,621	9.7	413.3	413.3	413.3	0.0
AK	21,170	50	382	15.8	415.9	415.9	415.9	0.0
AL	21,560	62	433	14.0	423.0	423.0	423.0	0.0
AM	22,030	62	445	13.6	429.4	429.4	429.4	0.0
AN	22,490	56	475	12.7	434.6	434.6	434.6	0.0
AO	23,100	56	470	12.9	440.0	440.0	440.0	0.0
AP	23,700	27	313	19.3	450.6	450.6	450.6	0.0
AQ	24,230	32	486	12.4	461.5	461.5	461.5	0.0
AR	24,750	52	653	9.3	465.4	465.4	465.4	0.0
AS	25,930	65	643	9.4	470.1	470.1	470.1	0.0
AT	26,050	64	614	9.9	470.6	470.6	470.6	0.0

<sup>1</sup>Feet above confluence with San Lorenzo River

TABLE 24

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CALIFORNIA**  
 AND INCORPORATED AREAS

**FLOODWAY DATA**

**FLOODING SOURCE: ZAYANTE CREEK**

**Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams  
[Not Applicable to this Flood Risk Project]**

#### **6.4 Coastal Flood Hazard Mapping**

Flood insurance zones and BFEs including the wave effects were identified on each transect based on the results from the onshore wave hazard analyses. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and knowledge of coastal flood processes to determine the aerial extent of flooding. Sources for topographic data are shown in Table 23.

Zone VE is subdivided into elevation zones and BFEs are provided on the FIRM.

The limit of Zone VE shown on the FIRM is defined as the farthest inland extent of any of these criteria (determined for the 1% annual chance flood condition):

- The *primary frontal dune zone* is defined in 44 CFR Section 59.1 of the NFIP regulations. The primary frontal dune represents a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes that occur immediately landward and adjacent to the beach. The primary frontal dune zone is subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune zone occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.
- The *wave runup zone* occurs where the (eroded) ground profile is 3.0 feet or more below the 2-percent wave runup elevation.
- The *wave overtopping splash zone* is the area landward of the crest of an overtopped barrier, in cases where the potential 2-percent wave runup exceeds the barrier crest elevation by 3.0 feet or more.
- The *breaking wave height zone* occurs where 3-foot or greater wave heights could occur (this is the area where the wave crest profile is 2.1 feet or more above the total stillwater elevation).
- The *high-velocity flow zone* is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flow velocity squared ( $hv^2$ ) is greater than or equal to  $200 \text{ ft}^3/\text{sec}^2$ . This zone may only be used on the Pacific Coast.

The SFHA boundary indicates the limit of SFHAs shown on the FIRM as either “V” zones or “A” zones.

Table 26 indicates the coastal analyses used for floodplain mapping and the criteria used to determine the inland limit of the open-coast Zone VE and the SFHA boundary at each transect.

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

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD 88)	Zone Designation and BFE (ft NAVD 88)		
1		VE 20	N/A	Runup	Runup
2		VE 38	N/A	Overtopping	Overtopping
3		VE 22	N/A	Overtopping	Overtopping
4		VE 21	N/A	Runup	Runup
5		VE 17	N/A	Runup	Runup
6		VE 18	N/A	Runup	Runup
7		VE 20	N/A	Runup	Runup
8		VE 23	N/A	Runup	Runup
9		VE 21	N/A	Overtopping	Overtopping
10		VE 17	N/A	Runup	Runup
11		VE 19	N/A	Runup	Runup
12		VE 19	N/A	Overtopping	Overtopping
13		VE 21	N/A	Overtopping	Overtopping
14		VE 26	N/A	Runup	Runup
15		VE 19	N/A	Runup	Runup
16		VE 27	N/A	Runup	Runup
17	✓	VE 17	N/A	PFD	PFD
18		VE 32	N/A	Runup	Runup
19		VE 24	N/A	Runup	Runup
20		VE 32	N/A	Runup	Runup
21		VE 38	N/A	Overtopping	Overtopping
22		VE 31	N/A	Runup	Runup
23		VE 27	N/A	Runup	Runup
24		VE 34	N/A	Runup	Runup
25		VE 33	N/A	Runup	Runup
26		VE 24	N/A	Runup	Runup
27		VE 29	N/A	Runup	Runup
28		VE 32	N/A	Runup	Runup
29		VE 13	N/A	Runup	Runup
30		VE 18	N/A	Overtopping	Overtopping

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD 88)	Zone Designation and BFE (ft NAVD 88)		
31		VE 18	N/A	Overtopping	Overtopping
32		VE 19	N/A	Runup	Runup
33		VE 19	N/A	Overtopping	Overtopping
34		VE 20	N/A	Runup	Runup
35		VE 17	N/A	Runup	Runup
36		VE 31	N/A	Runup	Runup
37		VE 19	N/A	Runup	Runup
38		VE 18	N/A	Overtopping	Overtopping
39		VE 20	N/A	Runup	Runup
40		VE 20	N/A	Runup	Runup
41		VE 31	N/A	Runup	Runup
42		VE 42	N/A	Overtopping	Overtopping
43		VE 23	N/A	Runup	Runup
44		VE 35	N/A	Runup	Runup
45		VE 29	N/A	Runup	Runup
46		VE 16	N/A	Runup	Runup
47		VE 18	N/A	Overtopping	Overtopping
48		VE 20	N/A	Overtopping	Overtopping
49		VE 24	N/A	Runup	Runup
50		VE 22	N/A	Runup	Runup
51		VE 20	N/A	Runup	Runup
52		VE 23	N/A	Runup	Runup
53		VE 19	N/A	Runup	Runup
54		VE 25	N/A	Overtopping	Overtopping
55		VE 23	N/A	Runup	Runup
56		VE 26	N/A	Overtopping	Overtopping
57		VE 21	N/A	Overtopping	Overtopping
58		VE 21	N/A	Runup	Runup
59		VE 22	N/A	Runup	Runup
60		VE 20	N/A	Runup	Runup
61		VE 21	N/A	Runup	Runup

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD 88)	Zone Designation and BFE (ft NAVD 88)		
62		VE 23	N/A	Runup	Runup
63		VE 18	N/A	Runup	Runup
64		VE 21	N/A	Runup	Runup
65		VE 16	N/A	Runup	Runup
66		VE 20	N/A	Runup	Runup
67		VE 20	N/A	Runup	Runup
68		VE 19	N/A	Runup	Runup
69	✓	VE 18	N/A	PFD	PFD
70	✓	VE 19	N/A	PFD	PFD
71	✓	VE 22	N/A	PFD	PFD
72	✓	VE 21	N/A	Runup	PFD

## 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 31, “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 [www.fema.gov/floodplain-management/letter-map-amendment-loma](http://www.fema.gov/floodplain-management/letter-map-amendment-loma) 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 [www.fema.gov/online-tutorials](http://www.fema.gov/online-tutorials).

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 [www.fema.gov/floodplain-management/letter-map-amendment-loma](http://www.fema.gov/floodplain-management/letter-map-amendment-loma) 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 [www.fema.gov/online-tutorials](http://www.fema.gov/online-tutorials).

### **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 [www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instruction](http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instruction) 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 Santa Cruz County FIRM are listed in Table 27.

**Table 27: Incorporated Letters of Map Change  
[Not Applicable to this Flood Risk Project]**

### **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 [www.fema.gov](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](http://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 Santa Cruz County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBM) and/or Flood Boundary and Floodway Maps (FBFM) 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 Santa Cruz County FIRMs in countywide format was 03/02/2006.

**Table 28: Community Map History**

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Capitola, City of	05/17/1974	05/17/1974	03/19/1976	08/15/1984	05/16/2012 03/02/2006
Santa Cruz, City of	03/08/1974	03/08/1974	04/23/1976	02/15/1985	05/16/2012 03/02/2006
Santa Cruz County, Unincorporated Areas	08/16/1974	08/16/1974	05/29/1979	04/15/1986	05/16/2012 03/02/2006
Scotts Valley, City of	05/31/1974	05/31/1974	11/07/1975	10/18/1983	05/16/2012 03/02/2006
Watsonville, City of	03/22/1974	03/22/1974	11/21/1975	06/15/1984	05/16/2012 03/02/2006

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

Table 29 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
All Sources	05/16/2012	BakerAECOM LLC	HSFEHQ-09-D-0368	July 2011	Santa Cruz County Unincorporated Areas

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Sources within City of Capitola	06/03/1986	Brown and Caldwell	H-4723	May 1983	Capitola, City of
Sources within City of Watsonville	06/03/1986	Brown and Caldwell	H-4723	September 1982	Watsonville, City of
Sources within City of Santa Cruz	04/15/1986	Brown and Caldwell	H-4723	April 1983	Santa Cruz, City of
Sources within Santa Cruz County	04/15/1986	Brown and Caldwell	H-4723	April 1983	Santa Cruz County, Unincorporated Areas
Sources within City of Scotts Valley	04/18/1983	Brown and Caldwell	H-4723	November 1982	Scotts Valley, City of

## 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 30. 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
Santa Cruz, City of	*	04/1978	Initial CCO	FEMA, this community and the study contractor
		04/08/1983	Final CCO	FEMA, this community and the study contractor
Santa Cruz, City of	*	04/1978	Initial CCO	FEMA, this community and the study contractor
		04/08/1983	Final CCO	FEMA, this community and the study contractor
Santa Cruz County and Incorporated Areas	05/16/2012	02/10/2010	Initial CCO	FEMA, City of Santa Cruz, City of Watsonville, Santa Cruz County, and BakerAECOM
		02/15/2011	Final CCO	FEMA, City of Watsonville, Santa Cruz County, and BakerAECOM
Santa Cruz County and Incorporated Areas	*	*	Initial CCO	FEMA, this community and the study contractor
		05/06/2005	Final CCO	FEMA, this community and the study contractor
Santa Cruz County (Unincorporated Areas)	*	04/1983	Initial CCO	FEMA, this community and the study contractor
		04/08/1983	Final CCO	FEMA, this community and the study contractor
		05/24/1983 – 05/27/1983	Initial CCO	FEMA, this community and the study contractor
		*	Final CCO	FEMA, this community and the study contractor
Scotts Valley, City of	*	04/1978	Initial CCO	FEMA, this community and the study contractor
		04/22/1992	Final CCO	FEMA, this community and the study contractor

\*Data not available

## 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 [www.fema.gov](http://www.fema.gov).

Table 31 is a list of the locations where FIRMs for Santa Cruz 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
Capitola, City of	City Hall 420 Capitola Ave	Capitola	CA	95010
Santa Cruz, City of	City Hall Planning Department: Permits, Building, Zoning 809 Center Street Room 206	Santa Cruz	CA	95060
Santa Cruz County, Unincorporated Areas	County of Santa Cruz Planning Department 701 Ocean Street 4 <sup>th</sup> Floor	Santa Cruz	CA	95060
Scotts Valley, City of	Planning Department 1 Civic Center Drive	Scotts Valley	CA	95066
Watsonville, City of	Community Development Department 250 Main Street	Watsonville	CA	95076

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 32.

Table 32 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	<a href="http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library">www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library</a>
NFIP website	<a href="http://www.fema.gov/national-flood-insurance-program">www.fema.gov/national-flood-insurance-program</a>
NFHL Dataset	<a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA Region IX	FEMA Region IX, 1111 Broadway, Suite 1200, Oakland, CA 94607 (510) 627-7029
Other Federal Agencies	
USGS website	<a href="http://www.usgs.gov">www.usgs.gov</a>
Hydraulic Engineering Center website	<a href="http://www.hec.usace.army.mil">www.hec.usace.army.mil</a>
State Agencies and Organizations	
State NFIP Coordinator	Ricardo Pineda, PE, CFM California Dept. of Water Resources 1416 9 <sup>th</sup> Street, Room 1601 Sacramento, CA 95814 916-574-0611 <a href="mailto:rpineda@water.ca.gov">rpineda@water.ca.gov</a>
State GIS Coordinator	David Harris Agency Information Officer California Natural Resources Agency 1416 Ninth Street, Room 1311 Sacramento, CA 95814 916-445-5088 <a href="mailto:david.harris@resources.ca.gov">david.harris@resources.ca.gov</a>

**SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES**

Table 33 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
Brown and Caldwell 1978	Brown and Caldwell	<i>Santa Cruz Wastewater Facilities Planning Study</i>		City of Santa Cruz, California	May 1978	
Commerce 2010	U.S. Department of Commerce, Bureau of the Census	<i>2000 Census of Population</i>			August 2010	<a href="http://www.fedstats.gov">http://www.fedstats.gov</a>
USACE 1974	U.S. Department of the Army, Corps of Engineers	<i>Environmental Evaluation of Pajaro River Flood Control Project, Santa Cruz and Monterey Counties, California</i>		San Francisco, California	August 1974	
A.L. Kroeber 1967	Book Company	<i>Handbook of the Indians of California</i>	A.L. Kroeber	Berkeley, California	1967	
City of Santa Cruz Museum	City of Santa Cruz Museum	<i>Permanent Display of American Indian Artifacts</i>		Santa Cruz, California		
USDA 1980	U.S. Department of Agriculture, Natural Resources Conservation	<i>Soil Survey of Santa Cruz County, California</i>		Washington, D.C.	August 1980	
Otto Water Engineers, Inc. 1984	Federal Emergency Management Agency	<i>Northern California Coastal Flood Studies</i>	Otto Water Engineers, Inc.		August 1984	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Commerce 1981	U.S. Department of Commerce, Bureau of the Census	<i>1980 Census of Population, Housing, Advanced Reports</i>			March 1981	
Rand-McNally 1981	Rand-McNally	<i>Commercial Atlas and Marketing Guide</i>			1981	<a href="http://extension.state.edu/catalog/">http://extension.state.edu/catalog/</a>
Harris and Assoc. 1976	Harris and Associates	<i>Draft Environmental Impact Report for the Wastewater Facilities Plan, City of Scotts Valley, California</i>		City of Coastland, State	October 1976	
USACE June 1963	U.S. Department of the Army, Corps of Engineers	<i>Interim Report for Flood Control, Pajaro River Basin, California</i>		San Francisco, CA	June 1963	
USACE 1973 (a.)	U.S. Department of the Army, Corps of Engineers	<i>Floodplain Information, Aptos, Trout, and Valencia Creek, City of Aptos, California State</i>		San Francisco, CA	July 1973	
USACE 1973 (b.)	U.S. Department of the Army, Corps of Engineers	<i>Floodplain Information, San Lorenzo River, Santa Cruz County, California</i>		San Francisco, CA	July 1973	
USACE 1976	U.S. Department of the Army, Corps of Engineers	<i>Floodplain Information, Corralitos Creek, Santa Cruz County, California</i>		San Francisco, CA	June 1976	
Santa Cruz County, Office of Watershed 1979	Santa Cruz County, Office of Watershed Management	<i>San Lorenzo River Watershed Management Plan, Draft</i>			May 1979	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 1979	U.S. Department of the Army, Corps of Engineers, San Francisco District	<i>San Lorenzo River Reconnaissance Study</i>			December 1979	
USACE 1965	U.S. Department of the Army, Corps of Engineers	<i>Survey Report – Flood Control and Allied Purposes, Soquel Creek, Santa Cruz County, California</i>		San Francisco, CA	November 1963, revised May 1965	
USACE 1956	U.S. Department of the Army, Corps of Engineers	<i>Floods of December 1955 and January 1956 in Northern California Coastal Streams</i>		San Francisco, CA	June 1956	
Briggs 1982	Department of Earth Sciences, University of California at Santa Cruz	<i>Impact of the January 3-4, 1982, Floods in Santa Cruz County, California</i>	Gary B. Briggs		1982	
USACE General Design Memorandum	U.S. Department of the Army, Corps of Engineers	<i>General Design Memorandum – San Lorenzo River Flood Control Project</i>				
Commerce 2010	U.S. Department of Commerce, National Climatic Data Center,	<i>Storm Events [online]</i>			May 18, 2010	<a href="http://www4.ncdc.noaa.gov">http://www4.ncdc.noaa.gov</a>

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 1974	U.S. Department of the Army, Corps of Engineers	<i>Flood Control Alternatives for Pajaro Valley, Pajaro River, Salsipuedes Creek, and Corralitos Creek</i>		San Francisco, CA	July 1974	
USACE 1978	U.S. Department of the Army, Corps of Engineers	<i>Review Report, Flood Control and Allied Purposes, Pajaro River Basin, California</i>		San Francisco, CA	January 1978	
City of Santa Cruz 1975	City of Santa Cruz	<i>Zoning Ordinance, Ord. 75-2, Part 4</i>			April 10, 1975	
City of Scotts Valley 1982	City of Scotts Valley	<i>Ordinance No. 103, An Ordinance of the City of Scotts Valley Amending Section 15.04.080 of the Municipal Code Providing for the Regulation of Excavation, Grading, Filling, and Cleaning Activities and Erosion and Sediment Control</i>			February 17, 1982	
City of Watsonville 1980	City of Watsonville	<i>Watsonville Municipal Code, Section 14-16, Part 22</i>			November 28, 1980	
Philip Williams & Assoc. 2009	Philip Williams & Associates, Ltd.	<i>Hydraulic Analysis for Santa Cruz County, CA, FEMA Task Order No. 5</i>			May 2009	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
DOI 1977	U.S. Department of the Interior, Geological Survey	<i>Water Resources Investigations Report 77-21, Magnitude and Frequency of Floods in California</i>			June 1977	
USACE 1968	U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center	<i>Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package</i>		Davis, CA	October 1968 with updates	
USACE January 1973	U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center	<i>HEC-1 Flood Hydrograph Package Users Manual</i>		Davis, CA	January 1973	
State of California DWR 1975	State of California, The Resources Agency, Department of Water Resources	<i>Bulletin No. 195, Rainfall Analysis for Drainage Design Volume III – Intensity-Duration-Frequency Curves</i>			October 1975	
USWRC 1976	U.S. Water Resources Council	<i>Bulletin 17, Guidelines for Determining Flood Flow Frequencies</i>			1976	
USWRC 1977	U.S. Water Resources Council	<i>Bulletin 17A, Guidelines for Determining Flood Flow Frequency</i>			Revised June 1977	
USACE March 2008	U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center	<i>HEC- RAS (River Analysis System) version 4.0</i>		Davis, CA	March 2008	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE June 2004	U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center	<i>HEC- RAS (River Analysis System) version 3.1.2</i>		Davis, CA	June 2004	
AECOM 2008	AECOM Watershed Concepts	<i>Watershed Information System (WISE) version 4.1</i>		Roanoke, VA	2008	
USACE December 1980	U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center	<i>Computer Program 723-X6-L202A, HEC-2 Water Surface Profiles</i>		Davis, CA	December 1980 with updates	
Ven T. Chow 1959	McGraw-Hill Book Company	<i>Open Channel Hydraulics</i>	Ven T. Chow	New York	1959	
Spink Corp. 1978	Spink Corporation	<i>Aerial Photography, Scale 1:4,800, Contour Interval 4 feet</i>		Sacramento, CA	1978	
USACE 1971	U.S. Department of the Army, Corps of Engineers	<i>Pajaro River Topographic Maps, Scale 1:1,200, Contour Interval 2 feet</i>			1971	
City of Santa Cruz 1974	City of Santa Cruz	<i>Topographic Maps, Scale 1:1,200, Contour Interval 4 feet</i>	Murray-McCormick Aerial Surveys, Inc.		October 15, 1974	
Ben B. White & Assoc. 1965	Ben B. White & Associates, Inc.	<i>City of Capitola Topographic Maps, Scale 1:600, Contour Interval 2 feet</i>			October 25, 1965	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE September 1980	U.S. Department of the Army, Corps of Engineers, San Francisco District	<i>San Lorenzo River Study – Stage II Field and Simulation Studies – Final Report</i>		San Francisco, CA	September 1980	
USACE n.d.	U.S. Department of the Army, Corps of Engineers, San Francisco District	<i>Estimate of 100- Year Tide for Flood Insurance Studies</i>		San Francisco, CA	Unpublished	
Santa Cruz County 1965	Santa Cruz County	<i>San Lorenzo River Basin Topographic Maps, Scale 1:4,800, Contour Interval 20 feet</i>			1965	
FEMA 2003	Federal Emergency Management Agency	<i>Guidelines and Specifications for Flood Hazard Mapping Partners - Appendix B: Converting to the North American Vertical Datum of 1988</i>		Washington, D.C.	April 2003	
James R. Pagenkopf 1976	R.M. Parsons Laboratory, M.I.T., with modification made by Otto Water Engineers	<i>A Two-Dimensional Finite Element Circulation Model, A User's Manual for CAFÉ-1</i>	James R. Pagenkopf, et al		August 1976	
Commerce 1944-1983	U.S. Department of Commerce, National Climatic Data Center	<i>Meteorological Record for San Francisco, California, Airport</i>		Asheville, NC	1944-1983	

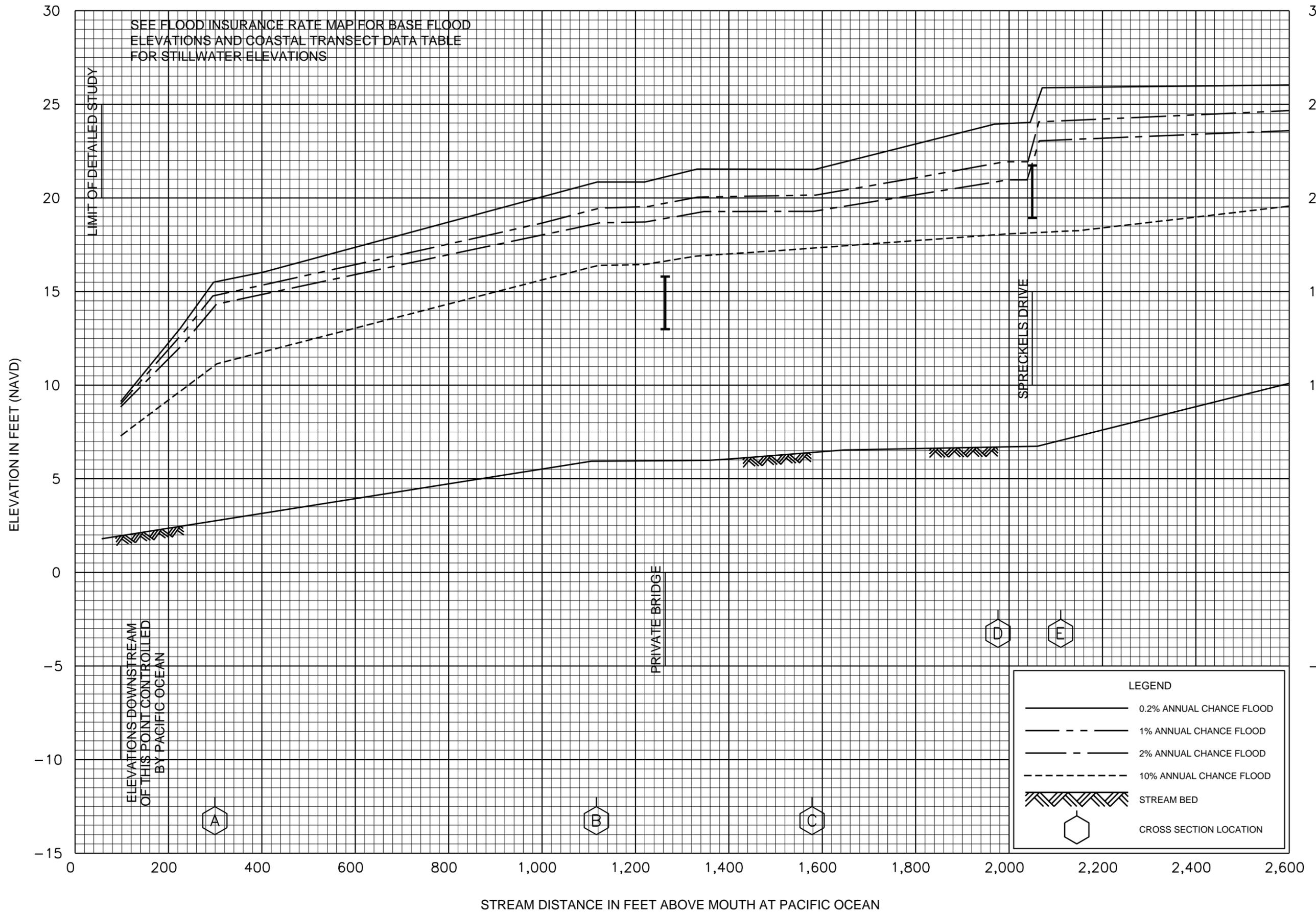
Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Commerce 1955-1983	U.S. Department of Commerce, National Climatic Data Center	<i>Three-Hourly North American Surface Weather Maps</i>		Asheville, NC	1955-1983	
USACE 1977	U.S. Department of the Army, Corps of Engineers	<i>Shore Protection Manual</i>			1977	
Commerce 1945-1983	U.S. Department of Commerce, National Oceanic and Atmospheric Administration	<i>Tide Tables, High and Low Water Predictions, West Coast of North and South America</i>			1945- 1983	
R.S. Dobson 1967	Stanford University	<i>A Program to Construct Refraction Diagrams and Compute Wave Heights for Waves Moving into Shoaling Waters</i>	R.S. Dobson		March 1967	
USACE 1978 (a.)	U.S. Department of the Army, Corps of Engineers	<i>California Coast Storm Damage, Winter 1977-1978</i>	G.W. Domurat		1978	
I.J. Hunt 1959	Proceeding of ASCE, Vol. 85, No. WW3	<i>1959 Design of Seawalls and Breakwaters</i>	I.J. Hunt		1959	
USACE 1978 (b.)	U.S. Department of the Army, Corps of Engineers, Coastal Engineering Research Center	<i>Revised Wave Runup Curves for Smooth Slopes, Technical Aid No. 78-2</i>	P.N. Stoa		July 1978	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
CDBW	California Department of Boating and Waterways	<i>Deep-Water Wave Statistics for the California Coast</i>	Meteorology International, Inc.			
USACE May 1974 (a.)	U.S. Department of the Army, Corps of Engineers, Waterway Experiment Station	<i>Flood Insurance Study: Tsunami Prediction for the West Coast of the Continental United States, Technical Report H-78-26</i>	J.R. Houston and A.W. Garcia		May 1974	
USACE May 1974 (b.)	U.S. Department of the Army, Corps of Engineers, Waterway Experiment Station	<i>Flood Insurance Study: Tsunami Prediction for Pacific Coastal Communities, Technical Report H- 64-3</i>	J.R. Houston and A.W. Garcia		May 1974	
USACE 1979	U.S. Department of the Army, Corps of Engineers, Waterway Experiment Station	<i>A Numerical Model for Tsunami Inundation, Technical Report HL-79-2</i>	J.R. Houston and A.W. Garcia		February 1979	
Otto Water Engineers, Inc. 1983	Otto Water Engineers, Inc.	<i>Aerial Photography, Scale 1:4,800, Contour Interval 4 feet</i>			1983	
Monterey Peninsula WMD	Monterey Peninsula Water Management District.	<i>2003 Elevation Data (State Plane Coordinate System, Zone IV, NAD83, feet, NAVD 1988)</i>	Central Coast Joint Data Committee			<a href="http://www.ccjdc.org/">http://www.ccjdc.org/</a>

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Assoc. of Monterey Bay Area Gov. 2011	Association of Monterey Bay Area Governments	<i>LIDAR Dataset for the Central Coast of California, Digital raster and vector format</i>			2011	
HUD 1979	U.S. Department of Housing and Urban Development, Federal Insurance Administration	<i>Flood Hazard Boundary Map, Santa Cruz County, California (Unincorporated Areas ), Scale 1:24,000</i>			May 1979	
USACE June 1976	U.S. Department of the Army, Corps of Engineers	<i>Floodplain Information, Soquel Creek, Santa Cruz County, California</i>		San Francisco, CA	June 1976	
FEMA 2009 (a.)	Federal Emergency Management Agency	<i>Flood Insurance Study, San Benito County, California, and Incorporated Areas</i>		Washington, D.C.	2009	
FEMA 2006	Federal Emergency Management Agency	<i>Flood Insurance Study, Santa Cruz County, California, and Incorporated Areas</i>		Washington, D.C.	2006	
FEMA 1984	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Capitola, California</i>		Washington, D.C.	1984	
FEMA 1985	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Santa Cruz, California</i>		Washington, D.C.	1985	
FEMA 1983	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Scotts Valley, California</i>		Washington, D.C.	1983	

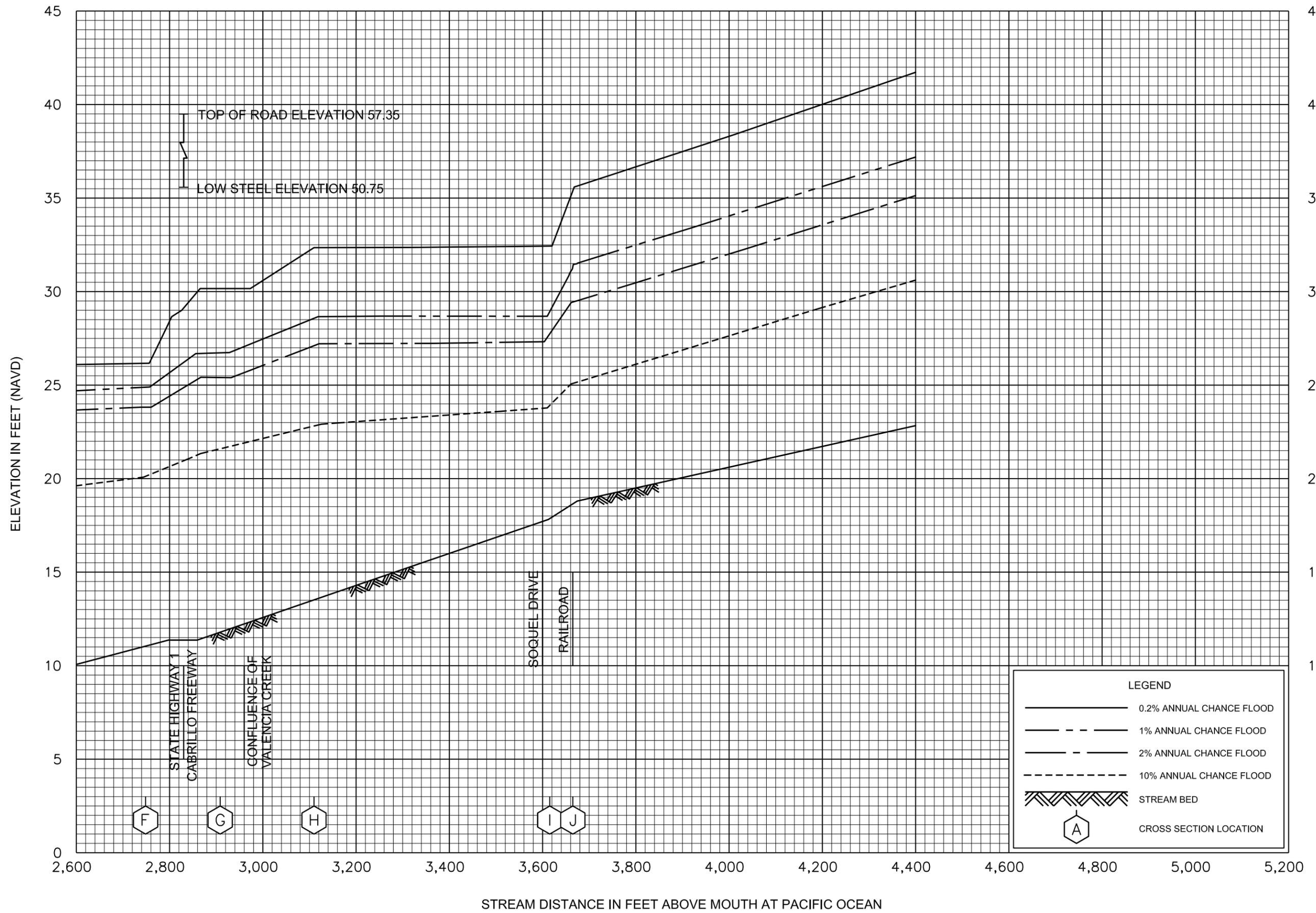
Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 1984	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Watsonville, California</i>		Washington, D.C.	1984	
FEMA 2009 (b.)	Federal Emergency Management Agency	<i>Flood Insurance Study, Monterey County, California (Unincorporated Areas)</i>		Washington, D.C.	2009	
FEMA 2009 (c.)	Federal Emergency Management Agency	<i>Flood Insurance Study, Santa Clara County, California (Unincorporated Areas)</i>		Washington, D.C.	2009	
FEMA 1986	Federal Emergency Management Agency	<i>Flood Insurance Study, San Mateo County, California (Unincorporated Areas)</i>		Washington, D.C.	1986	
Divoky, D 2007		<i>Supplementary WHAFIS Documentation: WHAFIS 4.0, A Revision of FEMA's WHAFIS 3.0 Program</i>	Divoky, D.	Atlanta, GA	2007	
FEMA 1988	Federal Emergency Management Agency	<i>Wave Height Analysis for Flood Insurance Studies (Technical Documentation for WHAFIS Program Version 3.0)</i>		Washington, D.C.	1988	
FEMA 2005	Federal Emergency Management Agency	<i>Final Draft Guidelines for Coastal Flood Hazard Analysis and mapping for the Pacific Coast of the United States</i>			2005	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 1992	Coastal Engineering Research Center, Department of the Army, Waterways Experiment Station, U.S. Army Corps of Engineers	<i>Automated Coastal Engineering system, Version 1.07</i>	David Leenknecht, Andre Szuwalski, and Ann R. Sherlock		1992	
USACE 1984	U.S. Army, Corps of Engineers	<i>Shore Protection Manual, Volumes 1-3</i>		Washington D.C.	1984	
Van der Meer, J.W. 2002		<i>Wave Run-up and Overtopping at Dikes. Technical Report, Technical Advisory Committee for Water Retaining Structures (TAW)</i>		Delft, the Netherlands	2002	



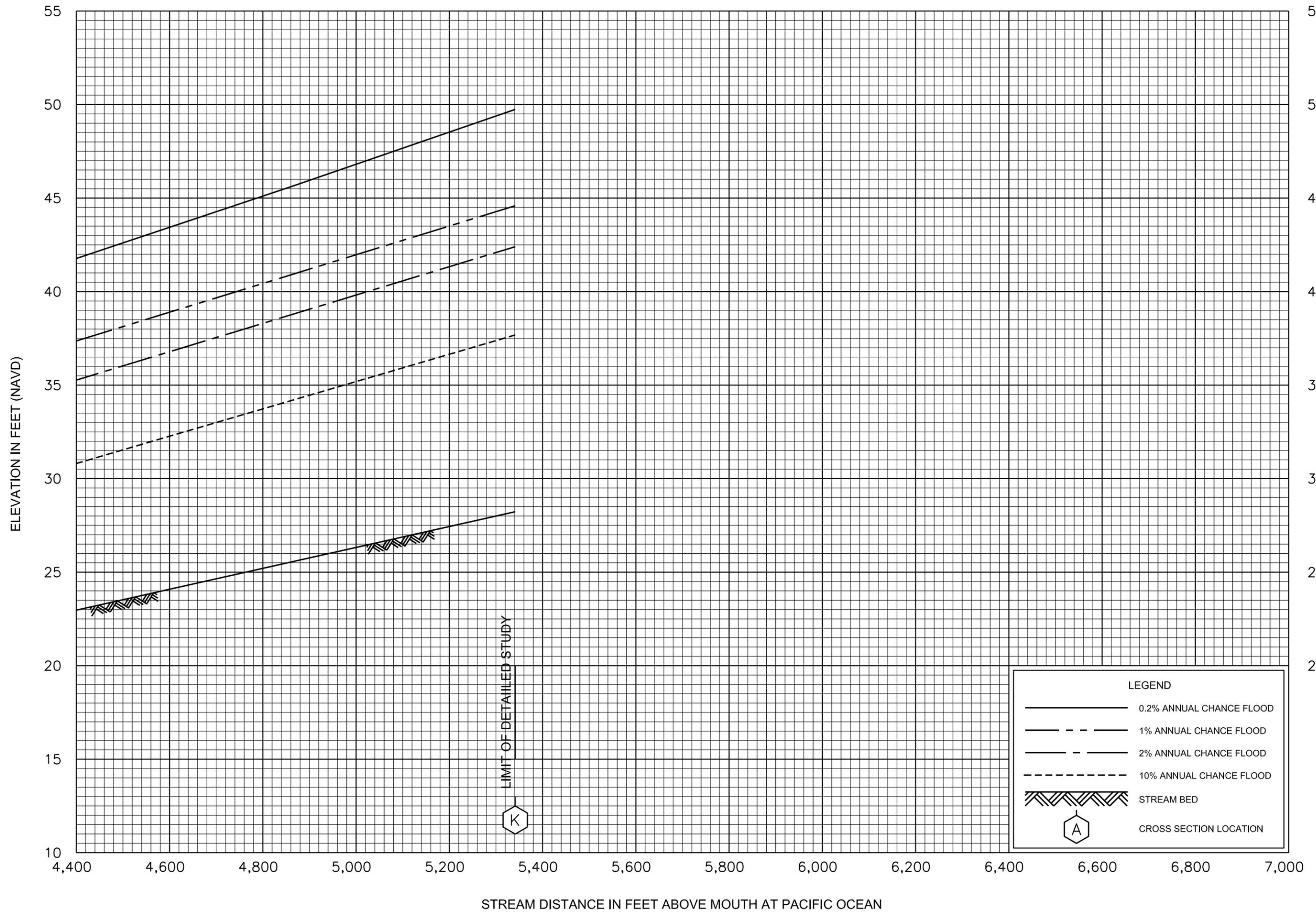
FLOOD PROFILES  
APTOS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS



FLOOD PROFILES  
APTOS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS



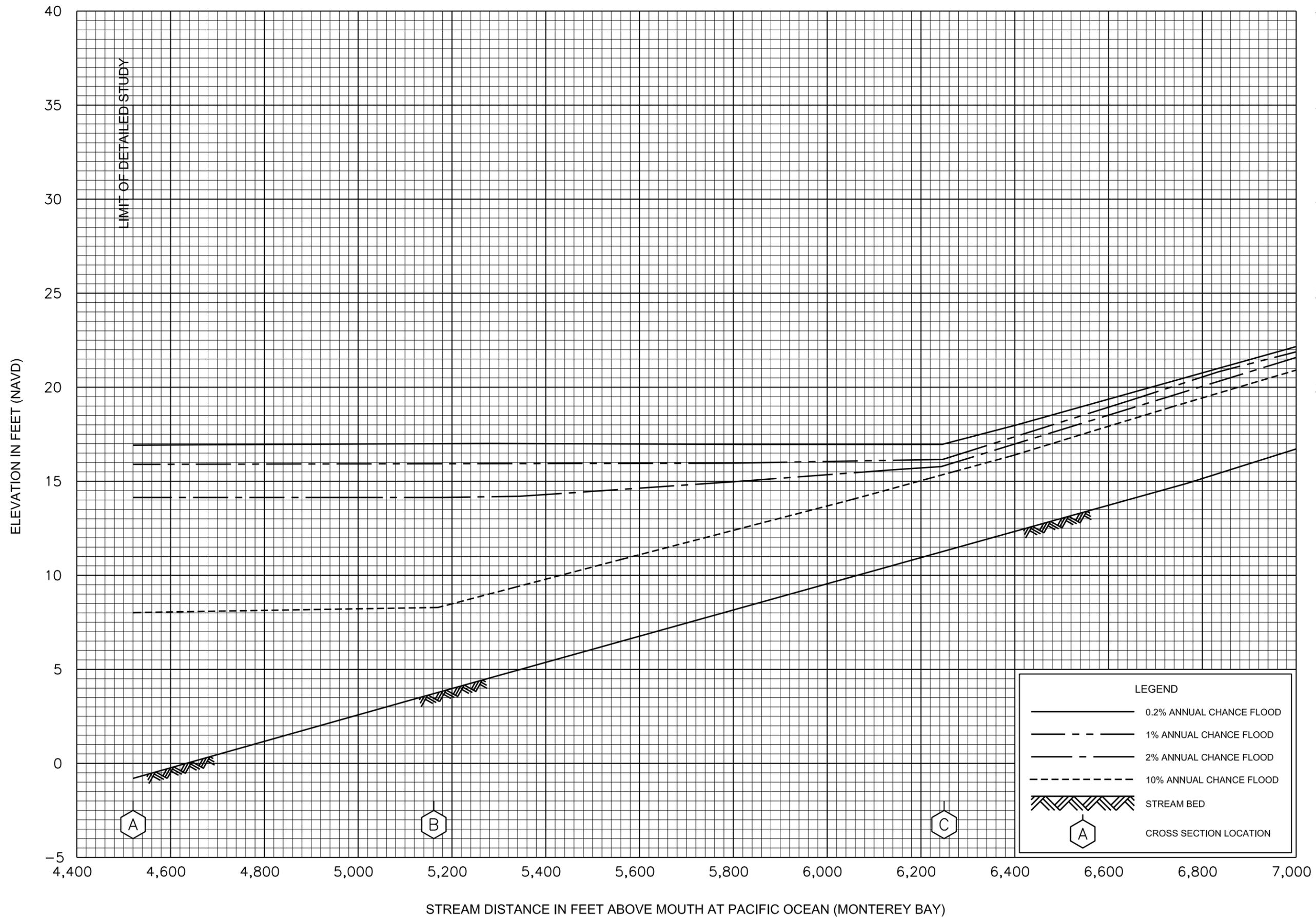
FLOOD PROFILES

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FEDERAL EMERGENCY MANAGEMENT AGENCY

SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS

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FLOOD PROFILES

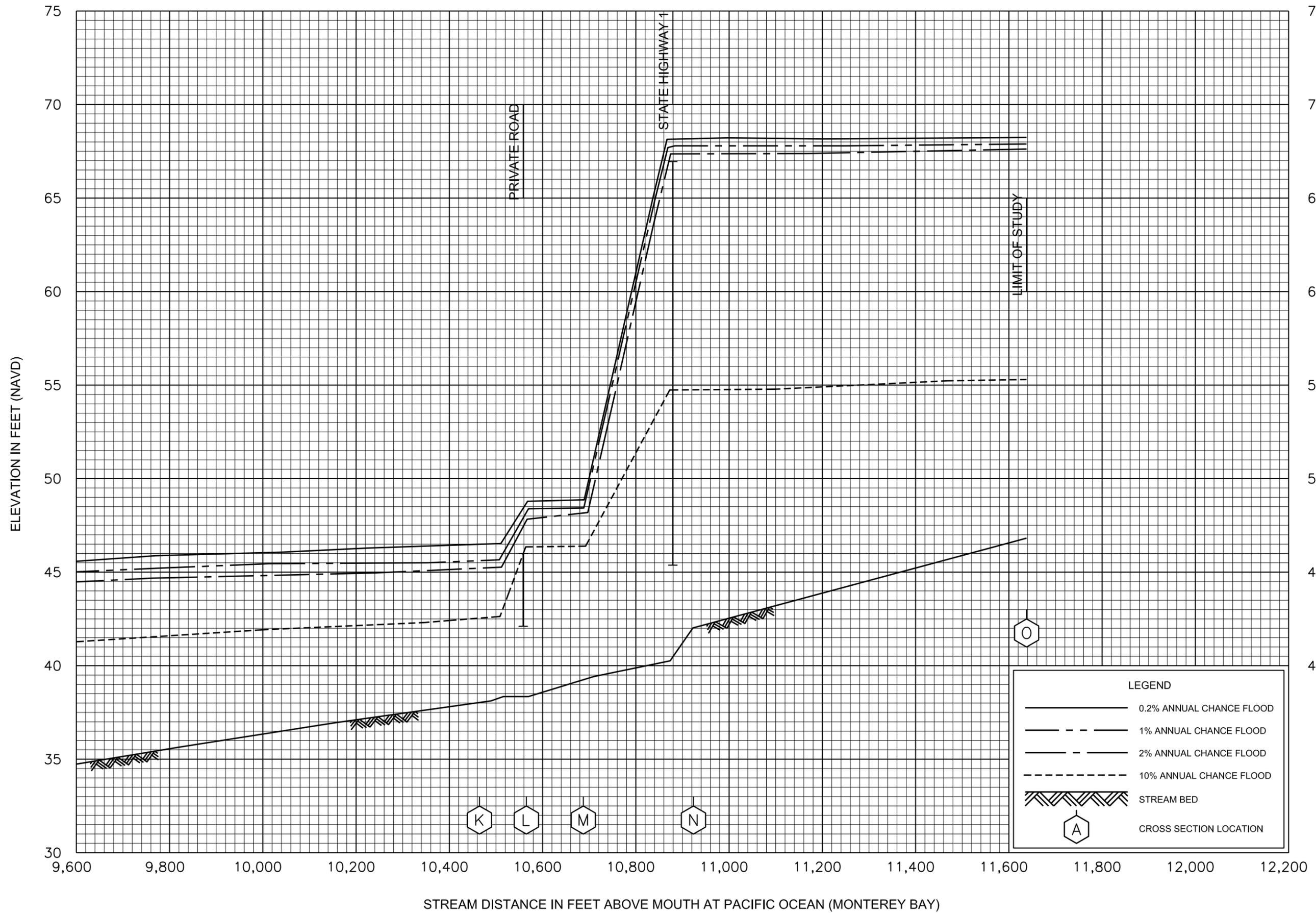
ARANA GULCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS

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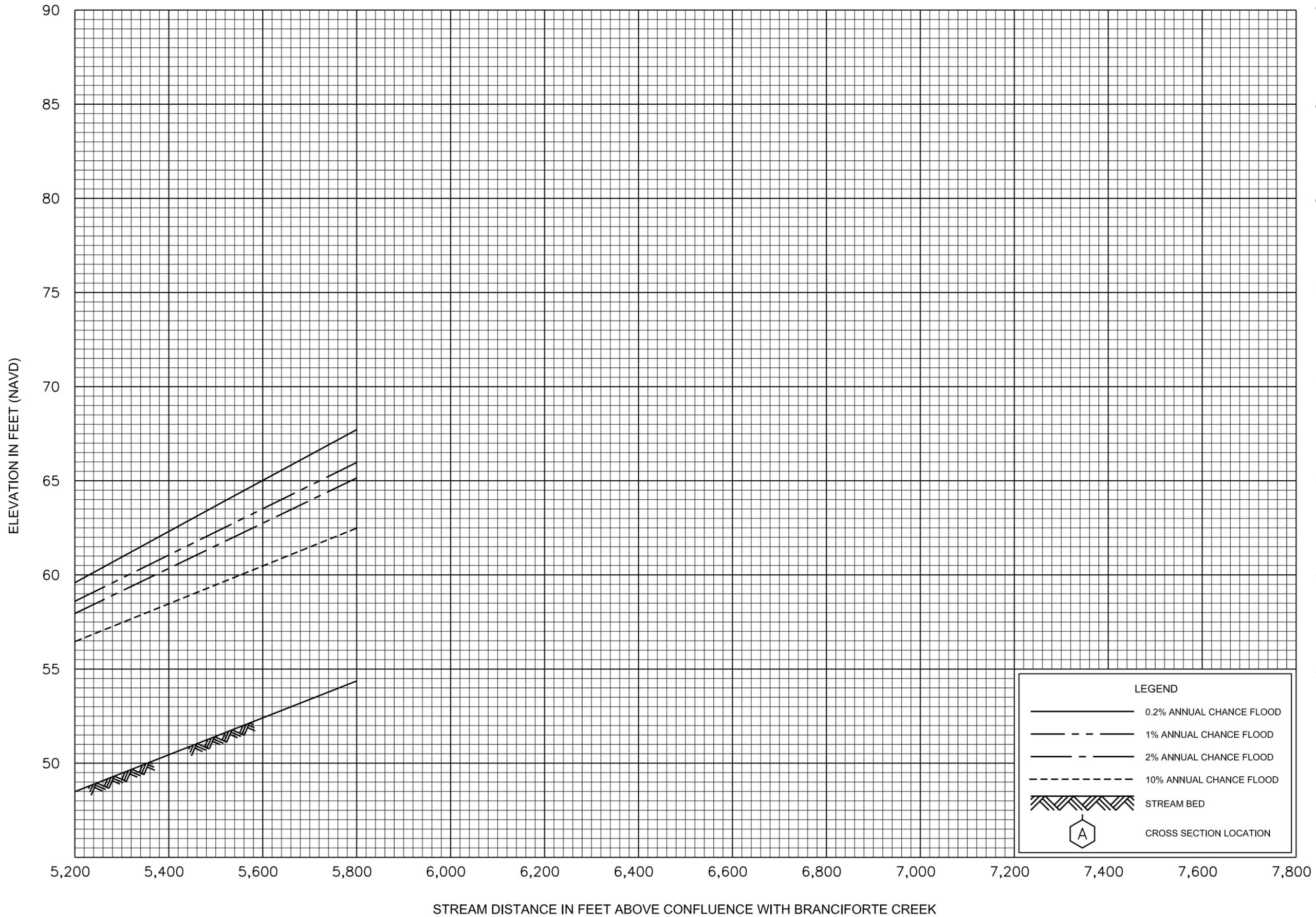


FLOOD PROFILES  
ARANA GULCH

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS

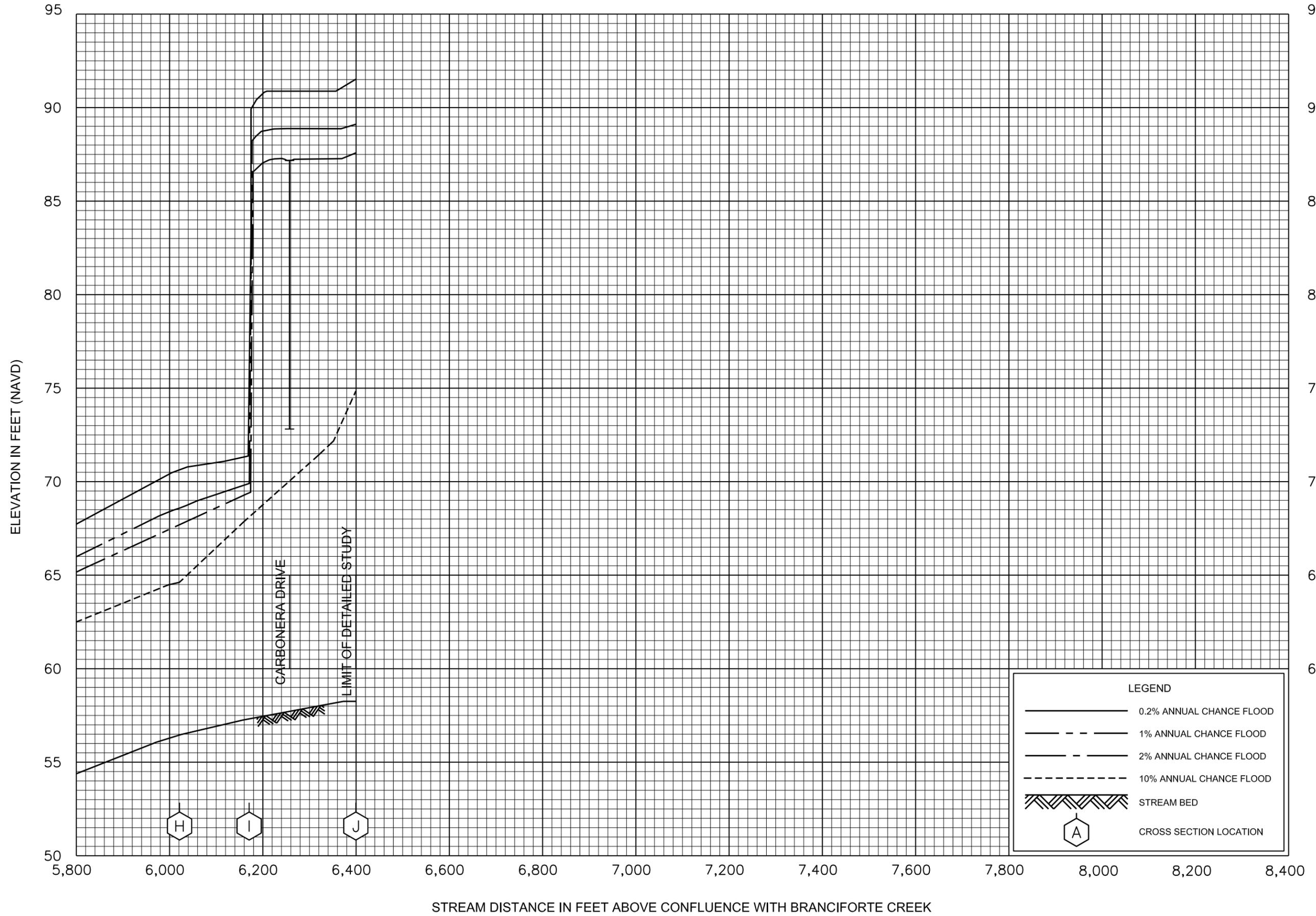






FLOOD PROFILES  
CARBONERA CREEK

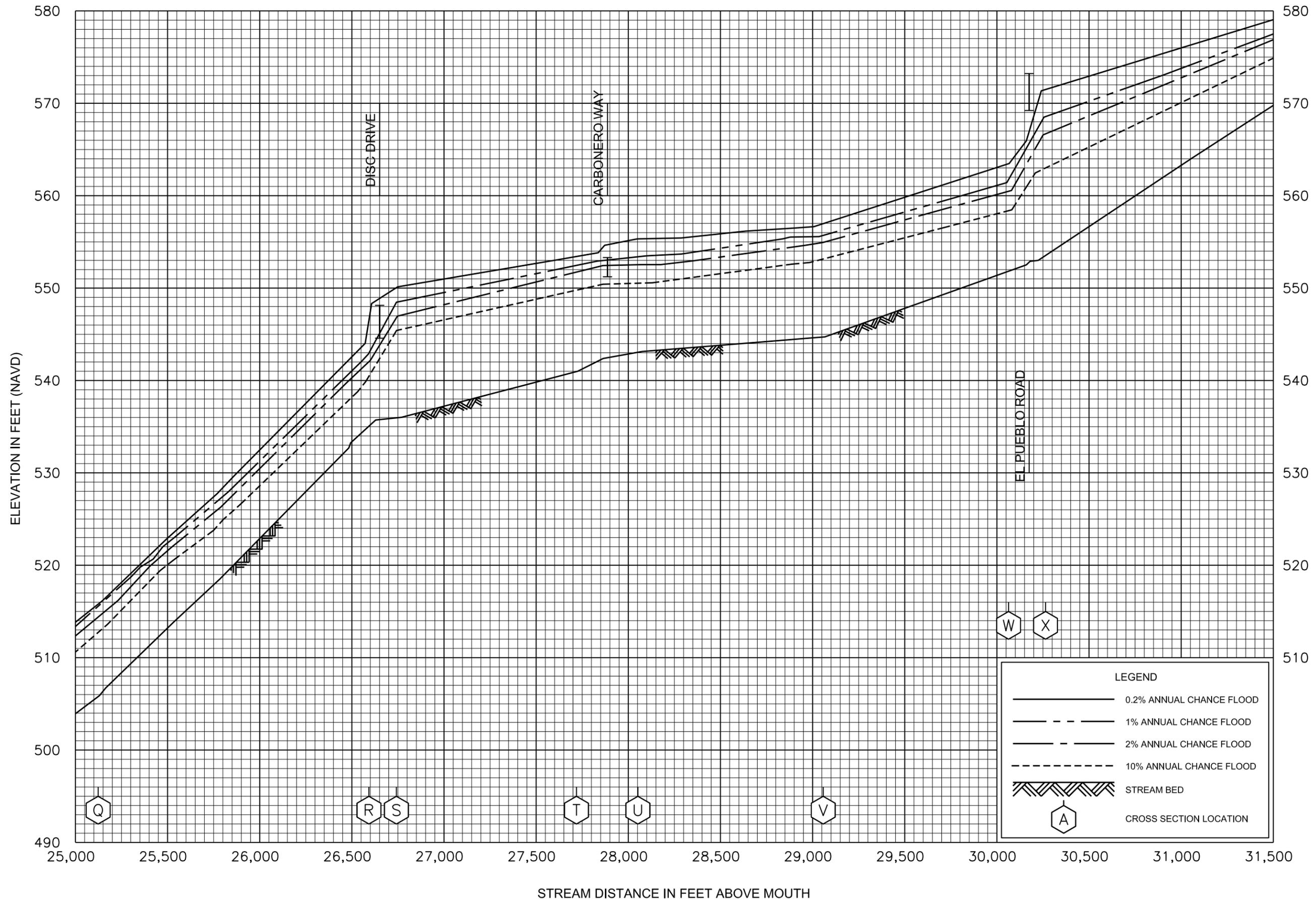
FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS



FLOOD PROFILES  
CARBONERA CREEK

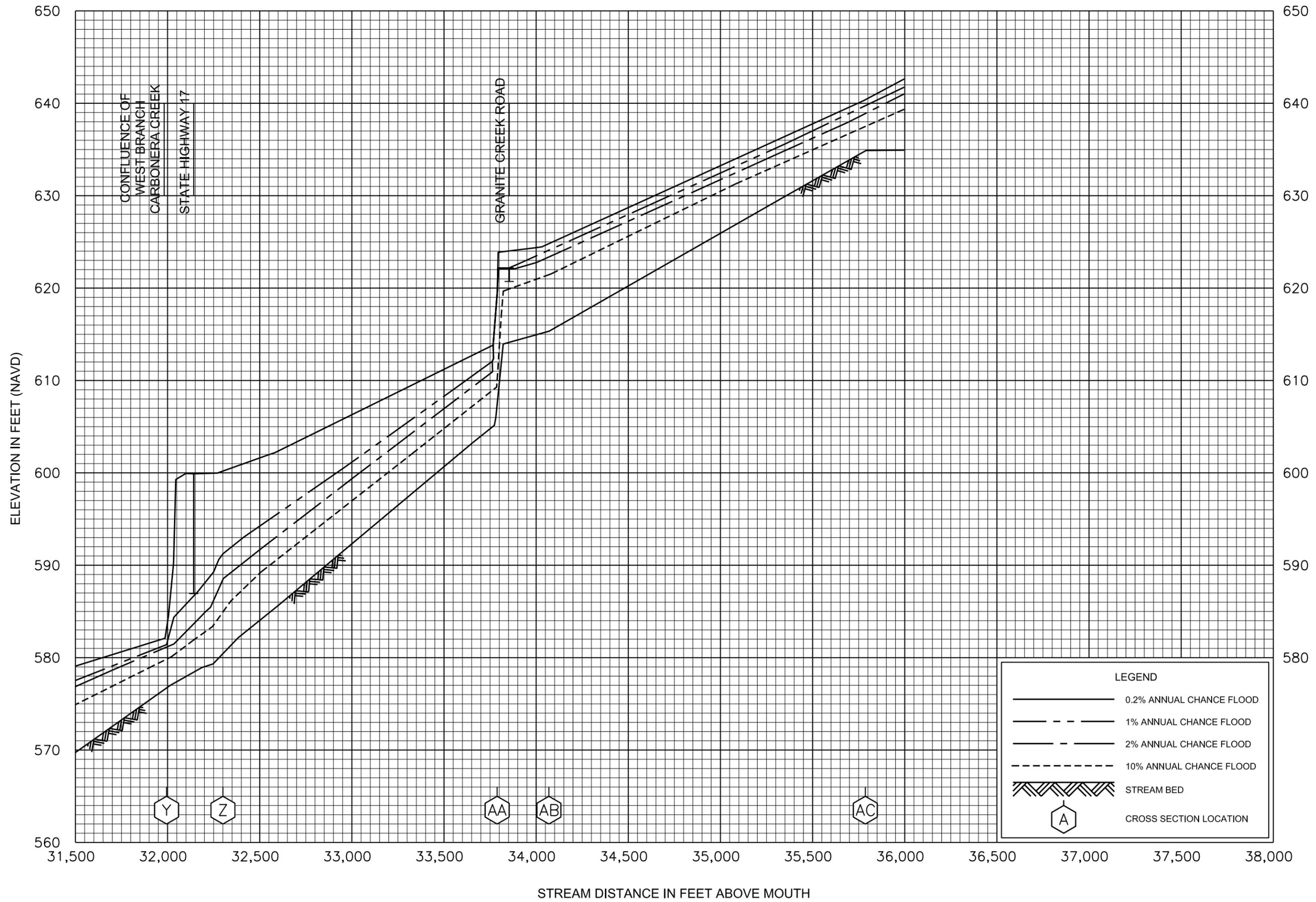
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SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS





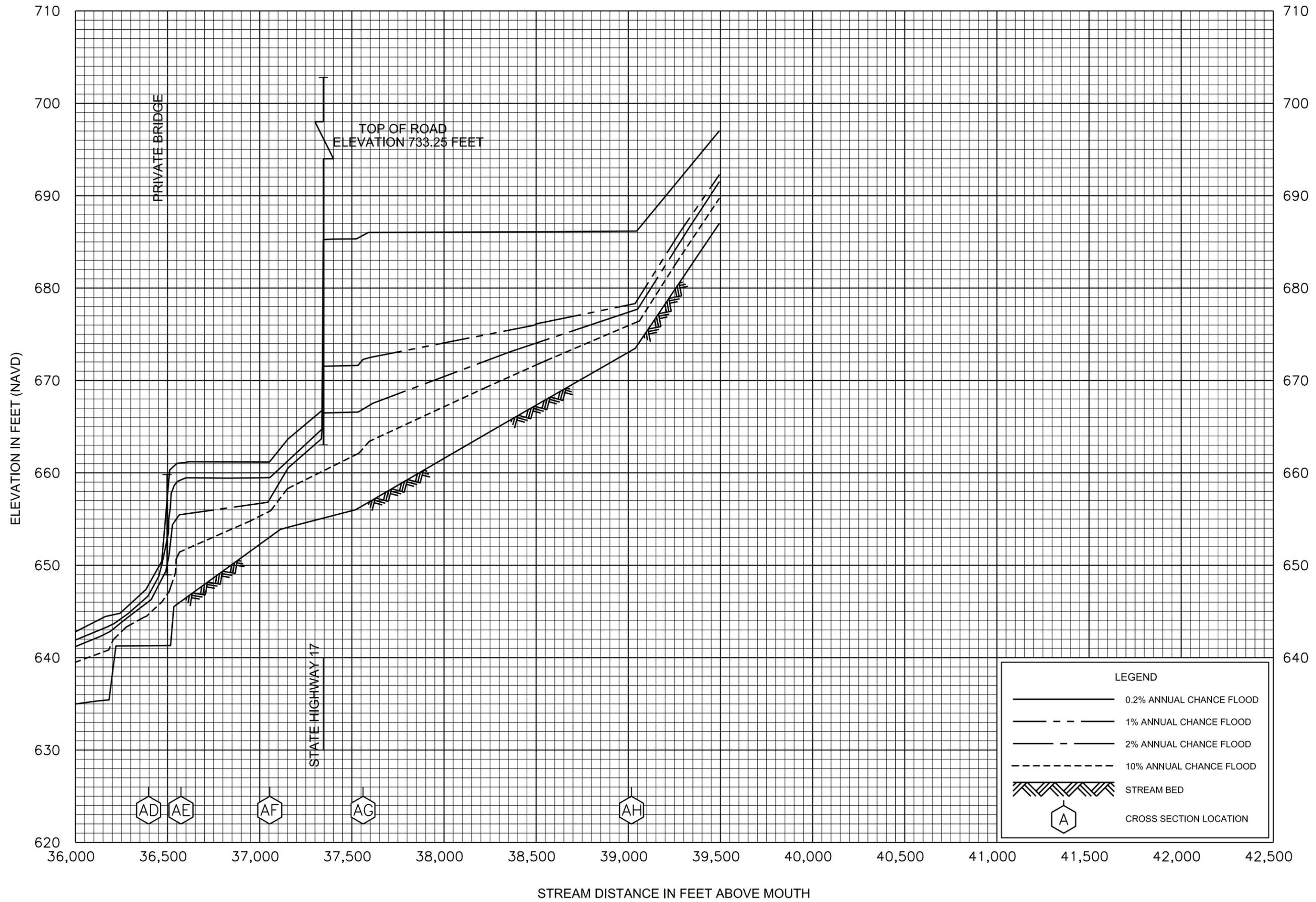
FLOOD PROFILES  
CARBONERA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CA**  
AND INCORPORATED AREAS



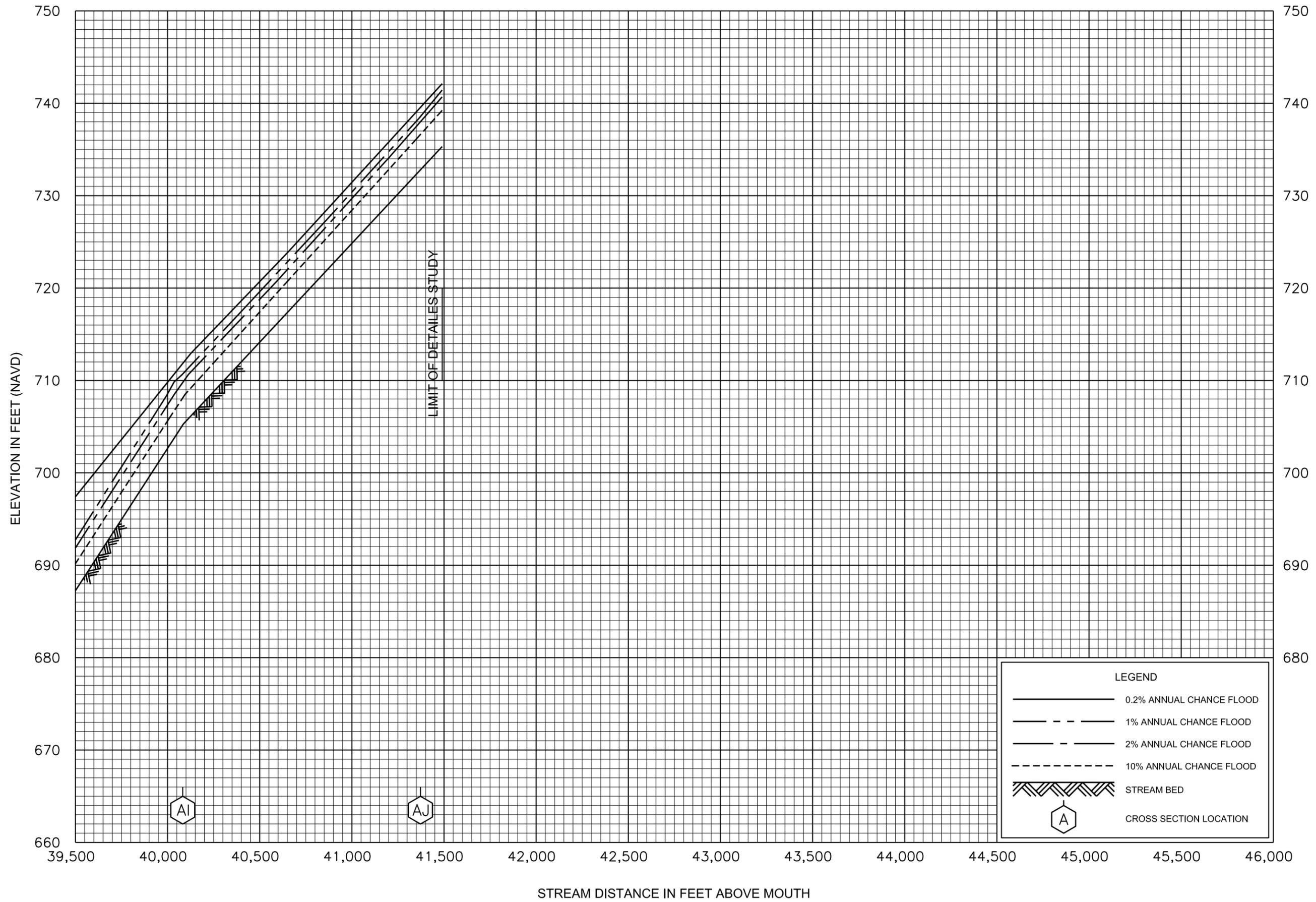
FLOOD PROFILES  
CARBONERA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**SANTA CRUZ COUNTY, CA**  
AND INCORPORATED AREAS



FLOOD PROFILES  
CARBONERA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS



FLOOD PROFILES  
CARBONERA CREEK

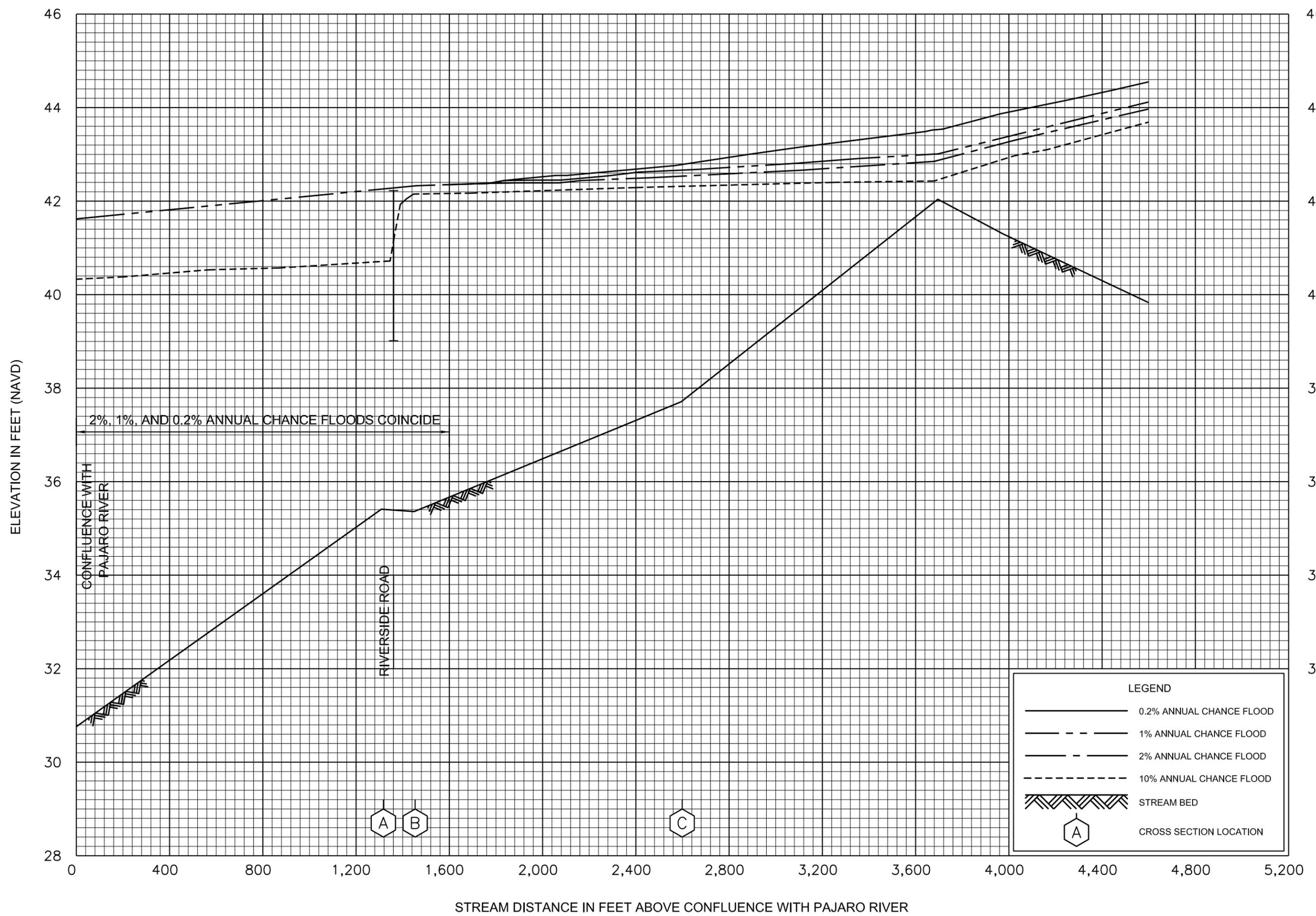
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SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS





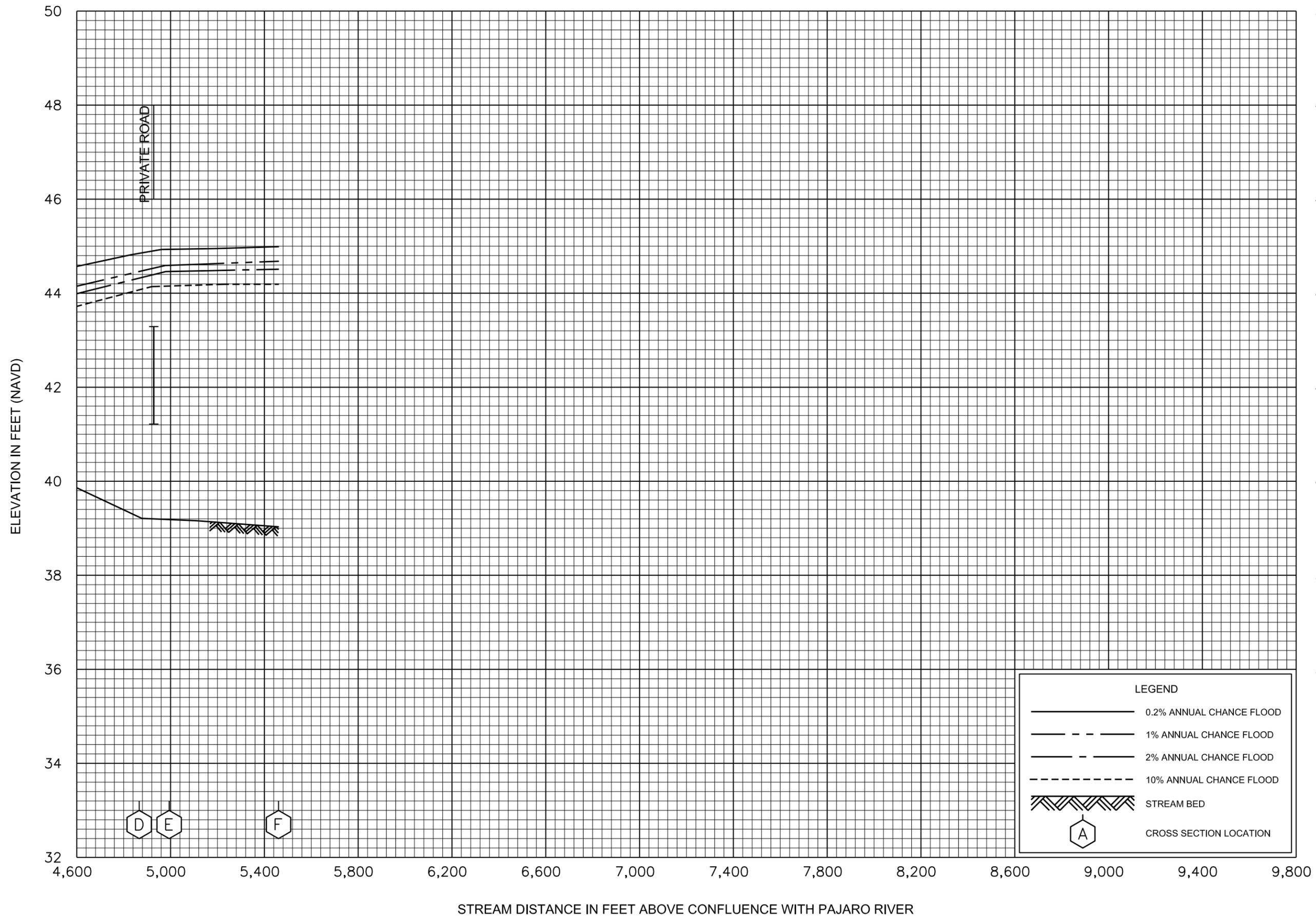






FLOOD PROFILES  
COWARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS



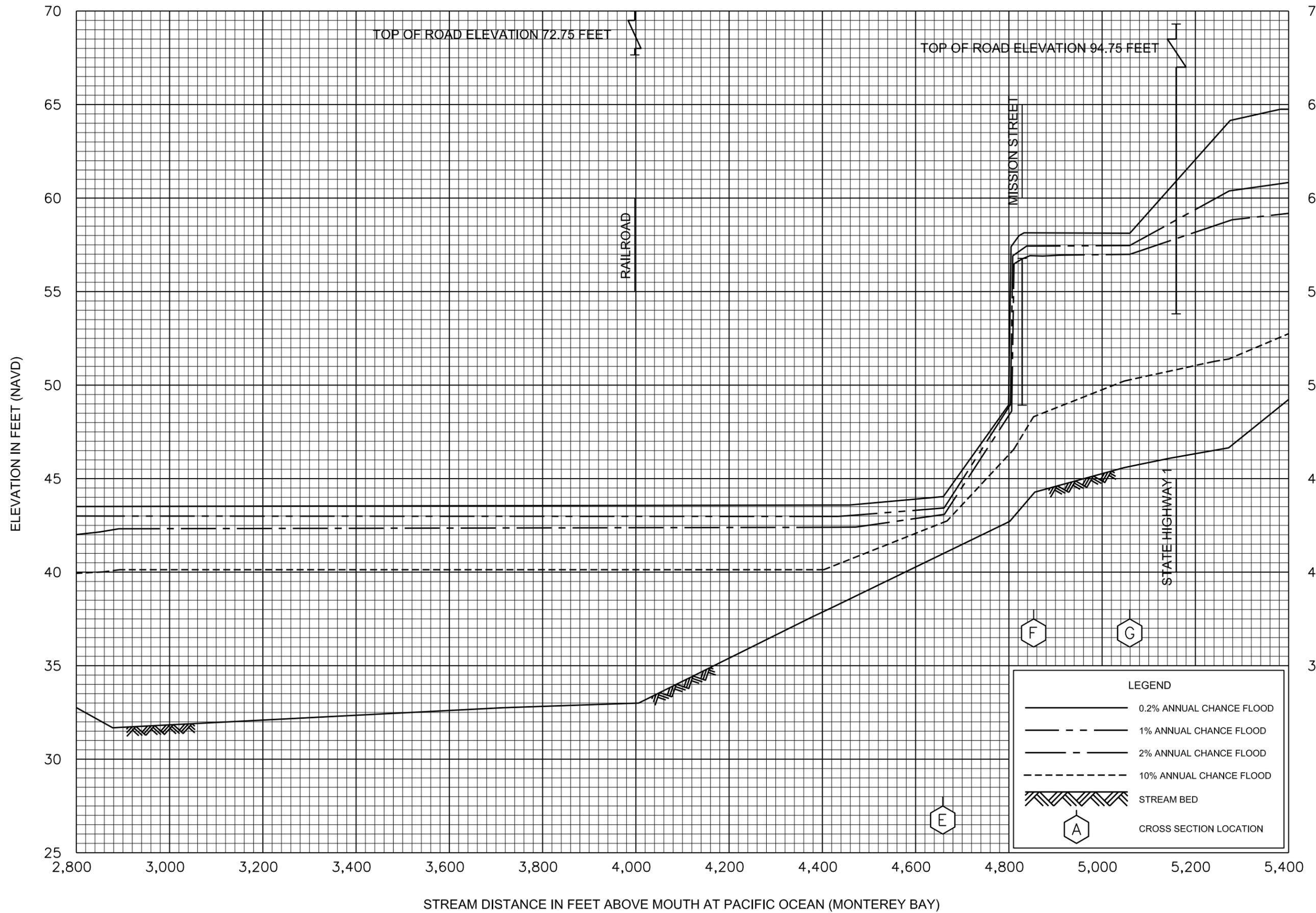
FLOOD PROFILES  
COWARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS









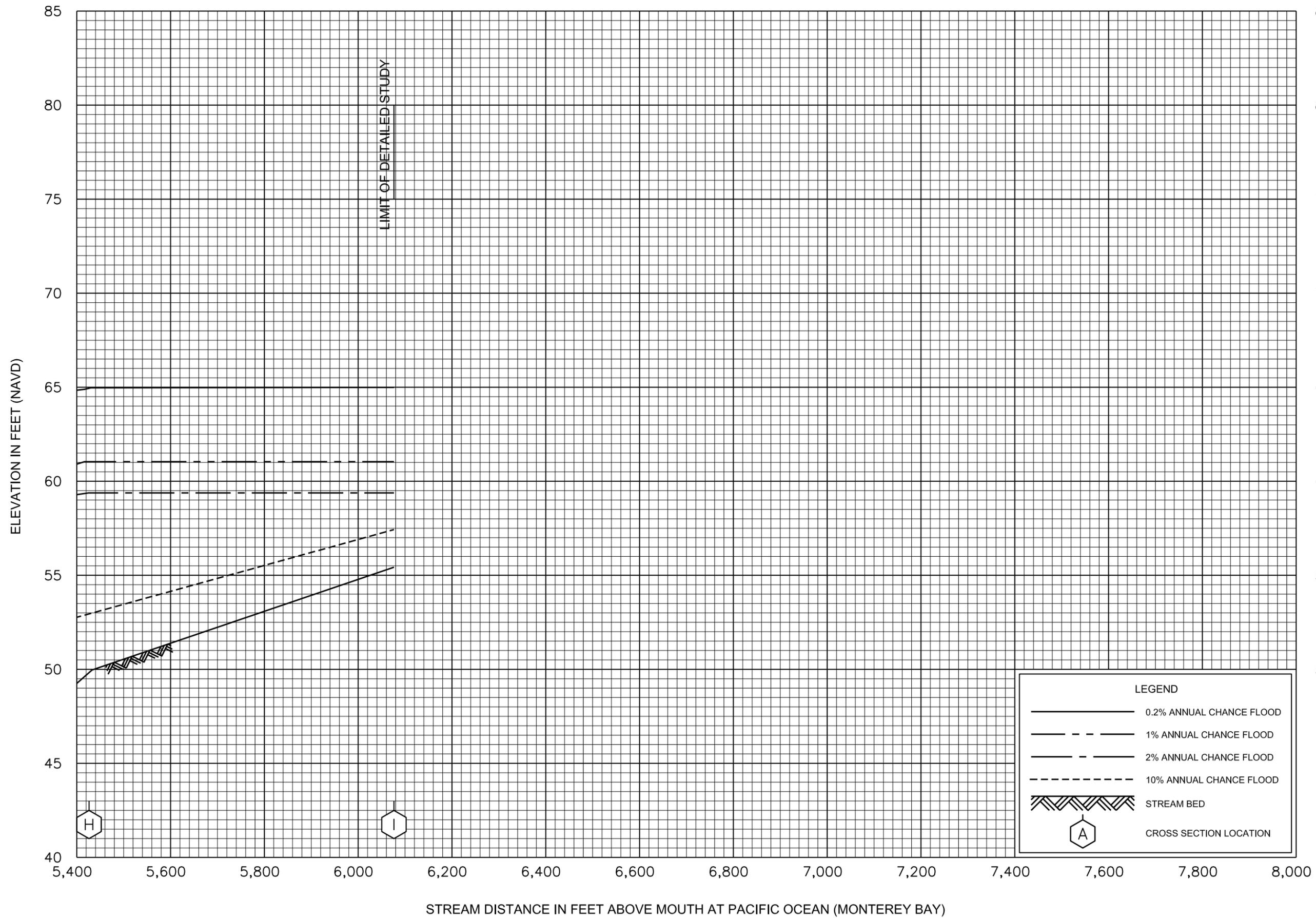
**FLOOD PROFILES**

**MOORE CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SANTA CRUZ COUNTY, CA**

AND INCORPORATED AREAS

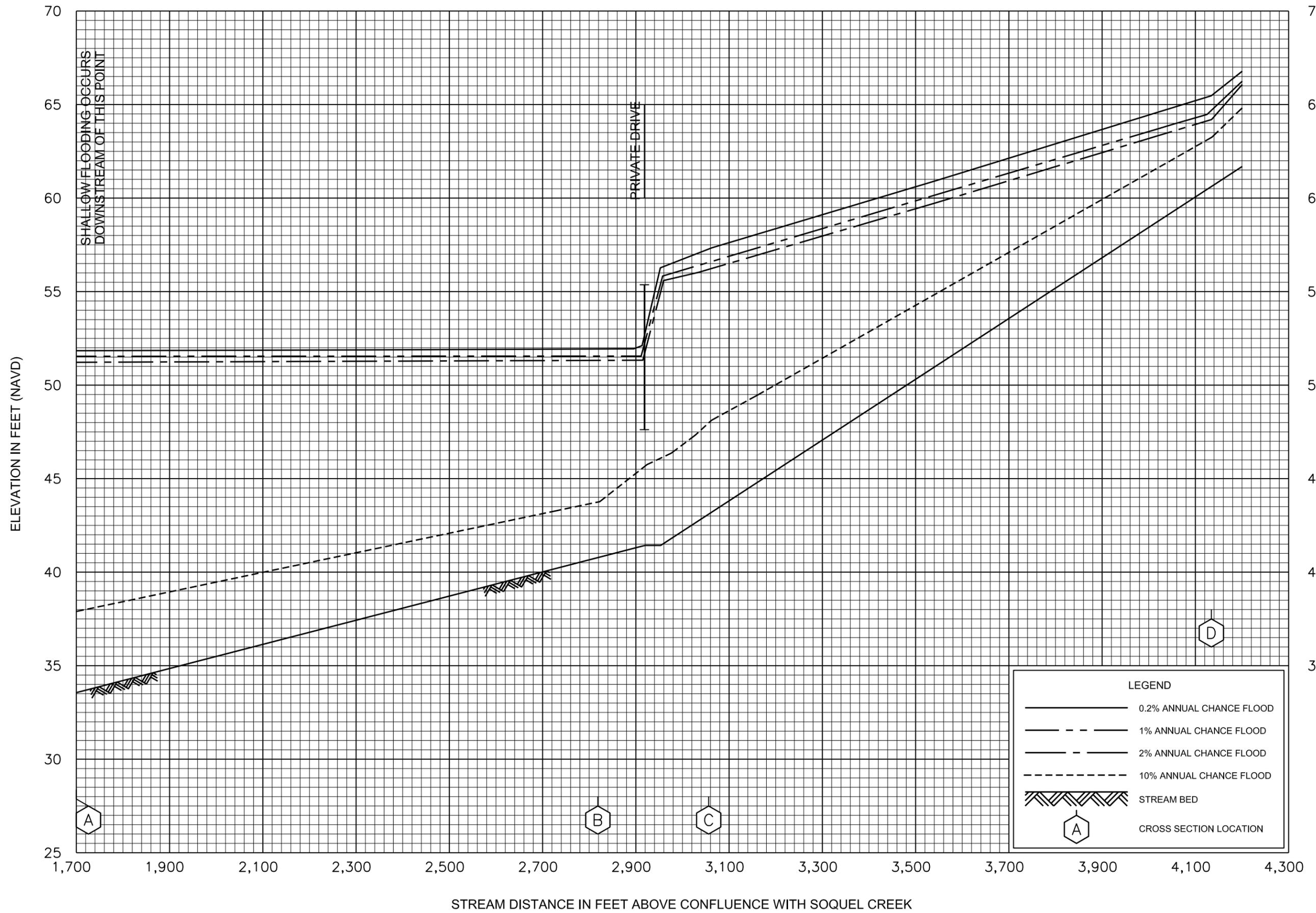


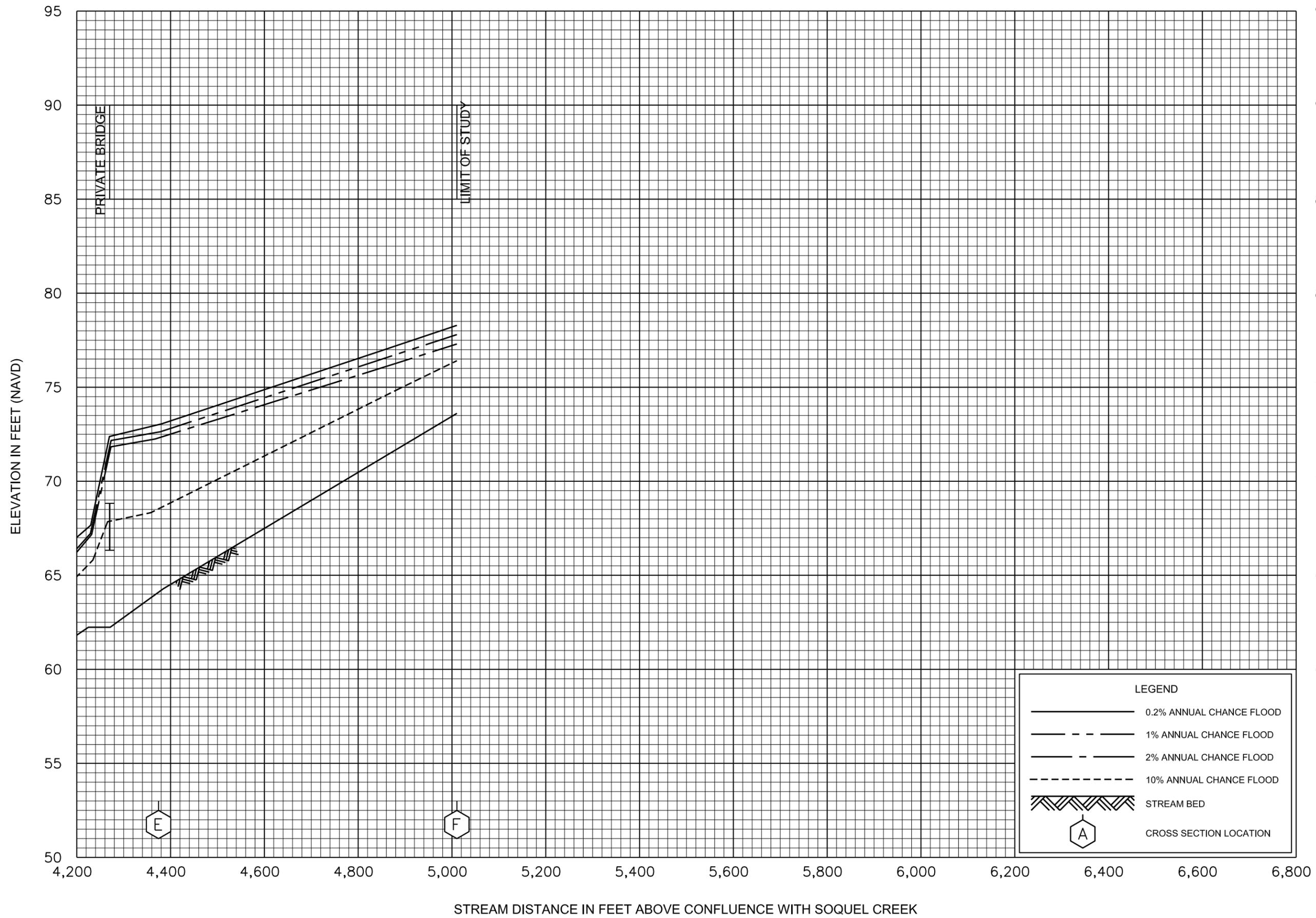
FLOOD PROFILES

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FLOOD PROFILES  
NOBEL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
SANTA CRUZ COUNTY, CA  
AND INCORPORATED AREAS