

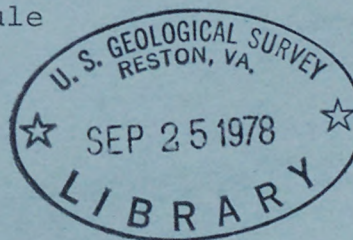
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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

FLOOD-PLAIN DELINEATION
For
CUB RUN BASIN
FAIRFAX COUNTY, VIRGINIA

efoy
Pat L. Soule



Open-File Report 78-17

Prepared in cooperation with the
County of Fairfax

1978

ABSTRACT-INDEX SHEET

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Water-surface profiles of the 25-, 50-, and 100-year recurrence interval discharges have been computed for all streams and reaches of channels in Fairfax County, Virginia having a drainage area greater than 1 square mile (2.59 km²) except for Dogue Creek, Little Hunting Creek, and that part of Cameron Run above Lake Barcroft. Maps having a 2-foot (0.60 m) contour interval and a horizontal scale of 1 inch (2.54 cm) equals 100 feet (30.5 m) have been used for base on which flood boundaries were delineated for 25-, 50-, and 100-year floods to be expected in each basin under ultimate development conditions. This report is one of a series and presents a discussion of techniques employed in computing discharges and profiles as well as the flood profiles and maps on which flood boundaries have been delineated for the Cub Run basin in Fairfax County.

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UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

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CONVERSION FACTORS

Factors for converting English units to metric units are shown to four significant figures. However, in the text the metric equivalents are shown only to the number of significant figures consistent with the values for the English units.

<u>English</u>	<u>Multiply by</u>	<u>Metric</u>
acres	4.047×10^{-3}	km ² (square kilometers)
ft ³ /s (cubic feet per second)	2.832×10^{-2}	m ³ /s (cubic meters per second)
ft (feet)	3.048×10^{-1}	m (meters)
in (inches)	$2.540 \times 10^{+1}$	mm (millimeters)
mi (miles)	1.609	km (kilometers)
mi ² (square miles)	2.590	km ² (square kilometers)

Flood-Plain Delineation for Cub Run Basin
Fairfax County, Virginia

Pat L. Soule

ABSTRACT

Water-surface profiles of the 25-year and 100-year floods and maps on which the 25-, 50-, and 100-year flood boundaries are delineated for streams in the Cub Run basin are presented in this report.

The techniques used in the computation of the flood profiles and delineation of flood boundaries are presented, and specific hydraulic problems encountered within the study area are also included.

INTRODUCTION

Suburban areas in many parts of the United States have experienced remarkable growth over the last decade or so. Much of this growth, which replaced farms and woodlands with streets, housing developments and shopping centers, caused serious environmental problems. Continued growth and increased competition for desirable space have required careful guidance and planning of future development to insure optimum land use.

Fairfax County began to experience such growth during the early 1950's. In 1959 much of Fairfax County was still rural, but the desirability of regulating encroachment into the flood hazard areas became apparent and appropriate local legislation was enacted by Fairfax County. For the legislation to be effective, it was necessary to quantify the effect of development on floods and to delineate the boundaries of flood inundation.

Data collection in Cub Run basin began in 1963, and continued through the release of maps and a letter report to the county of Fairfax in July 1972.

This report is one of a series summarizing the results of the hydraulic analysis done under the cooperative program between the county of Fairfax and the Geological Survey. The hydrologic analysis has been published separately (Anderson, 1970).

Purpose and scope

The purpose of the Cub Run study was to determine the boundaries of floods having recurrence intervals of 25-, 50-, and 100-years under conditions of ultimate development. The flood boundaries were to be delineated on large-scale maps that would become a part of the zoning ordinance documents for Fairfax County. The maps also could be used for management, design and land-use planning.

To achieve the objective of the study, it was necessary to analyze the effects of urbanization upon floodflows and to develop techniques to compute the flood magnitude from measurable basin parameters for any given recurrence interval and for any degree of development. Reasonably accurate methods were available for estimating the magnitude and frequency of floods expected from rural or undeveloped drainage basins. However, as a drainage basin is changed from rural to a suburban or an urban condition, the magnitude and frequency of flooding is also changed. Changes in flood frequency and magnitude resulting from basin development had previously received only scant study because of the sparse data available.

The cooperative agreement between U.S. Geological Survey and Fairfax County established a project to study the effects of basin development on floods and to delineate flood boundaries on specially prepared maps of stream valleys. The scope of the project included all of the basins in Fairfax County having a drainage area greater than 1 square mile

(2.59 square kilometers). Excepted were the Dogue Creek and Little Hunting Creek basins, the upper tributaries of Cameron Run basin and Tripps Run and Holmes Run above Lake Barcroft. Studies of these basins were made by a private consulting firm. The maps were to have 2-foot (0.60 m) contours and be at a scale of 1 inch (2.54 cm) equals 100 feet (30.5 m). The project allowed for collection of basic data, for analytical investigation, and for definition of flood-prone areas.

Anderson (1970) described the procedure used and the results obtained in the analysis of the effect of urbanization on flooding. He presented mathematical and graphical relations that may be used to estimate the flood discharge at a given recurrence interval up to 100 years for sites in the Washington Metropolitan area having various degrees of development.

The purpose of this report is to provide a consolidated reference containing a summary of the techniques used in computation of flood profiles, a discussion of specific hydraulic problems encountered within the study area, a graphical presentation and listing of flood profiles, and the maps showing the area inundated by floods having recurrence intervals of 25-, 50-, and 100-years.

Description of Study Area

Fairfax County is situated in northern Virginia adjacent to and just west of Washington, D.C. (fig. 1). Fairfax County was formed by the division of the County of Prince William in 1742. From colonial days until World War II Fairfax County remained primarily rural. Following World War II, with the tremendous growth of Federal Government and influx of light industry, the County lost its primary agricultural character and became largely residential. The population grew from 41,000 in 1940 to 564,000 in 1974 and it is estimated that by the year 2000 Fairfax County will have a population between 1 and 1.5 million. More than 50 percent of the land area had been developed by 1974. (written comm., Fairfax County, 1974).

The Cub Run basin is in the western part of Fairfax and southern portion of Loudoun Counties between latitudes $38^{\circ}48'N$ and $38^{\circ}57'N$ and longitudes $77^{\circ}22'W$ and $77^{\circ}31'W$ (fig. 2).

The basin has a north-south orientation with headwaters within Dulles International Airport boundary and mouth on Bull Run near the town of Manassas, Virginia. The basin in Fairfax County is bounded by Little Rocky Run basin to the southeast, Difficult Run basin to the east, Horsepen Run basin to the north and Bull Run basin to the south and west. The entire drainage basin includes a total area of approximately 52 square miles (1335 km^2).

Cub Run basin is entirely in the Piedmont Lowland physiographic province and is characterized by rolling hills

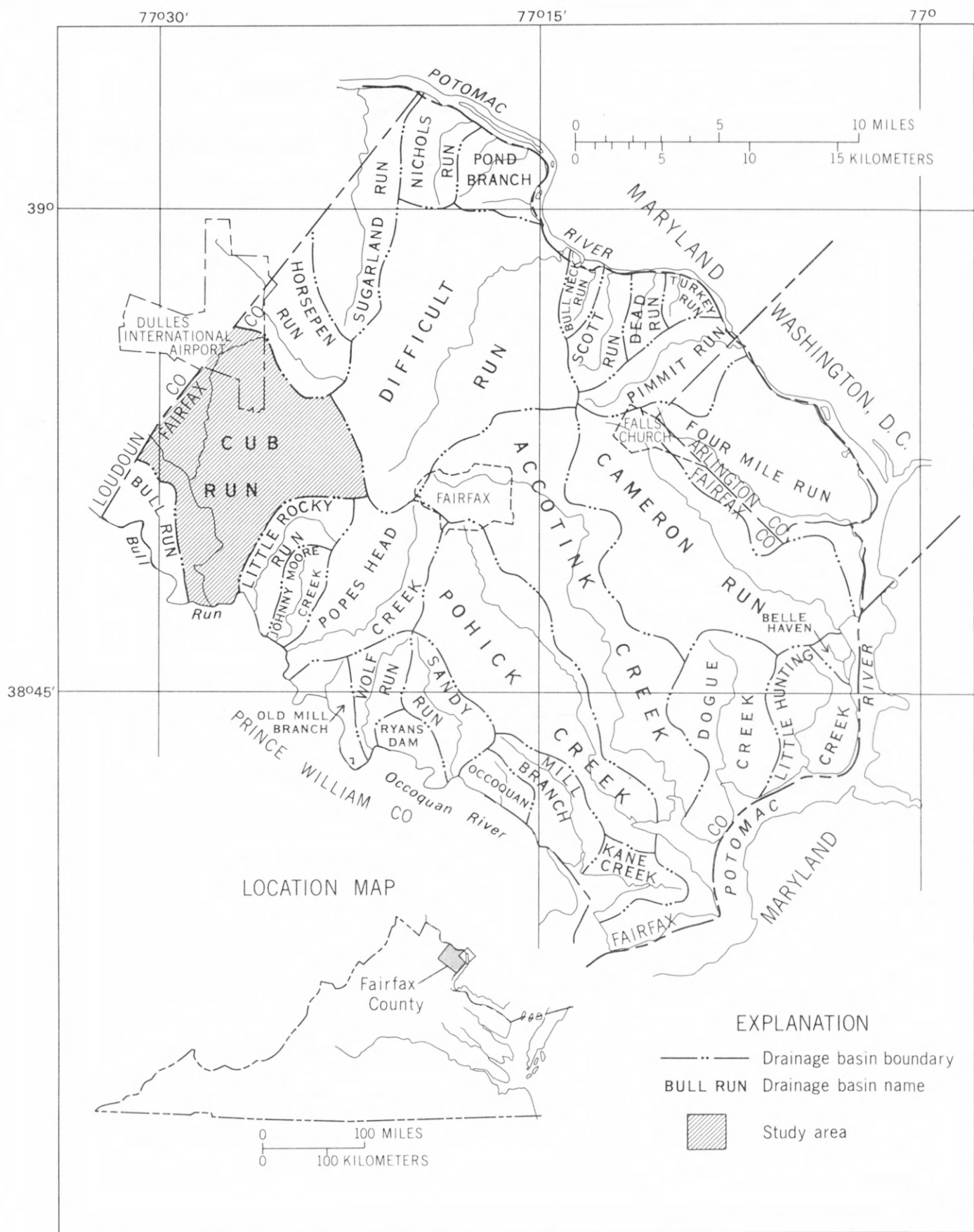


Figure 1. Location map of study area

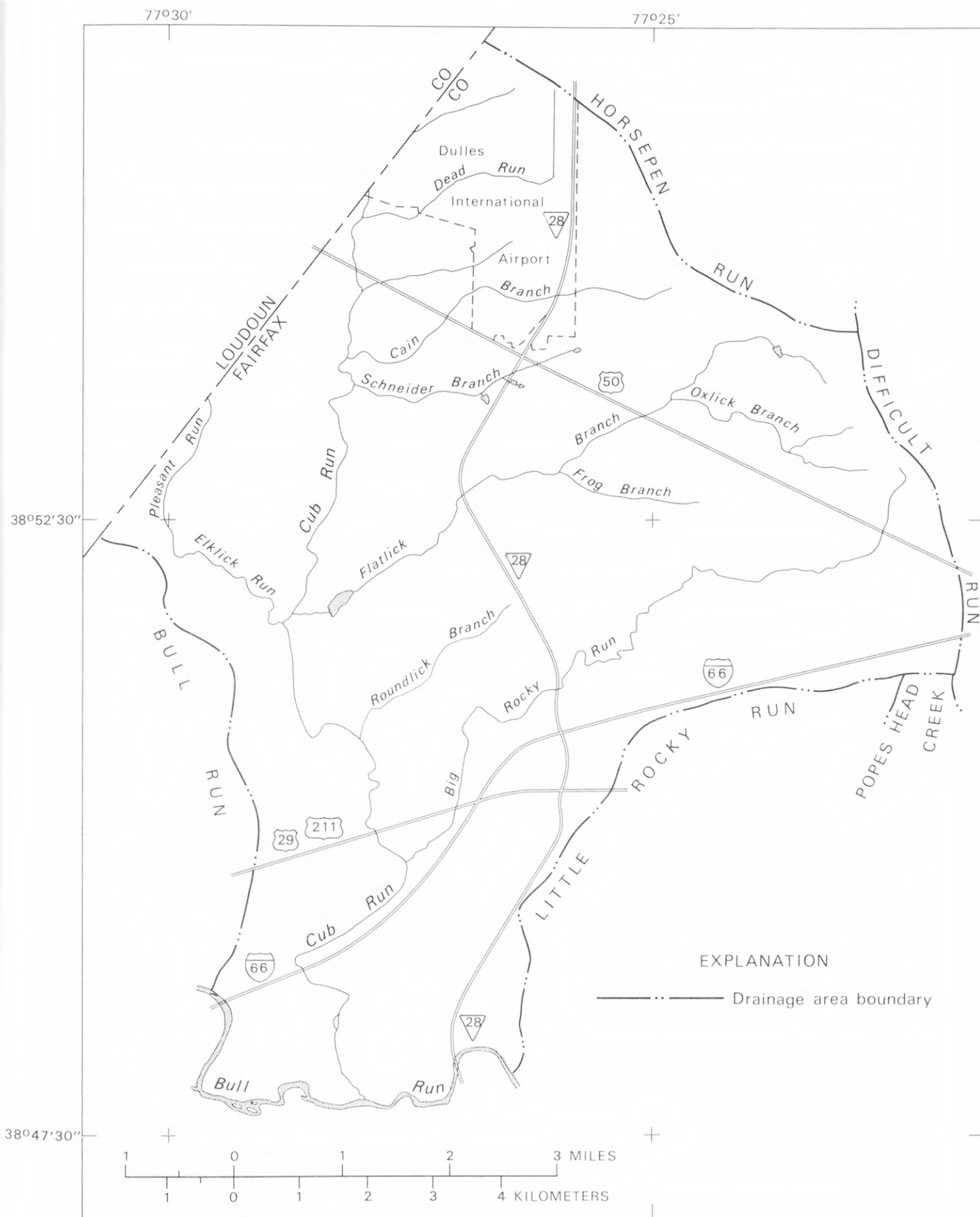


Figure 2. Map of Cub Run basin

and a well developed drainage network. Cub Run heads an elevation of about 300 ft (91 m) elevation at Dulles Airport and discharges into Bull Run at an elevation of about 150 ft (46 m) above mean sea level. The main channel slopes of Cub Run are relatively flat while the channels of the tributary streams are steep.

There is little development within Cub Run basin. In 1965 imperviousness for the basin was computed to be less than 1 percent (Anderson, 1970, p. 11). Since 1965, residential development has taken place within the upper portions of the Big Rocky Run and Flatlick Run drainages. Ultimate development with an overall imperviousness of 40 percent is anticipated for the basin. The area in the vicinity of Dulles International Airport will have airport oriented development with high imperviousness.

Field work in the Cub Run basin was done in the winter 1970-1971.

FLOOD-PLAIN MAPPING

Maps

The base maps on which flood boundaries are delineated have 2-foot (0.60 m) contour interval and a horizontal scale of 1 inch (2.54 cm) equals 100 feet (30.5 m). Natural and manmade features along the stream are shown. The maps were compiled by the U.S. Geological Survey, from aerial photographs taken in 1965 with revisions made from photographs taken in 1971. The maps include a 250-foot (76.2 m) grid based on the Virginia coordinate system, north zone.

Discharge

The flood areas delineated are those determined using ultimate-development discharges. Highly developed basins differ from natural basins in that for a given storm (1) runoff is greater, (2) discharge time is much shorter, and (3) floods of comparable magnitude have a higher frequency of occurrence. These factors were analyzed through a study of streamflow and precipitation records, most of which were collected in the vicinity of Washington, D.C. The report, "Effects of Urban Development on Floods in Northern Virginia", (Anderson, 1970) describes the analysis used and summarizes the conclusions of that analysis. The effect of imperviousness with respect to runoff volumes was evaluated by comparing typical runoff coefficients for natural and highly developed basins. Regression analysis was used; first to derive the relation of lag time (the time lapse from the centroid of precipitation excess to the centroid of runoff) as a function of length-slope parameter; and second, to derive the relation of the mean annual flood (2.33-year recurrence interval), adjusted for effects of imperviousness, as a function of drainage-basin area and lag time. An analysis of flood and rainfall frequencies was made to derive ratios of 25-, 50-, and 100-year floods to the mean annual flood for any percentage of imperviousness. Using the available information for a basin in the project area, the magnitude of the 2.33, 25-, 50-, and 100-year flood peaks can be computed from measurable basin parameters for any percentage of imperviousness in the ultimate development plan.

The term "recurrence interval", as used here, is the average interval of time within which a given flood discharge will be equaled or exceeded once. The recurrence interval is inversely related to the chance of a given flood being equaled or exceeded in any one year. Thus, the 100-year flood has a 1 percent chance of being equalled or exceeded in any one year. No periodicity is implied.

Profile Computation

Having computed the 25-, 50-, and 100-year floods at selected points by the method set forth by Anderson (1970), the corresponding water-surface profiles were computed using the standard step method of backwater analysis. The method is based on a balance of energy between successive pairs of stream cross-sections. For tranquil flow the computations start at the farthest downstream section, or at a control section, and proceed upstream; but for supercritical flow the computations start at the most upstream section, or critical section, and proceed downstream until flow again becomes tranquil. Peak-discharge magnitudes varied with size of drainage area and were changed at selected points, such as above the confluence of a major tributary. The water-surface profile elevations are available for each cross-section. The cross-sections are referenced to an arbitrary base line, drawn to an approximate centroid of flow, and measured in an upstream direction from an arbitrary starting point. Profiles were computed in accordance with accepted methods of the U.S. Geological Survey.

Following are several general items pertaining to the profile computations:

1. Discharge magnitudes greater than that of the 100-year flood may occur. However, the rate of change of stage per unit discharge generally becomes comparatively less as the discharge increases.
2. No factors of safety were used in the computations. Bridges and culverts were assumed to be free of debris. Roughness coefficients (Manning's "n") were selected based on summer vegetation.
3. New construction and channelization work may modify hydraulic properties, thus changing the flood profiles in the future.

Delineation of Flood Boundaries

The first step in the delineation of flood areas was to transpose flood profile elevation, computed at each cross section, onto the base maps on which channel cross-section had initially been located. Delineation was then completed by interpreting elevation between these cross sections and between map contours on a linear basis.

The maps show the 25- and 100-year flood boundaries generally and include the 50-year flood boundaries in some places. In areas where topography is steep, there was insufficient space to show both the 25- and 100-year flood boundaries and only the 100-year flood was delineated.

The delineation represents the average water-surface elevation. During actual floods, the water-surface may not be level across the stream.

FLOOD PROFILES FOR CUB RUN BASIN

Flood-profile data tables for streams in the Cub Run basin are:

- Table 1. Water-surface profile data for Cub Run
- Table 2. Water-surface profile data for Sand Branch
- Table 3. Water-surface profile data for Dead Run
- Table 4. Water-surface profile data for Cain Branch
- Table 5. Water-surface profile data for Schneider Branch
- Table 6. Water-surface profile data for Flatlick Branch
- Table 7. Water-surface profile data for Frog Branch
- Table 8. Water-surface profile data for Oxlick Branch
- Table 9. Water-surface profile data for Elklick Branch
- Table 10. Water-surface profile data for Pleasant Run
- Table 11. Water-surface profile data for Roundlick Branch
- Table 12. Water-surface profile data for Big Rocky Run

The tables were prepared so that the reader can locate the position for which information is desired on the flood plain maps included in this report, determine base-line stationing from the map by projection to the base line, and by use of the station number find in the table the nearest section for which information was determined.

For each cross section used in profile computations, tables 1 to 12 summarize: (1) The base-line reference stations of that section, (2) the percent imperviousness taken from "Fairfax County, A Comprehensive Plan for the Bull Run Planning District (1969)" and used for computing discharge for the different recurrence interval flood at that point, (3) the resulting discharge and the corresponding water-surface profile elevation for 25-, 50-, and 100-year floods.

CUB RUN BASIN

Table 1: Water Surface Profile Data for Cub Run

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
2	16+10	40	16,000	19,700	23,600	161.4	164.1	166.2	Confluence with Bull Run
3	25+04	40	16,000	19,700	23,600	161.5	164.2	166.2	
4	34+42	40	16,000	19,700	23,600	161.6	164.2	166.3	
5	41+20	40	16,000	19,700	23,600	161.7	164.3	166.4	
6	47+30	40	16,000	19,700	23,600	162.0	164.6	166.5	
7	53+19	40	16,000	19,700	23,600	162.3	164.8	166.7	
8	58+63	40	16,000	19,700	23,600	162.8	165.1	167.0	
9	64+33	40	16,000	19,700	23,600	163.1	165.3	167.2	
10	67+96	40	16,000	19,700	23,600	163.2	165.4	167.3	
11	71+17	40	16,000	19,700	23,600	163.3	165.5	167.3	
12	76+87	40	16,000	19,700	23,600	163.6	165.6	167.4	
13	80+84	40	16,000	19,700	23,600	163.7	165.7	167.5	
14	85+74	40	16,000	19,700	23,600	164.2	166.0	167.7	
15									Interstate 66
17	89+72	40	16,000	19,700	23,600	168.3	169.2	169.8	
18	94+30	40	16,000	19,700	23,600	168.6	169.6	170.3	
19	98+73	40	16,000	19,700	23,600	168.8	169.8	170.6	
20	104+54	40	16,000	19,700	23,600	169.0	170.1	170.8	
21	109+10	40	16,000	19,700	23,600	169.2	170.3	171.1	
22	113+52	40	16,000	19,700	23,600	169.5	170.6	171.3	
23	118+36	40	16,000	19,700	23,600	169.7	170.8	171.6	
24	122+36	40	16,000	19,700	23,600	169.9	171.1	171.8	
25	126+38	40	16,000	19,700	23,600	170.0	171.2	172.1	
26	130+09	40	16,000	19,700	23,600	170.6	171.9	172.8	
27									Compton Road (State Rte 658)

Table 1: Water Surface Profile Data for Cub Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
28	131+96	40	16,000	19,700	23,600	173.2	174.8	175.7	
29	135+73	40	16,000	19,700	23,600	173.4	175.1	176.0	
30	139+50	40	16,000	19,700	23,600	173.7	175.4	176.3	
31	143+48	40	16,000	19,700	23,600	173.8	175.5	176.4	
32	147+12	40	16,000	19,700	23,600	174.4	176.2	177.3	
33	150+08	40	16,000	19,700	23,600	174.6	176.3	177.5	
34	152+24	40	16,000	19,700	23,600	174.9	176.7	178.0	
35	154+57	40	16,000	19,700	23,600	175.3	177.1	178.4	
36	156+65	40	16,000	19,700	23,600	175.5	177.2	178.6	
37	158+71	40	16,000	19,700	23,600	176.1	177.8	179.2	
38	160+66	40	16,000	19,700	23,600	177.6	179.4	180.8	
39	162+89	40	16,000	19,700	23,600	178.3	180.0	181.4	
40	165+08	40	16,000	19,700	23,600	183.5	184.3	185.4	
41	167+47	40	16,000	19,700	23,600	185.2	186.3	187.4	
42	169+57	45	13,700	16,700	19,800	187.3	188.6	189.8	
43	171+45	45	13,700	16,700	19,800	190.1	191.1	192.1	
44	172+70	45	13,700	16,700	19,800	194.2	195.2	196.2	
1044	173+38	45	13,700	16,700	19,800	194.9	196.0	197.0	
45	173+99	45	13,700	16,700	19,800	196.4	197.4	198.3	
46	175+63	45	13,700	16,700	19,800	199.5	200.5	201.6	
47	177+54	45	13,700	16,700	19,800	205.8	207.3	208.5	
48	180+00	45	13,700	16,700	19,800	208.0	209.4	210.7	
49	182+22	45	13,700	16,700	19,800	209.6	210.9	212.1	
50	185+83	45	13,700	16,700	19,800	212.3	213.5	214.6	
51	189+33	45	13,700	16,700	19,800	213.5	214.6	215.7	
52	192+70	45	13,700	16,700	19,800	213.9	214.9	216.0	
53							Lee Highway (U.S. Rts. 29-211)		
55	195+00	45	13,700	16,700	19,800	220.2	221.4	222.4	

Table 1: Water Surface Profile Data for Cub Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
56	199+04	45	13,700	16,700	19,800	220.8	222.2	223.2	
57	203+09	45	13,700	16,700	19,800	221.1	222.5	223.6	
58	206+82	45	13,700	16,700	19,800	221.3	222.8	223.9	
59	211+86	45	13,700	16,700	19,800	221.6	223.1	224.2	
60	216+28	45	13,700	16,700	19,800	221.7	223.2	224.3	
61	222+76	45	13,700	16,700	19,800	221.8	223.3	224.4	
62	229+56	45	13,700	16,700	19,800	221.8	223.3	224.5	
63	235+52	45	13,700	16,700	19,800	221.9	223.4	224.5	
64	241+70	45	13,700	16,700	19,800	221.9	223.4	224.6	
65	247+18	45	13,700	16,700	19,800	222.0	223.5	224.6	
66	254+26	45	13,600	16,600	19,600	222.1	223.6	224.8	
67	260+04	45	13,600	16,600	19,600	222.2	223.7	224.8	
68	265+83	45	13,600	16,600	19,600	222.3	223.8	224.9	
69	274+26	45	13,600	16,600	19,600	222.6	224.0	225.2	
70	283+98	45	13,600	16,600	19,600	223.0	224.4	225.5	
71	291+86	45	13,600	16,600	19,600	223.7	225.0	226.0	
72	299+23	45	13,600	16,600	19,600	224.6	225.7	226.7	
73	305+37	45	13,600	16,600	19,600	225.1	226.2	227.2	
74	310+07	45	13,600	16,600	19,600	225.5	226.6	227.6	
75	314+29	45	13,600	16,600	19,600	225.8	226.9	227.9	
76	319+07	45	13,600	16,600	19,600	226.2	227.5	228.5	
77	324+53	45	13,600	16,600	19,600	226.6	227.9	229.0	
78	328+39	60	10,600	12,600	14,700	227.3	228.6	229.6	
79	332+88	60	10,600	12,600	14,700	227.7	229.0	229.9	
80	337+57	60	10,600	12,600	14,700	227.8	229.0	230.0	
81	342+27	65	8,000	9,400	10,700	227.8	229.1	230.0	

Table 1: Water Surface Profile Data for Cub Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
82	346+70	65	8,000	9,400	10,700	227.9	229.1	230.1	
83	350+97	65	8,000	9,400	10,700	228.0	229.2	230.2	
84	355+82	65	8,000	9,400	10,700	228.2	229.4	230.3	
85	360+50	65	8,000	9,400	10,700	228.4	229.6	230.5	
86	364+50	65	8,000	9,400	10,700	228.7	229.8	230.7	
87	369+41	65	8,000	9,400	10,700	229.0	230.1	230.9	
88	373+05	65	8,000	9,400	10,700	229.1	230.2	231.0	
89	377+38	65	8,000	9,400	10,700	229.4	230.4	231.2	
90	380+60	65	8,000	9,400	10,700	229.8	230.7	231.4	
91	384+41	65	8,000	9,400	10,700	230.1	230.9	231.7	
92	385+00	65	8,000	9,400	10,700	230.2	231.0	231.8	Braddock Road (State Rte. 620)
93	385+42	65	8,000	9,400	10,700	230.2	231.0	231.8	
94	389+82	65	8,000	9,400	10,700	231.1	231.8	232.4	
95	393+96	65	8,000	9,400	10,700	232.2	233.0	233.6	
96	397+87	65	8,000	9,400	10,700	232.9	233.6	234.2	
97	401+24	65	8,000	9,400	10,700	233.6	234.3	234.9	
98	405+32	65	8,000	9,400	10,700	234.3	235.1	235.7	
99	409+17	65	8,000	9,400	10,700	234.9	235.6	236.3	
100	412+25	65	8,000	9,400	10,700	235.5	236.3	237.0	
101									Lee Road (State Rte 661)
102	413+27	65	8,000	9,400	10,700	236.0	236.7	237.4	
103	418+08	65	8,000	9,400	10,700	236.8	237.5	238.1	
104	421+00	65	8,000	9,400	10,700	237.2	237.9	238.5	
105	423+80	65	8,000	9,400	10,700	238.1	238.9	239.5	
106	427+16	65	8,000	9,400	10,700	238.7	239.5	240.1	
107	430+10	65	8,000	9,400	10,700	239.2	240.0	240.6	

Table 1: Water Surface Profile Data for Cub Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
108	433+22	65	8,000	9,400	10,700	240.0	240.8	241.4	
109	433+95	65	8,000	9,400	10,700	240.1	240.8	241.5	
110	434+67	65	8,000	9,400	10,700	240.5	241.1	241.8	
111	437+35	70	7,800	9,200	10,500	240.9	241.5	242.2	
112	440+62	70	7,800	9,200	10,500	241.9	242.5	243.2	
113	443+84	70	7,800	9,200	10,500	242.5	243.2	243.9	
114	447+38	70	7,800	9,200	10,500	243.5	244.2	244.9	
115	449+92	70	7,500	8,800	10,100	244.0	244.7	245.4	
116	452+71	70	7,500	8,800	10,100	244.3	245.0	245.7	
117	455+80	70	7,500	8,800	10,100	244.8	245.5	246.2	
118	459+83	70	7,500	8,800	10,100	245.6	246.4	247.1	
119	464+07	70	6,800	7,900	9,100	246.0	246.7	247.5	
120	467+46	70	6,800	7,900	9,100	246.1	246.9	247.6	
121	472+64	70	6,800	7,900	9,100	246.4	247.1	247.9	
122	478+00	70	6,800	7,900	9,100	246.5	247.3	248.0	
123	482+41	70	6,800	7,900	9,100	246.6	247.4	248.1	
124	488+23	70	6,300	7,400	8,500	246.8	247.5	248.3	
125	495+21	70	6,300	7,400	8,500	247.0	247.8	248.5	
126	502+19	70	5,900	6,900	7,900	247.4	248.1	248.8	
127	509+14	70	5,900	6,900	7,900	247.8	248.5	249.0	
128	515+22	70	5,900	6,900	7,900	248.2	248.9	249.4	
129	523+90	65	5,500	6,400	7,400	248.7	249.3	249.8	
130						Lee-Jackson Memorial Highway (U.S. Rte. 50)			
132	526+10	65	5,500	6,400	7,400	253.3	253.5	253.7	
133	534+65	65	5,500	6,400	7,400	253.4	253.6	253.8	

Table 1: Water Surface Profile Data for Cub Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
134	542+25	65	5,500	6,400	7,400	253.5	253.7	254.0	
135	548+36	65	4,700	5,500	6,400	253.7	254.0	254.2	
136	553+81	65	4,700	5,500	6,400	253.8	254.2	254.5	
137	558+30	60	3,100	3,600	4,200	254.1	254.5	254.7	
138	562+94	60	3,100	3,600	4,200	254.3	254.7	255.0	Dulles International Airport Boundary

CUB RUN BASIN

Table 2: Water Surface Profile Data for Sand Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
250	0+00	80	1,700	1,900	2,200	253.6	253.8	254.1	Confluence with Cub Run
251	3+64	80	1,700	1,900	2,200	253.8	254.1	254.3	
252	6+04	80	1,700	1,900	2,200	254.2	254.5	254.8	
253	8+18	80	1,700	1,900	2,200	254.8	255.1	255.4	
254	10+71	80	1,700	1,900	2,200	256.0	256.3	256.6	
255	13+41	80	1,700	1,900	2,200	258.1	258.3	258.6	

CUB RUN BASIN

Table 3: Water Surface Profile Data for Dead Run

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
200	5+00	75	2,100	2,400	2,800	254.0	254.3	254.6	Confluence with Cub Run
201	9+14	75	2,100	2,400	2,800	254.7	255.0	255.4	
202	11+95	75	2,100	2,400	2,800	255.5	255.8	256.2	
203	14+37	75	2,100	2,400	2,800	256.4	256.6	256.9	
204	16+85	75	2,100	2,400	2,800	257.2	257.4	257.8	
205	20+57	75	2,100	2,400	2,800	258.2	258.6	258.9	
206	24+37	75	2,100	2,400	2,800	259.4	259.7	260.1	
207	26+62	75	2,100	2,400	2,800	260.1	260.4	260.7	
208							Willard Road (State Rte. 607)		
209	27+37	75	2,100	2,400	2,800	260.4	260.6	261.0	
210	29+50	75	2,100	2,400	2,800	261.8	262.0	262.3	
211	31+03	75	2,100	2,400	2,800	262.6	262.8	263.1	

CUB RUN BASIN

Table 4: Water Surface Profile Data for Cain Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
300	10+00	80	2,100	2,400	2,700	246.7	247.4	248.2	Confluence with Cub Run
301	13+72	80	2,100	2,400	2,700	249.4	249.5	249.6	
302	16+63	80	2,100	2,400	2,700	250.3	250.4	250.6	
303	20+01	80	2,100	2,400	2,700	251.5	251.7	251.9	
304	22+86	80	2,100	2,400	2,700	252.6	252.8	253.0	
305	25+55	80	2,100	2,400	2,700	253.9	254.1	254.3	
306	28+63	80	2,100	2,400	2,700	255.1	255.3	255.5	
307	31+81	80	2,100	2,400	2,700	256.0	256.3	256.5	
308	34+78	80	2,100	2,400	2,700	257.0	257.3	257.6	
309	37+30	80	2,100	2,400	2,700	257.6	257.9	258.2	
310	39+59	80	2,100	2,400	2,700	258.0	258.3	258.6	
311	42+26	80	1,900	2,200	2,500	258.6	258.9	259.2	
312	45+32	80	1,900	2,200	2,500	259.8	260.1	260.4	
313	48+39	80	1,900	2,200	2,500	260.6	260.8	261.1	
314	51+41	80	1,900	2,200	2,500	261.7	261.9	262.1	
315	54+23	80	1,900	2,200	2,500	263.0	263.2	263.4	
316	57+43	80	1,900	2,200	2,500	263.9	264.2	264.5	
317						Lee-Jackson Highway (U.S. Rte.50)			
319	59+19	80	1,900	2,200	2,500	266.3	266.5	266.7	
320	61+38	80	1,900	2,200	2,500	266.4	266.6	266.8	
321	64+17	80	1,900	2,200	2,500	266.6	266.8	267.0	
322	66+66	80	1,900	2,200	2,500	266.8	267.1	267.3	
323	68+42	80	1,900	2,200	2,500	267.3	267.6	267.8	
324	70+76	80	1,900	2,200	2,500	268.9	269.2	269.4	
325	73+27	80	1,900	2,200	2,500	269.8	270.1	270.4	
326	75+60	80	1,900	2,200	2,500	270.8	271.1	271.4	

CUB RUN BASIN

Table 5: Water Surface Profile Data for Schneider Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
400	0+00	80	2,000	2,300	2,600	245.9	246.6	247.4	Confluence with Cub Run
401	2+68	80	2,000	2,300	2,600	245.9	246.7	247.4	Private Road
402									
403	7+80	80	2,000	2,300	2,600	246.1	246.8	247.6	
404	9+82	80	2,000	2,300	2,600	246.2	246.9	247.6	
405	12+92	80	2,000	2,300	2,600	246.6	247.2	247.9	
406	16+19	80	2,000	2,300	2,600	247.2	247.7	248.2	
407	19+32	80	2,000	2,300	2,600	248.1	248.4	248.7	
408	21+76	80	2,000	2,300	2,600	248.9	249.2	249.4	
409	24+25	80	2,000	2,300	2,600	250.0	250.2	250.4	
410	26+94	80	2,000	2,300	2,600	251.1	251.4	251.6	
411	29+87	80	1,800	2,100	2,300	252.1	252.3	252.4	
412	32+52	80	1,500	1,700	1,900	253.0	253.2	253.4	
413	35+07	80	1,500	1,700	1,900	253.9	254.0	254.2	
414	38+14	80	1,500	1,700	1,900	255.6	255.8	255.9	
415	40+99	80	1,500	1,700	1,900	256.5	256.7	256.8	
416	43+08	80	1,500	1,700	1,900	257.4	257.6	257.8	
417	45+22	80	1,500	1,700	1,900	258.3	258.4	258.6	
418	48+15	80	1,500	1,700	1,900	259.2	259.4	259.5	
419	51+02	80	1,500	1,700	1,900	260.9	261.1	261.3	
420	53+65	80	1,400	1,600	1,800	262.5	262.6	262.8	

CUB RUN BASIN

Table 6: Water Surface Profile Data for Flatlick Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
504	16+34	40	4,600	5,600	6,700	229.2	229.6	230.3	Dam, Chantilly Country Club
505	19+88	40	4,600	5,600	6,700	229.2	229.6	230.3	
506	22+41	40	4,600	5,600	6,700	229.3	229.8	230.4	
507	24+72	40	4,600	5,600	6,700	229.3	229.8	230.4	
508	27+85	40	4,600	5,600	6,700	229.6	230.2	230.8	
509	31+17	40	4,600	5,600	6,700	230.3	230.7	231.3	
510	34+71	40	4,600	5,600	6,700	231.2	231.7	232.1	
511	37+89	40	4,600	5,600	6,700	232.4	232.7	233.1	
512									Braddock Road (State Rte.620)
513	38+70	40	4,600	5,600	6,700	232.5	232.9	233.3	
514	42+46	40	4,600	5,600	6,700	233.6	234.1	234.6	
515	45+97	40	4,600	5,600	6,700	234.6	235.1	235.6	
516	48+87	40	4,600	5,600	6,700	235.4	235.9	236.5	
517	51+90	40	4,600	5,600	6,700	236.2	236.7	237.3	
518	55+17	40	4,600	5,600	6,700	236.8	237.4	238.0	
519	58+19	40	4,600	5,600	6,700	237.5	238.1	238.7	
520	61+62	40	4,500	5,500	6,500	238.6	239.2	239.8	
521	64+35	40	4,500	5,500	6,500	239.2	239.8	240.5	
522	67+98	40	4,400	5,400	6,400	239.7	240.4	241.0	
523	71+89	40	4,300	5,300	6,300	240.5	241.1	241.8	
524	75+13	40	4,300	5,300	6,300	241.5	242.0	242.6	
525	78+57	40	4,300	5,300	6,300	242.1	242.7	243.3	
526	82+30	40	4,300	5,300	6,300	242.8	243.4	244.1	
527	86+00	40	4,200	5,100	6,100	243.3	243.9	244.6	

Table 6: Water Surface Profile Data for Flatlick Branch - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
528	89+61	40	4,200	5,100	6,100	244.0	244.6	245.2	
529	92+89	40	4,200	5,100	6,100	244.6	245.3	246.0	
530	96+25	40	4,200	5,100	6,100	245.2	245.9	246.5	
									Sully Road (State Rte. 28)
531	99+11	40	4,200	5,100	6,100	247.4	248.7	250.2	
532	100+57	40	4,200	5,100	6,100	248.0	249.3	250.7	
533	102+42	40	4,200	5,100	6,100	248.2	249.5	250.8	
534	104+46	40	4,200	5,100	6,100	248.6	249.8	251.0	
535	106+74	40	4,200	5,100	6,100	249.5	250.5	251.7	
536	110+01	40	4,200	5,100	6,100	249.8	250.8	251.9	
537	113+58	40	4,200	5,100	6,100	250.1	251.0	252.1	
538	116+48	40	4,200	5,100	6,100	250.7	251.5	252.5	
539	118+77	40	4,200	5,100	6,100	251.2	251.9	252.8	
540	121+58	40	4,200	5,100	6,100	251.8	252.5	253.3	
541	124+13	40	4,200	5,100	6,100	252.5	253.2	253.9	
542	126+73	40	4,200	5,100	6,100	253.5	254.1	254.7	
543	128+96	40	4,200	5,100	6,100	254.0	254.6	255.2	
544	130+86	40	4,000	4,900	5,900	254.6	255.1	255.6	
545	133+36	40	4,000	4,900	5,900	255.3	255.7	256.2	
546	134+66	40	4,000	4,900	5,900	256.0	256.4	256.7	
547									Centreville Road (State Rte. 657)
548	136+34	40	4,000	4,900	5,900	257.4	257.8	258.1	
549	138+58	40	4,000	4,900	5,900	258.4	258.9	259.3	
550	141+50	40	4,000	4,900	5,900	259.8	260.4	261.0	

Table 6: Water Surface Profile Data for Flatlick Branch - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
551	144+20	40	4,000	4,900	5,900	261.6	262.1	262.7	
552	146+77	40	4,000	4,900	5,900	263.0	263.4	263.9	
553	149+78	40	4,000	4,900	5,900	263.9	264.4	265.0	
554	152+75	40	4,000	4,900	5,900	264.7	265.2	265.8	
555	155+52	40	3,400	4,100	4,900	265.0	265.6	266.2	
556	158+19	40	3,400	4,100	4,900	265.8	266.2	266.8	
557	160+97	40	3,400	4,100	4,900	266.8	267.2	267.7	
558	163+62	40	3,400	4,100	4,900	267.6	268.0	268.5	
559	166+48	40	3,400	4,100	4,900	268.7	269.0	269.5	
560	169+82	40	3,400	4,100	4,900	269.7	270.1	270.5	
561	173+15	40	3,400	4,100	4,900	271.1	271.5	271.9	
562	175+87	40	3,400	4,100	4,900	272.6	272.9	273.2	
563	178+32	40	3,400	4,100	4,900	273.1	273.5	274.0	
564	181+45	40	3,400	4,100	4,900	274.0	274.4	274.8	
565	184+63	40	3,400	4,100	4,900	275.0	275.4	275.9	
566	187+62	45	3,200	3,900	4,600	276.0	276.4	276.9	
567	190+53	45	3,200	3,900	4,600	277.1	277.5	278.0	
568	193+32	45	3,200	3,900	4,600	278.5	279.0	279.4	
569	195+98	45	3,200	3,900	4,600	280.1	280.5	281.0	
570	198+46	45	3,200	3,900	4,600	281.0	281.5	282.0	
571						Lee-Jackson Highway (U.S. Rte. 50)			
573	200+44	45	3,200	3,900	4,600	287.4	287.8	288.1	
574	203+27	45	3,100	3,700	4,400	287.4	287.8	288.2	
575	205+90	45	3,100	3,700	4,400	287.6	288.0	288.4	

Table 6: Water Surface Profile Data for Flatlick Branch - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
576	208+88	45	3,100	3,700	4,400	287.9	288.4	288.8	
577	211+59	45	3,100	3,700	4,400	288.1	288.6	289.1	
578	214+23	50	3,000	3,600	4,300	288.3	288.9	289.4	
579	216+83	50	3,000	3,600	4,300	289.0	289.5	290.0	
580						Lees Corner Road (State Rte. 695)			
581	217+75	50	3,000	3,600	4,300	290.0	290.3	290.7	
582	220+23	50	3,000	3,600	4,300	290.5	290.9	291.3	
583	222+23	60	1,900	2,200	2,600	291.2	291.6	292.0	
584	224+55	60	1,900	2,200	2,600	292.6	292.8	293.0	
585	226+34	60	1,700	2,100	2,400	294.2	294.4	294.7	
586	228+54	60	1,700	2,100	2,400	296.6	297.0	297.2	
587	230+72	60	1,700	2,100	2,400	298.0	298.4	298.7	
588	233+05	60	1,700	2,100	2,400	299.7	300.1	300.4	
589	235+37	60	1,700	2,100	2,400	301.9	302.3	302.7	
590	237+96	60	1,700	2,100	2,400	303.9	304.3	304.7	
591	240+62	60	1,700	2,100	2,400	306.0	306.4	306.7	
592	242+43	60	1,700	2,100	2,400	308.3	308.7	309.0	
593	244+26	60	1,700	2,100	2,400	309.9	310.4	310.7	
594	246+37	60	1,400	1,700	2,000	311.4	311.8	312.2	
595	248+19	60	1,400	1,700	2,000	313.7	314.2	314.6	
596	249+94	60	1,400	1,700	2,000	315.1	315.6	316.0	
597	251+57	60	1,400	1,700	2,000	316.3	316.8	317.2	
598	253+38	60	1,400	1,700	2,000	317.9	318.3	318.7	
599	255+20	60	1,400	1,700	2,000	319.8	320.2	320.6	
600	256+80	60	1,400	1,700	2,000	321.0	321.5	321.9	

CUB RUN BASIN

Table 7: Water Surface Profile Data for Frog Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
650	1+69	30	1,300	1,600	2,000	264.9	265.4	266.0	Confluence with Flatlick Branch
651	3+73	30	1,300	1,600	2,000	265.5	265.9	266.4	
652	5+56	30	1,300	1,600	2,000	266.9	267.2	267.6	
653	7+27	30	1,300	1,600	2,000	267.5	267.9	268.4	

CUB RUN BASIN

Table 8: Water Surface Profile Data for Oxlick Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
601	3+00	35	1,500	1,900	2,300	291.3	291.6	292.0	Confluence with Flatlick Branch
602	4+89	35	1,500	1,900	2,300	293.0	293.2	293.4	
603	7+03	35	1,500	1,900	2,300	295.0	295.3	295.6	
604	8+78	35	1,500	1,900	2,300	296.1	296.4	296.8	
605	10+77	35	1,500	1,900	2,300	298.1	298.4	298.7	
606	12+73	35	1,500	1,900	2,300	300.2	300.6	301.0	
607	14+52	35	1,500	1,900	2,300	301.5	301.8	302.3	
608	16+46	35	1,500	1,900	2,300	303.6	303.8	304.2	
609	18+60	35	1,500	1,900	2,300	305.8	306.2	306.5	
610	20+93	35	1,500	1,900	2,300	307.1	307.5	307.8	
611	23+43	35	1,500	1,900	2,300	309.1	309.4	309.6	
612	25+87	35	1,500	1,900	2,300	311.9	312.2	312.4	
613	28+19	35	1,500	1,900	2,300	313.8	314.2	314.6	
614	30+37	35	1,300	1,600	2,000	314.4	314.8	315.2	
615	32+47	35	1,300	1,600	2,000	316.2	316.6	317.0	
616	34+52	35	1,300	1,600	2,000	318.3	318.7	319.1	
617	35+79	35	1,300	1,600	2,000	320.5	320.8	321.1	
618	37+26	35	1,300	1,600	2,000	322.4	322.7	323.0	
619	38+89	35	1,300	1,600	2,000	324.0	324.3	324.7	
620	40+30	35	1,300	1,600	2,000	326.4	326.8	327.2	
621	41+31	35	1,300	1,600	2,000	328.1	328.6	329.2	
622	43+26	35	1,300	1,600	2,000	331.2	331.6	332.1	
623	45+07	35	1,300	1,600	2,000	333.7	334.2	334.7	
624	46+96	35	1,300	1,600	2,000	336.0	336.3	336.6	
625	48+59	35	1,000	1,300	1,600	337.3	337.6	337.9	
626	51+07	35	1,000	1,300	1,600	338.7	339.0	339.3	
627	53+48	35	1,000	1,300	1,600	340.7	341.0	341.2	

CUB RUN BASIN

Table 9: Water Surface Profile Data for Ellick Run

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
700	0+100	25	5,700	7,200	8,800	227.0	228.3	229.3	Confluence with Cub Run
701	1+71	25	5,700	7,200	8,800	227.2	228.5	229.5	
702	4+44	25	5,700	7,200	8,800	227.8	229.1	230.2	
703	6+96	25	5,700	7,200	8,800	228.1	229.4	230.4	
704	9+68	25	5,700	7,200	8,800	228.5	229.7	230.8	
705	12+81	25	5,700	7,200	8,800	229.3	230.6	231.7	
706	14+06	25	5,700	7,200	8,800	229.5	230.8	232.0	
707	15+57	25	5,700	7,200	8,800	230.1	231.3	232.3	
708	17+39	25	5,700	7,200	8,800	231.2	232.4	233.6	
709	20+22	25	5,700	7,200	8,800	232.3	233.4	234.6	
710	22+88	25	5,700	7,200	8,800	232.7	233.9	235.0	
711	26+01	25	5,700	7,200	8,800	233.3	234.5	235.7	
712	28+57	25	5,700	7,200	8,800	233.8	235.0	236.2	
713	31+27	25	5,700	7,200	8,800	234.3	235.5	236.6	
714	34+44	25	5,700	7,200	8,800	235.0	236.1	237.2	
715	37+50	25	5,700	7,200	8,800	235.7	236.8	238.0	
716	40+50	25	5,700	7,200	8,800	236.3	237.5	238.6	
717	45+85	25	5,700	7,200	8,800	237.1	238.2	239.3	
718	50+89	25	5,700	7,200	8,800	237.7	238.8	239.8	
719	54+64	25	5,700	7,200	8,800	237.9	239.0	240.0	
720	58+88	25	5,700	7,200	8,800	238.2	239.3	240.2	
721	62+47	25	5,700	7,200	8,800	238.5	239.5	240.5	
722	66+10	25	5,700	7,200	8,800	239.1	240.1	241.1	
723	69+96	25	5,700	7,200	8,800	239.9	240.9	241.8	
724									Pleasant Valley Rd. (State Rte. 609)

Table 9: Water Surface Profile Data for Elklick Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
725	71+45	25	5,700	7,200	8,800	240.0	241.0	241.9	
726	72+18	25	5,700	7,200	8,800	240.1	241.1	242.0	
727	74+96	25	5,700	7,200	8,800	240.4	241.3	242.2	
728	76+86	25	5,700	7,200	8,800	240.5	241.4	242.3	
729	80+34	25	5,700	7,200	8,800	240.9	241.8	242.7	
730	83+93	25	5,700	7,200	8,800	241.4	242.3	243.1	
731	87+79	25	5,700	7,200	8,800	242.1	243.0	243.8	
732	91+27	25	5,700	7,200	8,800	242.9	243.7	244.5	
733	93+28	25	5,700	7,200	8,800	243.4	244.2	245.0	
734	95+36	25	5,700	7,200	8,800	244.0	244.8	245.7	
735	99+44	25	5,700	7,200	8,800	245.0	246.0	246.9	
736	103+45	25	5,700	7,200	8,800	245.7	246.6	247.6	
737	107+16	25	5,700	7,200	8,800	246.1	247.1	248.0	
738	110+65	25	5,700	7,200	8,800	246.5	247.5	248.4	
739	114+68	25	5,500	7,000	8,500	246.8	247.8	248.7	
740	118+16	25	4,900	6,100	7,500	246.9	247.9	248.8	
741	124+17	25	4,900	6,100	7,500	247.3	248.2	249.1	

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Table 10: Water Surface Profile Data for Pleasant Run

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
750	5+00	25	1,600	2,000	2,400	246.8	247.8	248.7	Confluence with Elklick Run
751	8+85	25	1,600	2,000	2,400	247.1	248.0	249.0	
752	12+22	25	1,600	2,000	2,400	247.5	248.3	249.2	
753	15+15	25	1,600	2,000	2,400	247.9	248.6	249.4	
754	18+10	25	1,600	2,000	2,400	248.8	249.2	249.7	
755	20+54	25	1,600	2,000	2,400	249.6	249.9	250.2	
756	23+05	25	1,600	2,000	2,400	250.3	250.6	250.8	
757	25+78	25	1,600	2,000	2,400	251.6	251.8	252.0	
758	29+33	25	1,600	2,000	2,400	253.2	253.4	253.6	

CUB RUN BASIN

Table 11: Water Surface Profile Data for Roundlick Branch

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
774	6+90	25	1,200	1,500	1,800	222.1	223.5	224.7	Confluence with Cub Run
775	10+00	25	1,200	1,500	1,800	222.6	223.8	224.8	
776	13+07	25	1,200	1,500	1,800	223.9	224.5	225.3	
777	16+04	25	1,200	1,500	1,800	225.5	225.8	226.2	
778	18+87	25	1,200	1,500	1,800	227.0	227.3	227.6	
779	21+87	25	1,200	1,500	1,800	229.5	229.8	230.1	
780	24+22	25	1,200	1,500	1,800	230.3	230.7	231.1	
781	26+57	25	900	1,200	1,400	231.2	231.6	231.9	
782	29+38	25	900	1,200	1,400	232.8	233.2	233.4	
783	31+72	25	900	1,200	1,400	234.7	235.1	235.4	
784	34+09	25	900	1,200	1,400	235.8	236.3	236.6	
785	36+15	25	900	1,200	1,400	237.0	237.5	237.7	

CUB RUN BASIN

Table 12: Water Surface Profile Data for Big Rocky Run

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
800	0+10	30	5,200	6,300	7,500	186.3	187.4	188.6	Confluence with Cub Run
801	1+19	30	5,200	6,300	7,500	187.7	188.4	189.3	
802	2+10	30	5,200	6,300	7,500	192.9	193.3	193.5	
803	3+43	30	5,200	6,300	7,500	196.2	196.8	197.7	
804	4+91	30	5,200	6,300	7,500	199.0	199.6	200.3	
805	6+48	30	5,200	6,300	7,500	201.6	202.2	202.8	
806	8+36	30	5,200	6,300	7,500	206.6	207.2	207.5	
807	10+17	30	5,200	6,300	7,500	206.9	207.6	207.9	
808	12+19	30	5,200	6,300	7,500	207.3	208.0	208.5	
809	14+31	30	5,200	6,300	7,500	207.8	208.6	209.1	
810	16+87	30	5,200	6,300	7,500	208.4	209.2	209.8	
811	19+52	30	4,700	5,900	7,100	208.9	209.7	210.4	
812	22+47	30	4,700	5,900	7,100	209.4	210.2	211.0	
813	25+81	30	4,700	5,900	7,100	210.0	210.9	211.6	
814	28+47	30	4,700	5,900	7,100	210.7	211.5	212.3	
815	32+26	30	4,700	5,900	7,100	211.7	212.5	213.3	
816	35+42	30	4,700	5,900	7,100	212.3	213.2	213.9	
817	38+95	30	4,700	5,900	7,100	213.0	213.8	214.6	
818							Lee Highway (U.S. Rts. 29-211)		
819	40+78	30	4,700	5,900	7,100	216.5	217.1	217.6	
820	44+30	30	4,700	5,900	7,100	216.6	217.3	217.8	
821	47+45	30	4,700	5,900	7,100	216.8	217.4	218.0	
822	50+58	30	4,400	5,500	6,700	217.0	217.7	218.3	
823	53+77	30	4,400	5,500	6,700	217.3	218.0	218.6	
824	56+57	30	4,400	5,500	6,700	217.5	218.2	218.9	

Table 12: Water Surface Profile Data for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
825	58+97	30	4,400	5,500	6,700	217.7	218.4	219.2	
826	61+46	30	4,400	5,500	6,700	217.9	218.6	219.4	
827	64+48	30	4,400	5,500	6,700	218.2	219.0	219.8	
828	67+60	30	4,400	5,500	6,700	218.7	219.5	220.3	
829	70+24	30	4,400	5,500	6,700	219.4	220.2	221.0	
830	72+93	30	4,400	5,500	6,700	219.8	220.6	221.4	
831	76+09	30	4,400	5,500	6,700	220.4	221.2	222.0	
832	79+15	30	4,400	5,500	6,700	221.6	222.4	223.2	
833	82+30	30	4,400	5,500	6,700	222.1	222.9	223.7	
834	85+10	30	4,400	5,500	6,700	222.5	223.2	224.0	
835	87+80	30	4,400	5,500	6,700	222.9	223.6	224.4	
836	90+39	30	4,400	5,500	6,700	223.3	224.0	224.7	
837	93+50	30	4,400	5,500	6,700	223.9	224.6	225.3	
838	96+67	30	4,400	5,500	6,700	224.8	225.3	226.0	
839	99+19	30	4,400	5,500	6,700	225.6	226.2	226.8	
840	102+00	30	4,400	5,500	6,700	226.4	227.0	227.6	
841	104+86	30	4,400	5,500	6,700	227.1	227.8	228.4	
842	108+07	30	4,400	5,500	6,700	227.8	228.5	229.1	
843	111+31	30	4,200	5,300	6,400	228.5	229.1	229.8	
844	114+20	30	4,200	5,300	6,400	229.0	229.6	230.2	
845	117+07	30	4,200	5,300	6,400	229.9	230.5	231.0	
846							Braddock Rd (State Rte. 620)		
847	118+09	30	4,200	5,300	6,400	230.5	231.0	231.6	
848	121+07	30	4,200	5,300	6,400	231.8	232.4	232.9	
849	123+87	30	4,200	5,300	6,400	232.5	233.1	233.7	

Table 12: Water Surface Profile Data for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
850	127+05	30	4,200	5,300	6,400	233.6	234.3	234.9	
851	129+91	30	4,200	5,300	6,400	234.5	235.2	235.9	
852	131+99	30	4,200	5,300	6,400	235.2	236.0	236.6	
853	134+61	30	4,200	5,300	6,400	235.9	236.6	237.3	
854	137+58	30	4,200	5,300	6,400	236.5	237.3	238.0	
855	140+38	30	4,100	5,200	6,200	237.4	238.1	238.8	
							Sully Road (State Rte. 28)		
856	143+00	30	4,100	5,200	6,200	237.6	239.3	240.8	
857	146+07	25	4,000	5,000	6,000	240.9	242.0	243.2	
858	148+48	25	4,000	5,000	6,000	241.2	242.3	243.4	
859	150+36	25	4,000	5,000	6,000	241.8	242.8	243.7	
860	152+52	25	4,000	5,000	6,000	242.2	243.0	244.0	
861	154+53	25	3,800	4,700	5,700	242.4	243.2	244.2	
862	156+39	25	3,800	4,700	5,700	242.8	243.6	244.4	
863							Centreville Road (State Rte. 657)		
864	157+36	25	3,800	4,700	5,700	245.5	246.1	246.8	
865	158+93	25	3,800	4,700	5,700	245.8	246.4	247.2	
866	160+30	25	3,800	4,700	5,700	246.0	246.8	247.5	
867	161+77	25	3,800	4,700	5,700	246.5	247.3	248.0	
868	163+42	25	3,800	4,700	5,700	247.3	248.0	248.7	
869	165+27	25	3,800	4,700	5,700	248.7	249.2	249.7	
870	167+61	25	3,800	4,700	5,700	251.9	252.3	252.4	
871	169+29	25	3,800	4,700	5,700	254.5	254.9	255.3	
872	170+95	25	3,800	4,700	5,700	258.4	258.8	259.3	
873	173+07	25	3,800	4,700	5,700	260.4	261.0	261.7	
874	175+02	25	3,800	4,700	5,700	262.6	263.2	263.9	

Table 12: Water Surface Profile Data for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
875	176+77	25	3,800	4,700	5,700	265.2	265.8	266.5	
876	178+09	25	3,800	4,700	5,700	266.7	267.4	268.2	
877	178+65	25	3,800	4,700	5,700	266.7	267.4	268.2	
878	179+56	25	3,800	4,700	5,700	268.6	269.3	269.6	
879	181+00	25	3,800	4,700	5,700	268.7	269.3	269.8	
880	183+16	25	3,800	4,700	5,700	273.0	273.7	274.3	
881	185+53	25	3,800	4,700	5,700	273.5	274.2	274.9	
882	187+63	25	3,800	4,700	5,700	273.9	274.7	275.4	
883	189+63	25	3,800	4,700	5,700	274.6	275.4	276.2	
884	191+38	25	3,800	4,700	5,700	274.9	275.8	276.6	
885	193+20	25	3,800	4,700	5,700	275.3	276.1	276.9	
886	195+06	25	3,800	4,700	5,700	275.8	276.6	277.4	
887	196+43	25	3,800	4,700	5,700	277.0	277.8	278.6	
888	197+57	25	3,800	4,700	5,700	277.8	278.7	279.5	
889	199+08	25	3,800	4,700	5,700	278.1	279.0	279.8	
890	200+58	25	3,800	4,700	5,700	278.5	279.4	280.2	
891	202+15	25	3,800	4,700	5,700	278.8	279.6	280.5	
892	203+83	25	3,800	4,700	5,700	278.8	279.6	280.5	
893	205+62	25	3,800	4,700	5,700	279.8	280.7	281.5	
894	207+53	25	3,800	4,700	5,700	281.4	282.3	283.2	
895	209+58	25	3,800	4,700	5,700	282.4	283.4	284.4	
896	210+75	25	3,500	4,400	5,300	282.6	283.6	284.6	
897	212+47	25	3,500	4,400	5,300	282.8	283.7	284.7	
898	213+75	25	3,500	4,400	5,300	283.2	284.1	285.0	
899	215+40	25	3,500	4,400	5,300	284.0	284.9	285.9	

Table 12: Water Surface Profile for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
900	216+99	25	3,500	4,400	5,300	284.7	285.6	286.6	
901	218+63	25	3,500	4,400	5,300	285.5	286.5	287.5	
902	220+26	25	3,500	4,400	5,300	286.0	287.0	288.0	
903	221+56	25	3,500	4,400	5,300	286.2	287.2	288.1	
904	222+85	25	3,500	4,400	5,300	286.8	287.8	288.8	
905	223+77	25	3,500	4,400	5,300	287.0	288.1	289.0	
906	224+63	25	3,500	4,400	5,300	287.1	288.1	289.1	
907	225+11	25	3,100	3,900	4,800	287.1	288.1	289.1	
908	226+82	25	3,100	3,900	4,800	287.4	288.4	289.4	
909	228+11	25	3,100	3,900	4,800	287.7	288.8	289.8	
910	229+86	25	3,100	3,900	4,800	288.7	289.3	290.1	
911	230+93	25	3,100	3,900	4,800	289.7	290.3	291.0	
912	231+98	25	3,100	3,900	4,800	290.2	290.8	291.5	
913	233+47	25	3,100	3,900	4,800	295.7	296.2	296.7	
914	234+95	25	3,100	3,900	4,800	299.1	299.6	300.2	
915	236+60	25	3,100	3,900	4,800	300.2	300.8	301.4	
916	238+16	25	3,100	3,900	4,800	303.1	303.8	304.4	
917	239+80	25	3,100	3,900	4,800	307.2	307.7	308.3	
918	241+51	25	3,100	3,900	4,800	307.8	308.4	309.1	
919	242+56	25	3,100	3,900	4,800	308.2	308.8	309.5	
920	244+39	25	3,100	3,900	4,800	309.8	310.5	311.2	
921	246+38	25	3,100	3,900	4,800	311.0	311.8	312.6	
922	248+28	25	3,100	3,900	4,800	311.9	312.7	313.5	
923	250+90	25	3,100	3,900	4,800	312.6	313.4	314.2	
924	253+39	25	3,100	3,900	4,800	313.5	314.2	314.8	

Table 12: Water Surface Profile Data for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
925	256+54	25	3,100	3,900	4,800	314.7	315.2	315.8	
926	260+08	25	3,100	3,900	4,800	315.8	316.3	316.8	
927	263+77	25	3,100	3,900	4,800	316.9	317.4	317.9	
928	267+13	25	3,000	3,800	4,600	317.9	318.4	318.8	
929	270+26	25	3,000	3,800	4,600	319.5	319.9	320.3	
930	274+96	25	2,900	3,600	4,400	322.7	323.0	323.4	
931							Stringfellow Road (State Rte. 645)		
932	275+88	25	2,900	3,600	4,400	324.9	325.3	325.6	
933	277+27	25	2,900	3,600	4,400	325.8	326.3	326.7	
934	279+00	25	2,900	3,600	4,400	329.0	329.3	329.4	
935	280+72	25	2,900	3,600	4,400	331.7	332.2	332.8	
936	283+07	25	2,900	3,600	4,400	333.1	333.6	334.0	
937	285+26	25	2,900	3,600	4,400	335.0	335.4	335.7	
938	287+60	25	2,900	3,600	4,400	335.9	336.4	336.9	
939	290+37	25	2,900	3,600	4,400	337.1	337.7	338.3	
940	292+66	25	2,900	3,600	4,400	338.3	338.9	339.5	
941	294+86	25	2,900	3,600	4,400	339.2	339.8	340.4	
942	297+88	25	2,900	3,600	4,400	340.7	341.2	341.6	
943	300+29	25	2,900	3,600	4,400	341.9	342.3	342.8	
944	302+87	25	2,900	3,600	4,400	342.8	343.2	343.7	
945	305+47	25	2,900	3,600	4,400	343.7	344.1	344.5	
946	309+21	25	2,900	3,600	4,400	345.3	345.6	345.8	
947	312+02	25	2,900	3,600	4,400	346.6	346.9	347.2	
948	315+19	25	2,900	3,600	4,400	348.3	348.6	348.9	

Table 12: Water Surface Profile Data for Big Rocky Run - Continued

Section Number	Base-Line Station (feet)	Imp. (%)	Discharge 25-year (cfs)	Discharge 50-year (cfs)	Discharge 100-year (cfs)	Elevation 25-year (feet)	Elevation 50-year (feet)	Elevation 100-year (feet)	Remarks
949	318+16	25	2,900	3,600	4,400	349.2	349.5	349.8	
950	319+71	25	2,900	3,600	4,400	349.8	350.1	350.4	
951							Middle Ridge Drive		
952	321+53	25	2,900	3,600	4,400	352.9	354.0	355.2	
953	324+36	25	2,900	3,600	4,400	353.6	354.5	355.6	
954	326+98	25	2,900	3,600	4,400	355.1	355.6	356.3	
955	329+49	25	2,900	3,600	4,400	356.5	356.9	357.4	
956	332+57	25	2,900	3,600	4,400	358.0	358.4	358.9	
957	335+71	25	2,900	3,600	4,400	359.7	360.1	360.4	
958	338+13	25	2,900	3,600	4,400	361.1	361.5	361.8	
959	341+22	25	2,900	3,600	4,400	362.9	363.2	363.6	

Flood profiles (figs. 3-15) are included in this report presenting graphically those water-surface profiles computed for the 25-year and 100-year floods and the channel bed profile along the thalweg of the stream. The 25-year flood profile was omitted in cases where it is very close to the 100-year profile and showing both would cause confusion.

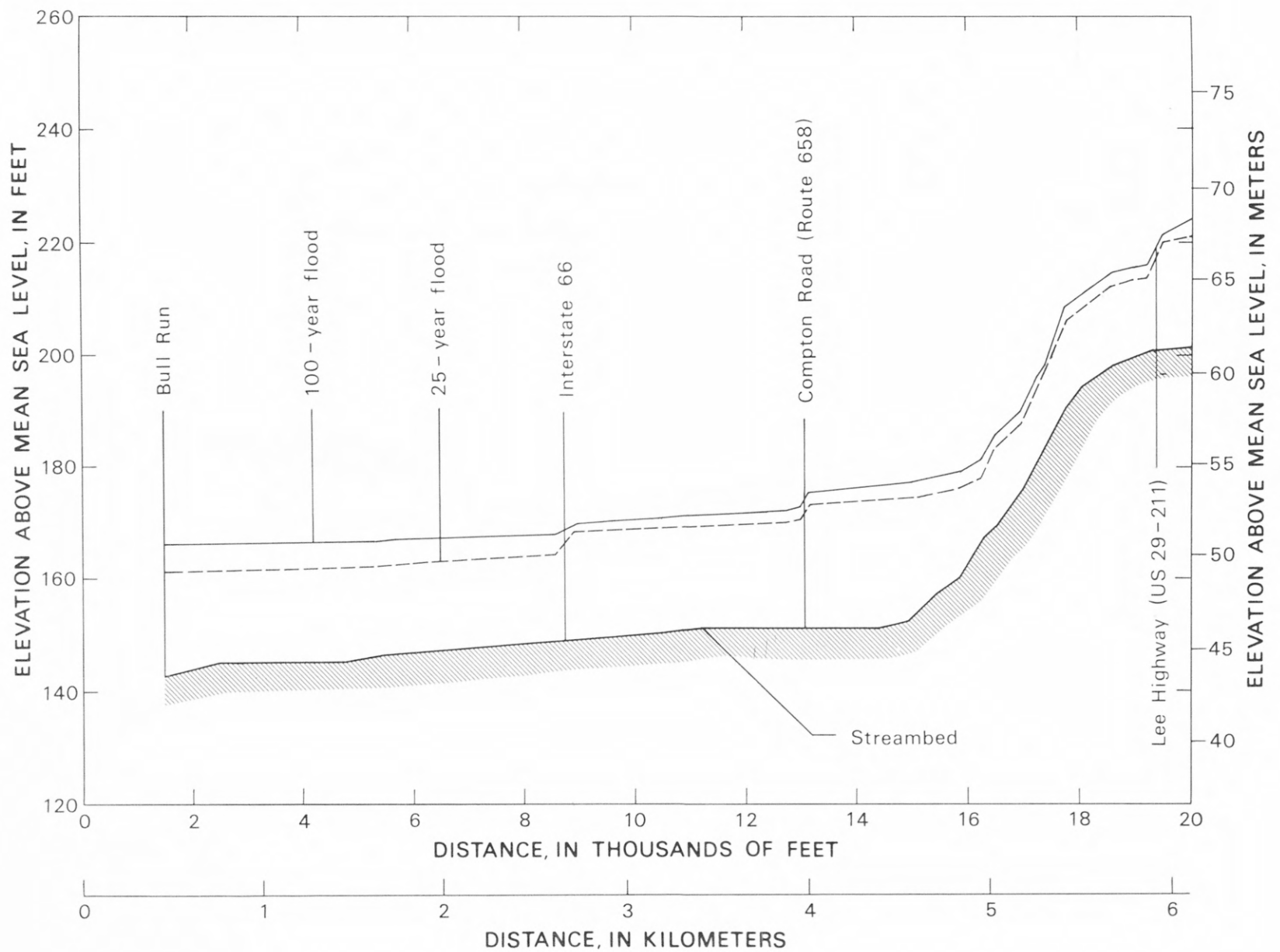


Figure 3. Flood profiles for 25-year and 100-year recurrence interval discharges, Cub Run, Mouth to Lee Highway

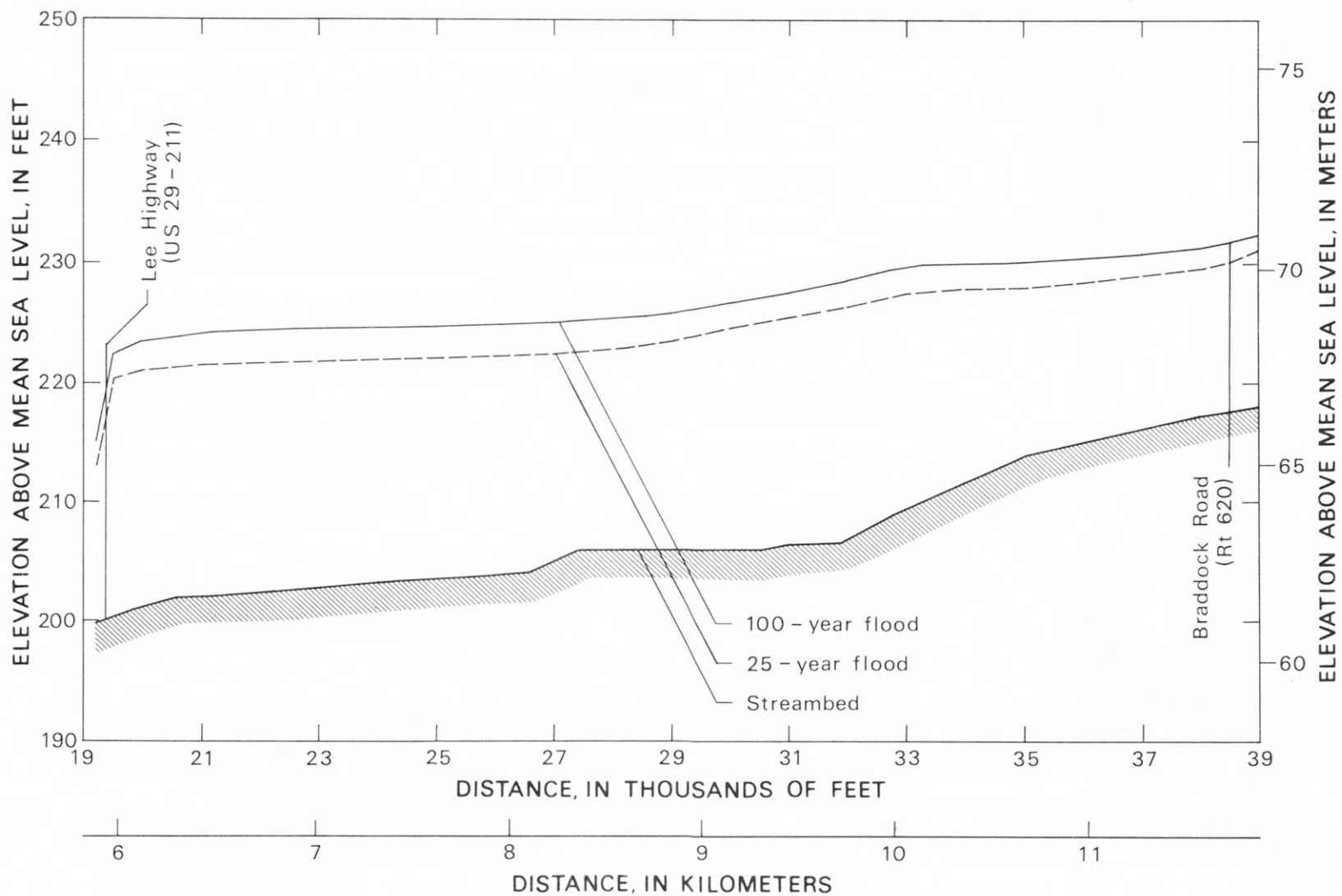


Figure 4. Flood profiles for 25-year and 100-year recurrence interval discharges, Cub Run, Lee Highway to Braddock Road

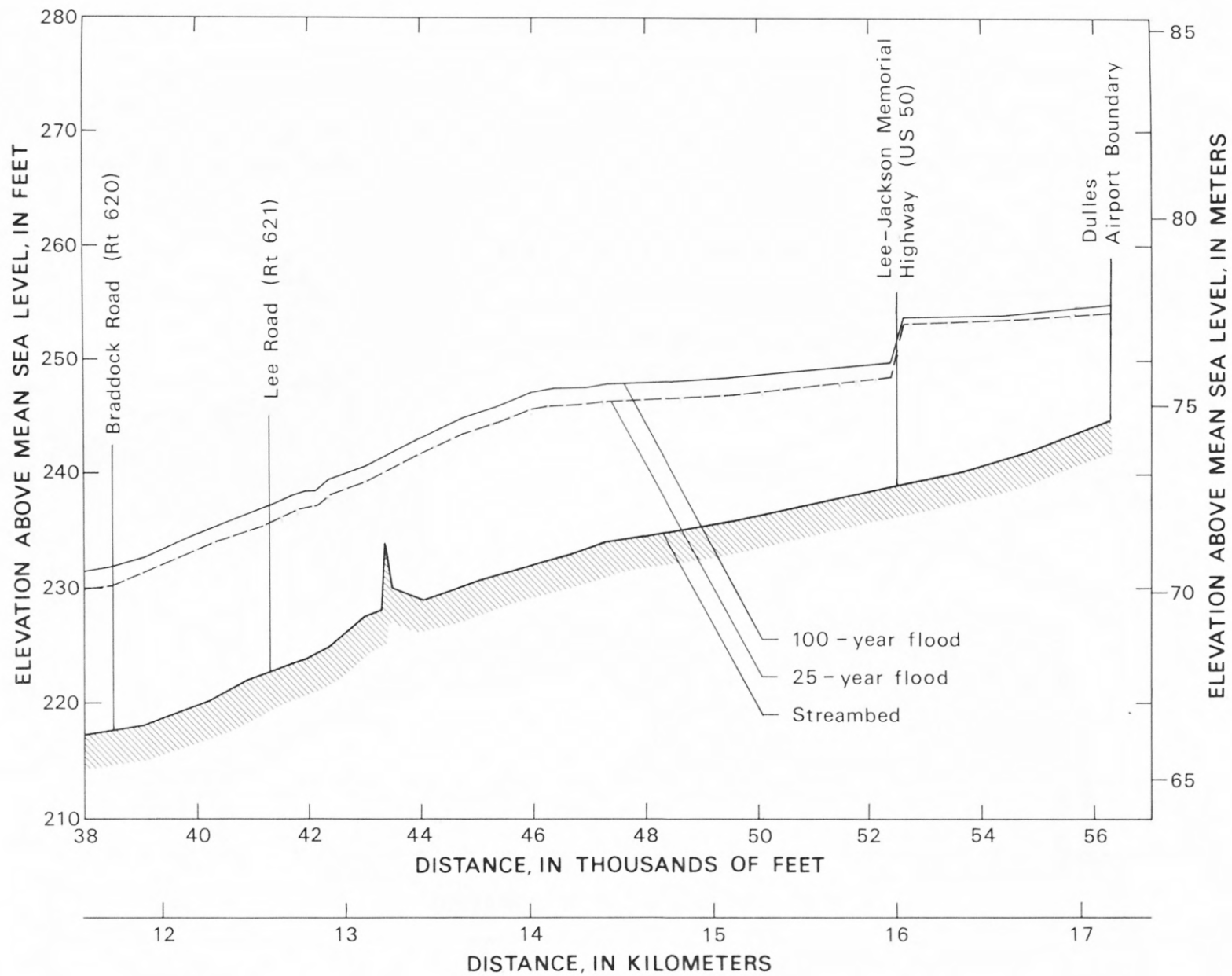


Figure 5. Flood profiles for 25-year and 100-year recurrence interval discharges, Cub Run, Braddock Road to Airport boundary

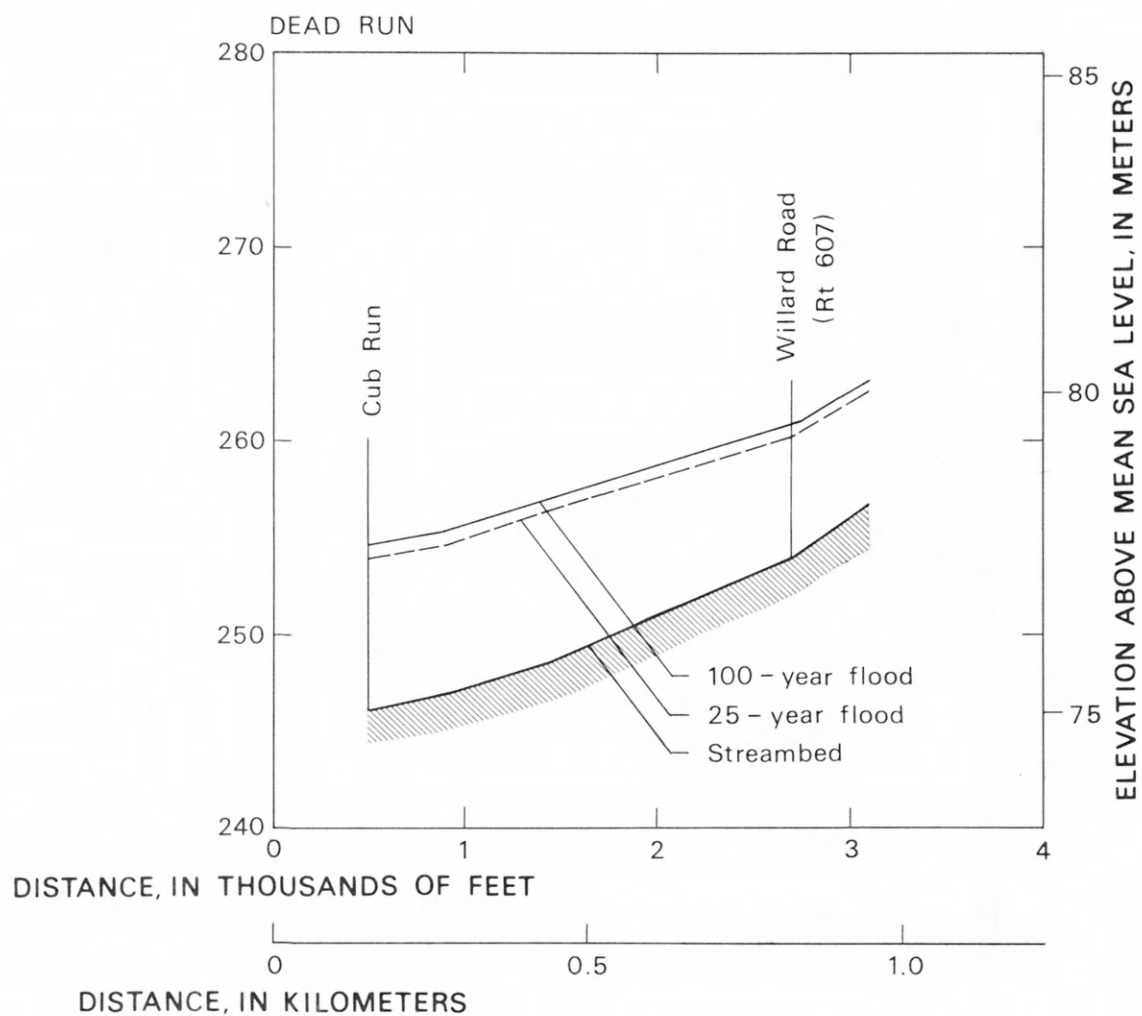
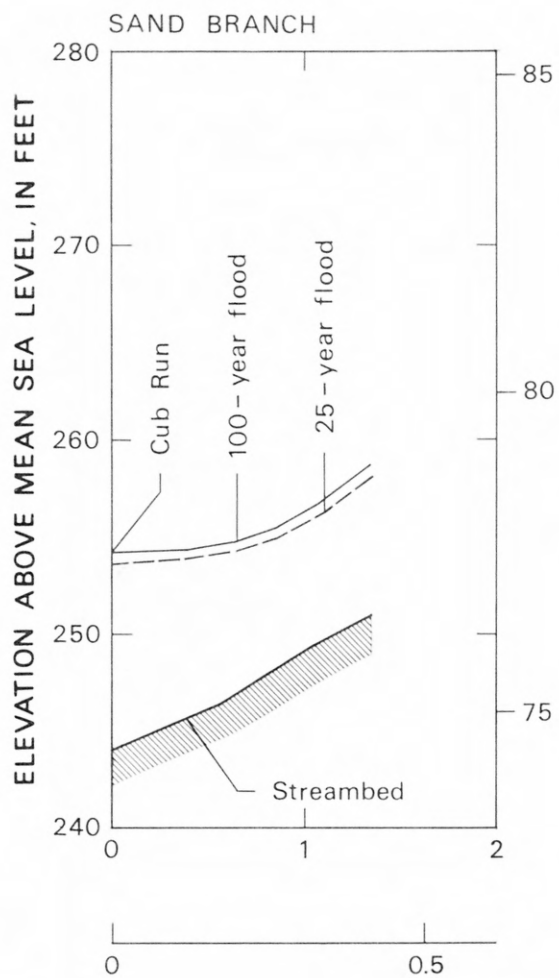


Figure 6. Flood profiles for 25-year and 100-year recurrence interval discharges, Sand Branch & Dead Run

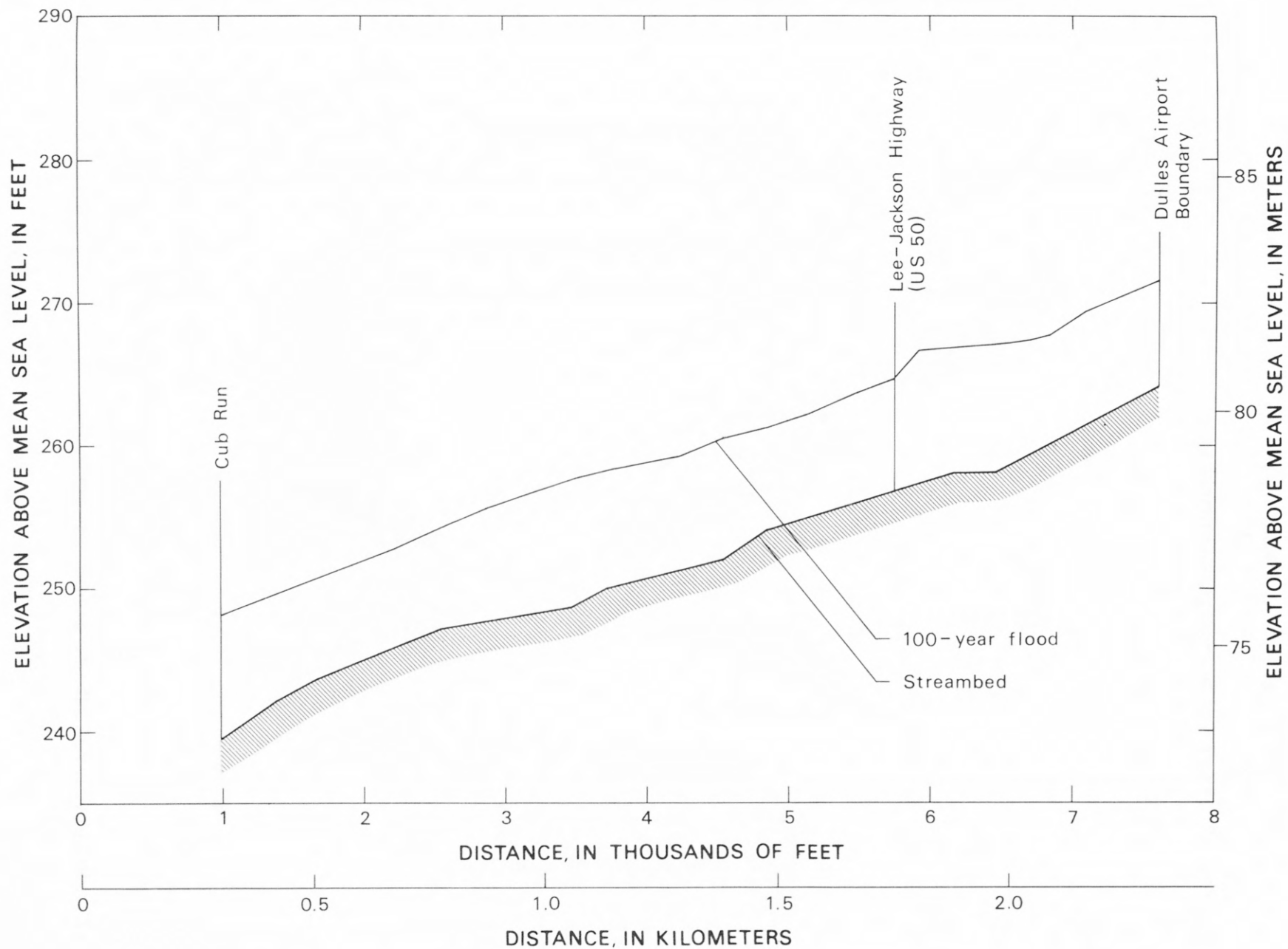


Figure 7. Flood profiles for 25-year and 100-year recurrence interval discharges, Cain Branch

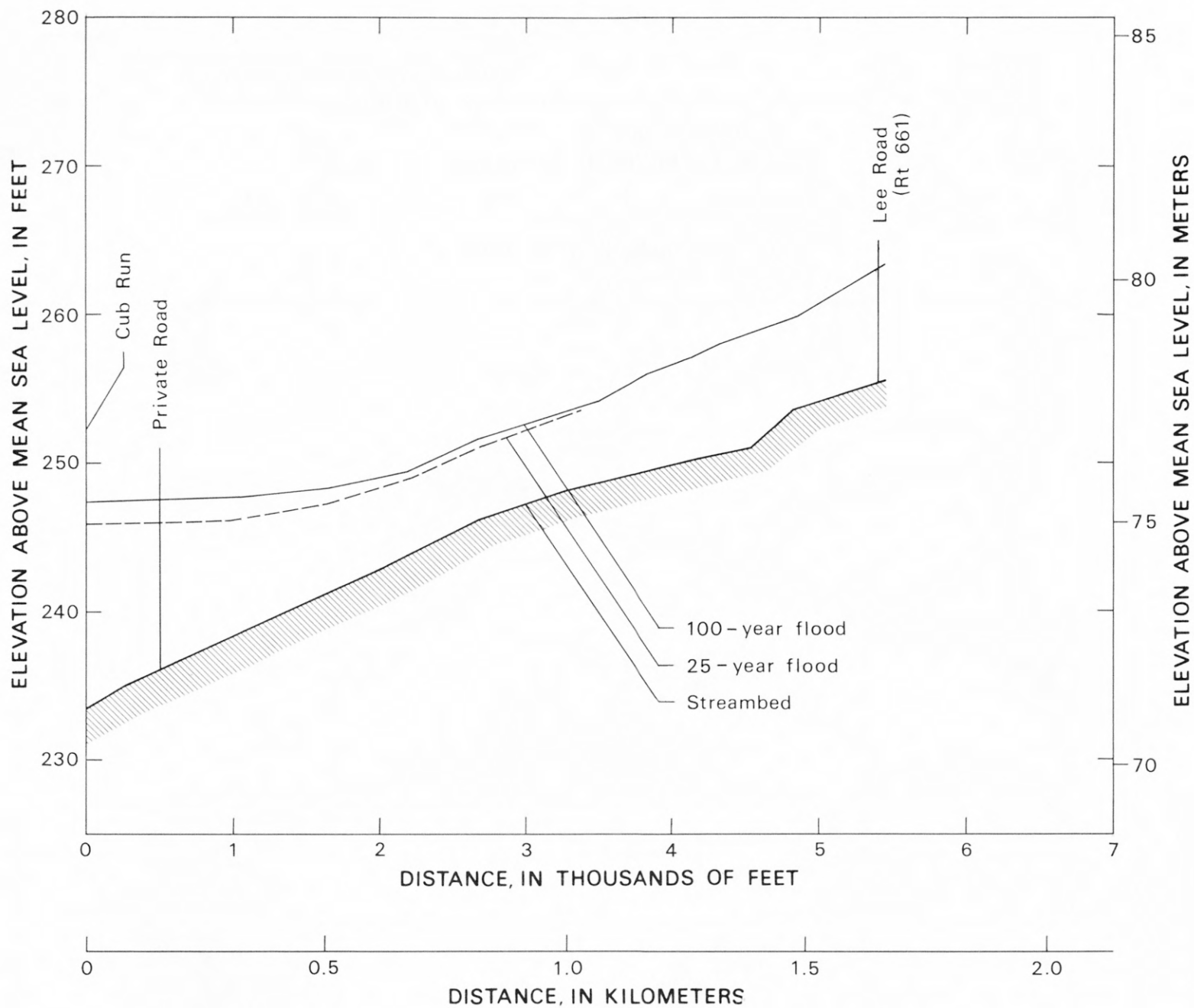


Figure 8. Flood profiles for 25-year and 100-year recurrence interval discharges, Schneider Branch

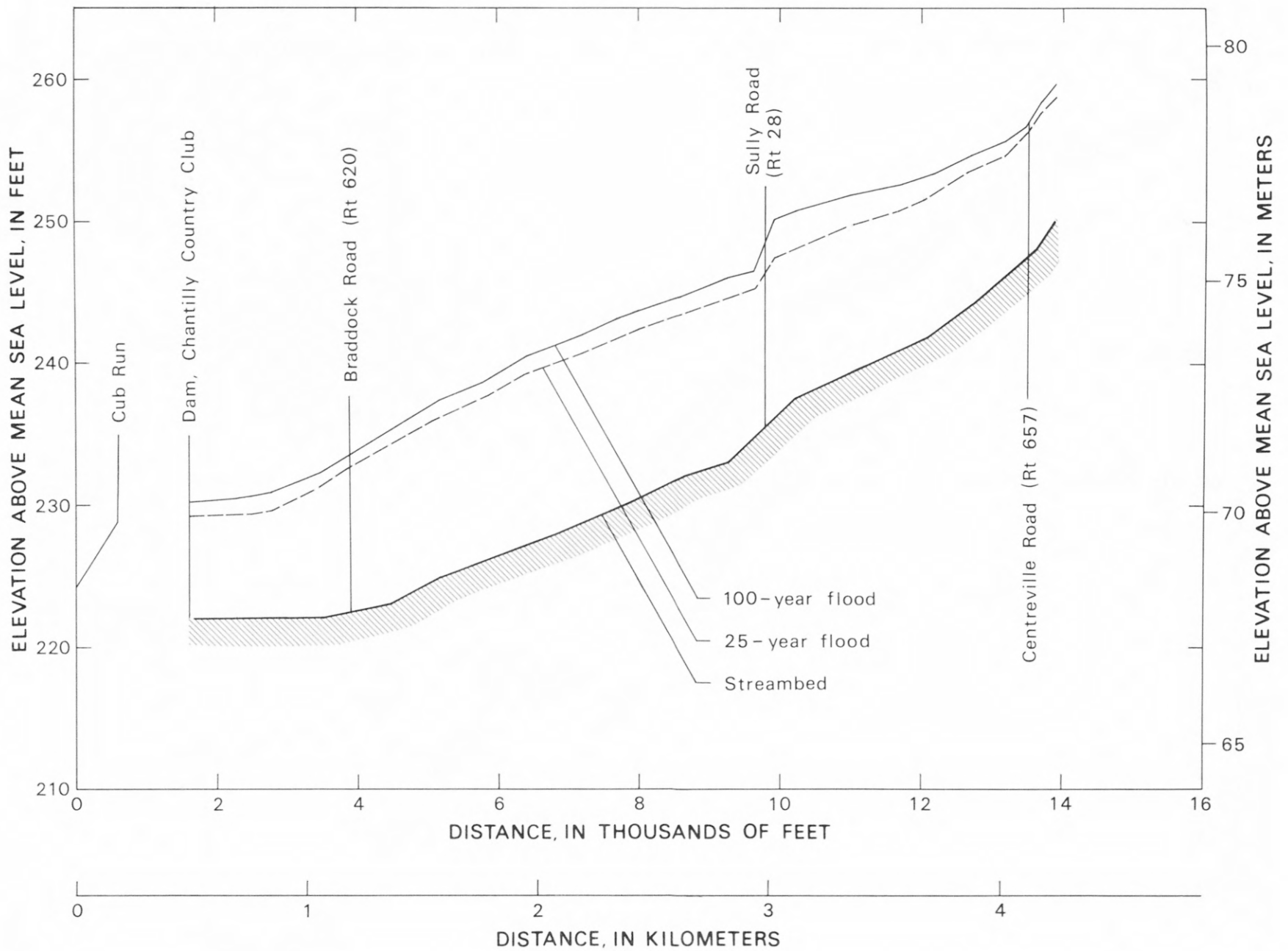


Figure 9. Flood profiles for 25-year and 100-year recurrence interval discharges, Flatlick Branch, Mouth to Centreville Road

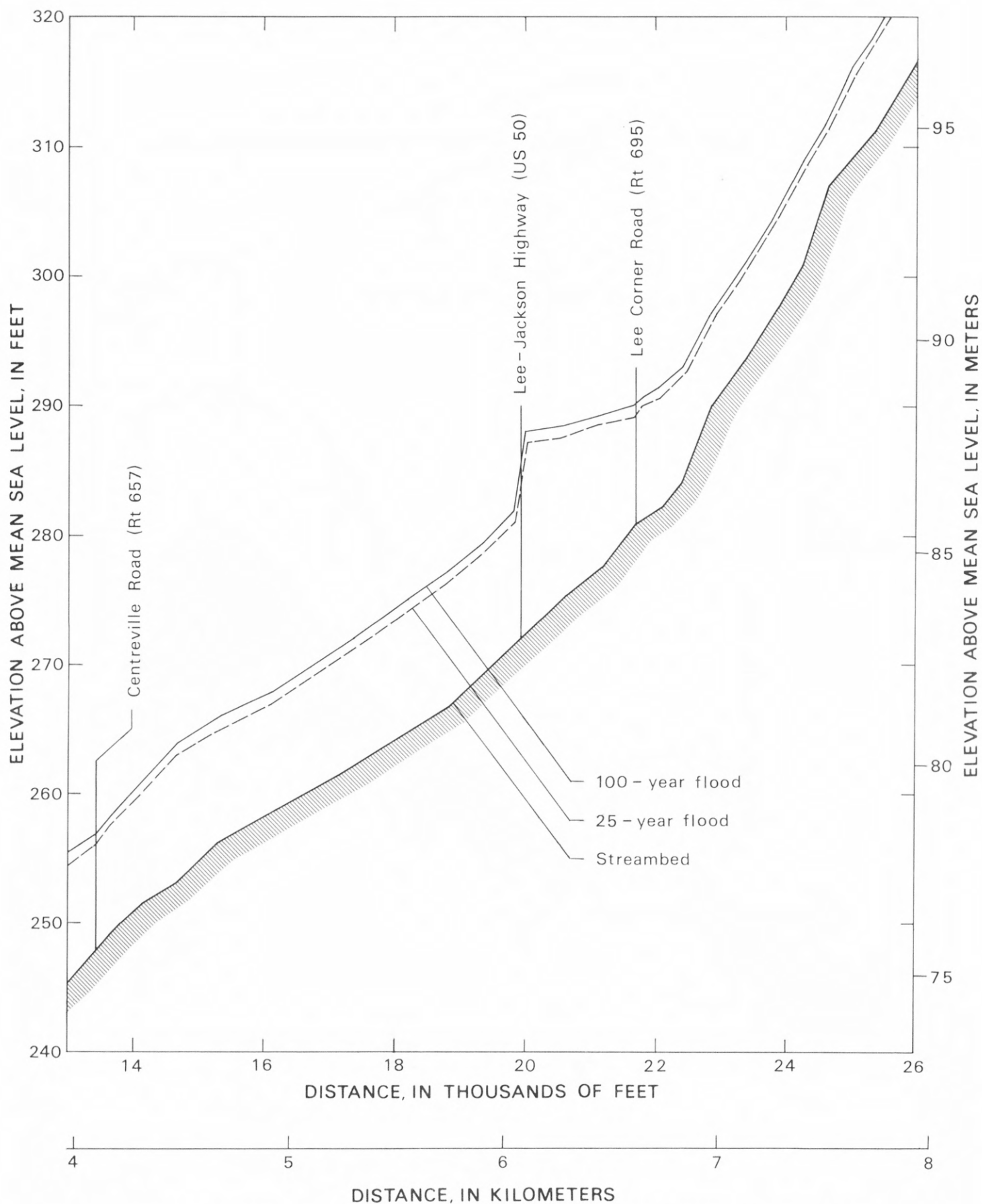


Figure 10. Flood profiles for 25-year and 100-year recurrence interval discharges, Flatlick Branch, Centreville Road to above Lee Corner Road

51

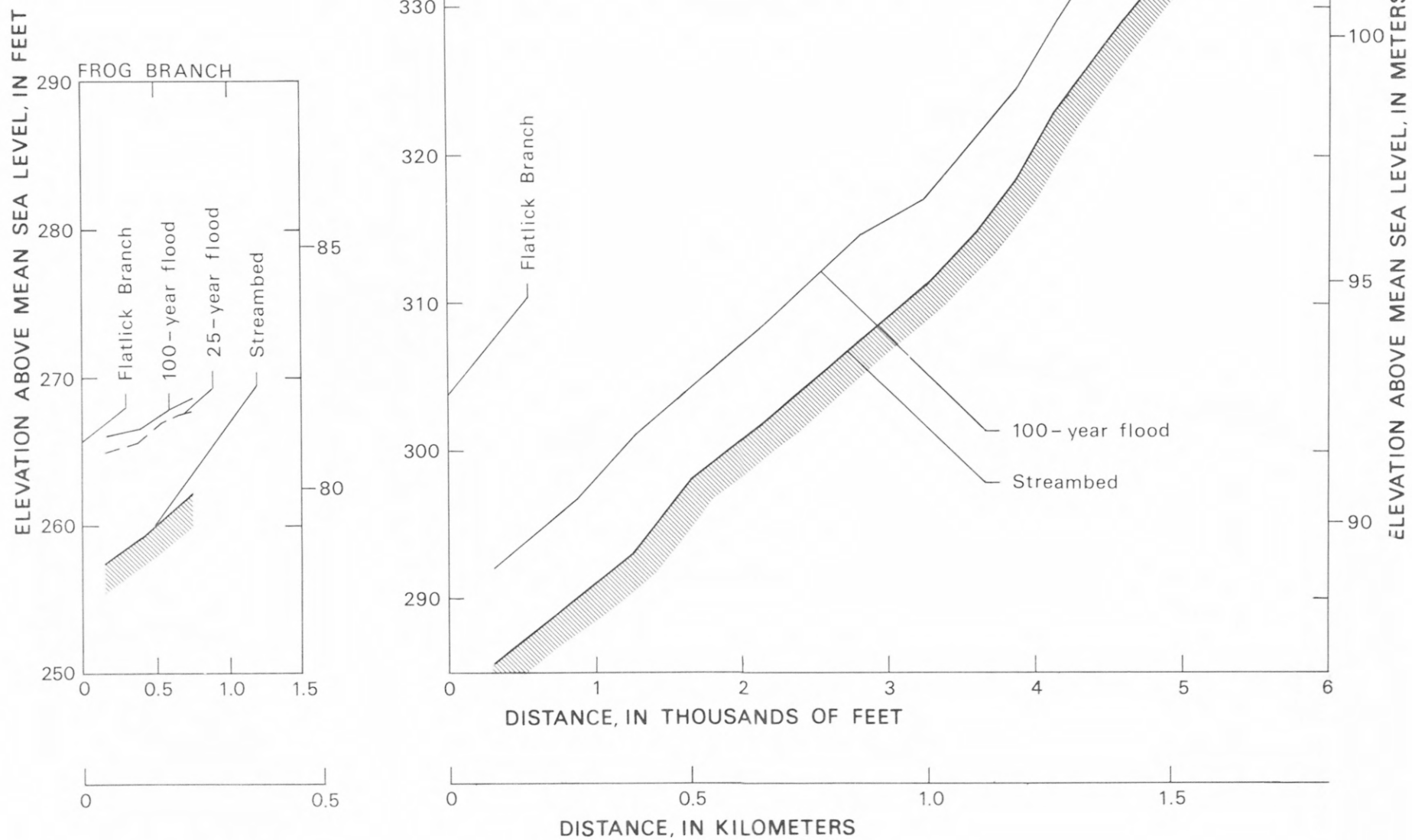


Figure 11. Flood profiles for 25-year and 100-year recurrence interval discharges, Frog Branch & Oxlick Branch

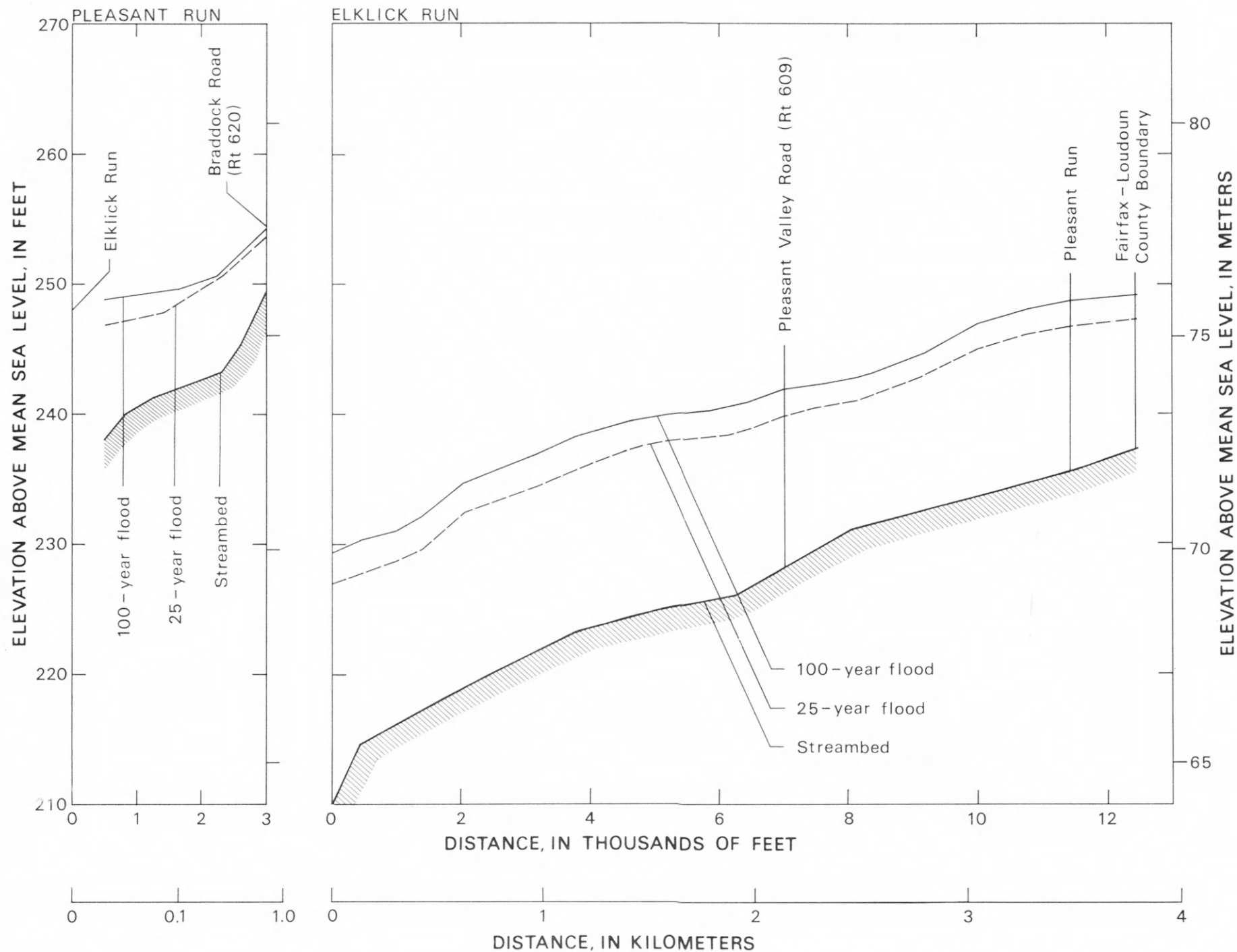


Figure 12. Flood profiles for 25-year and 100-year recurrence interval discharges, Pleasant Run and Ellick Run

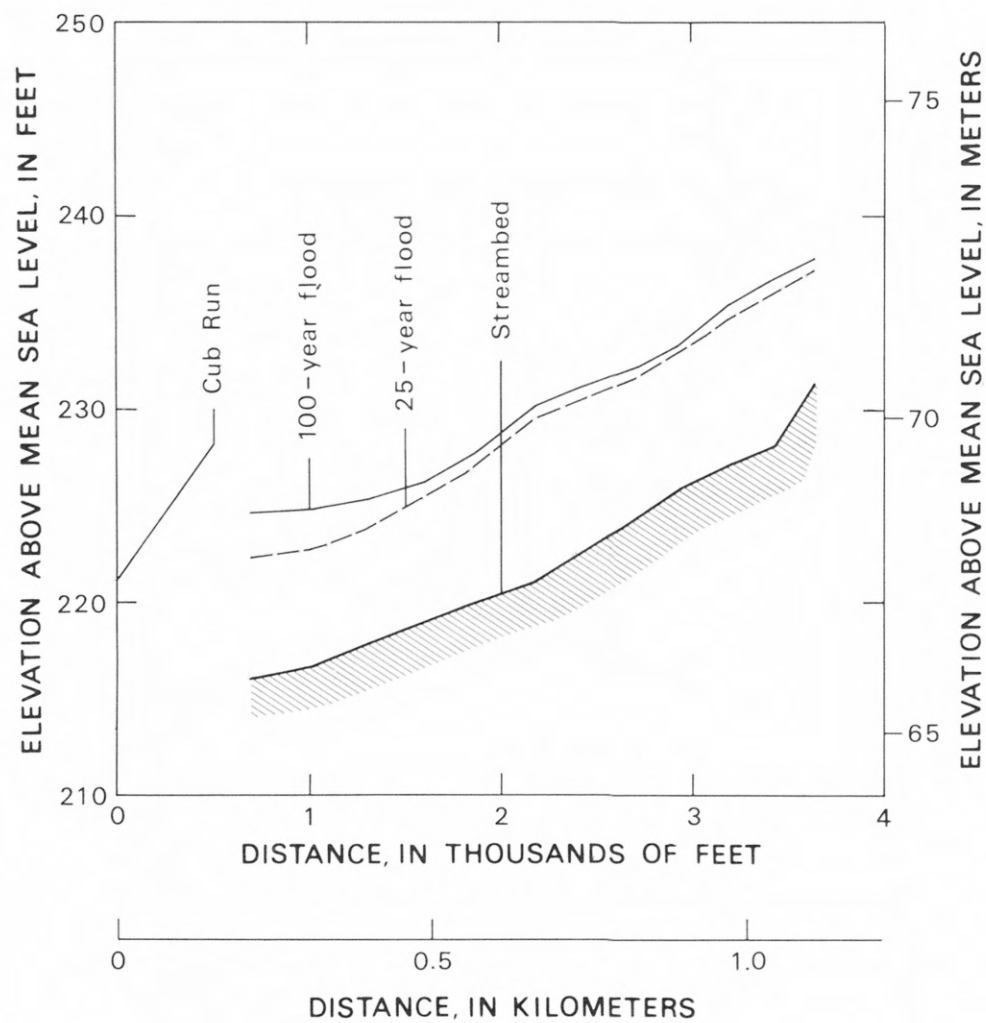


Figure 13. Flood profiles for 25-year and 100-year recurrence interval discharges, Roundlick Branch

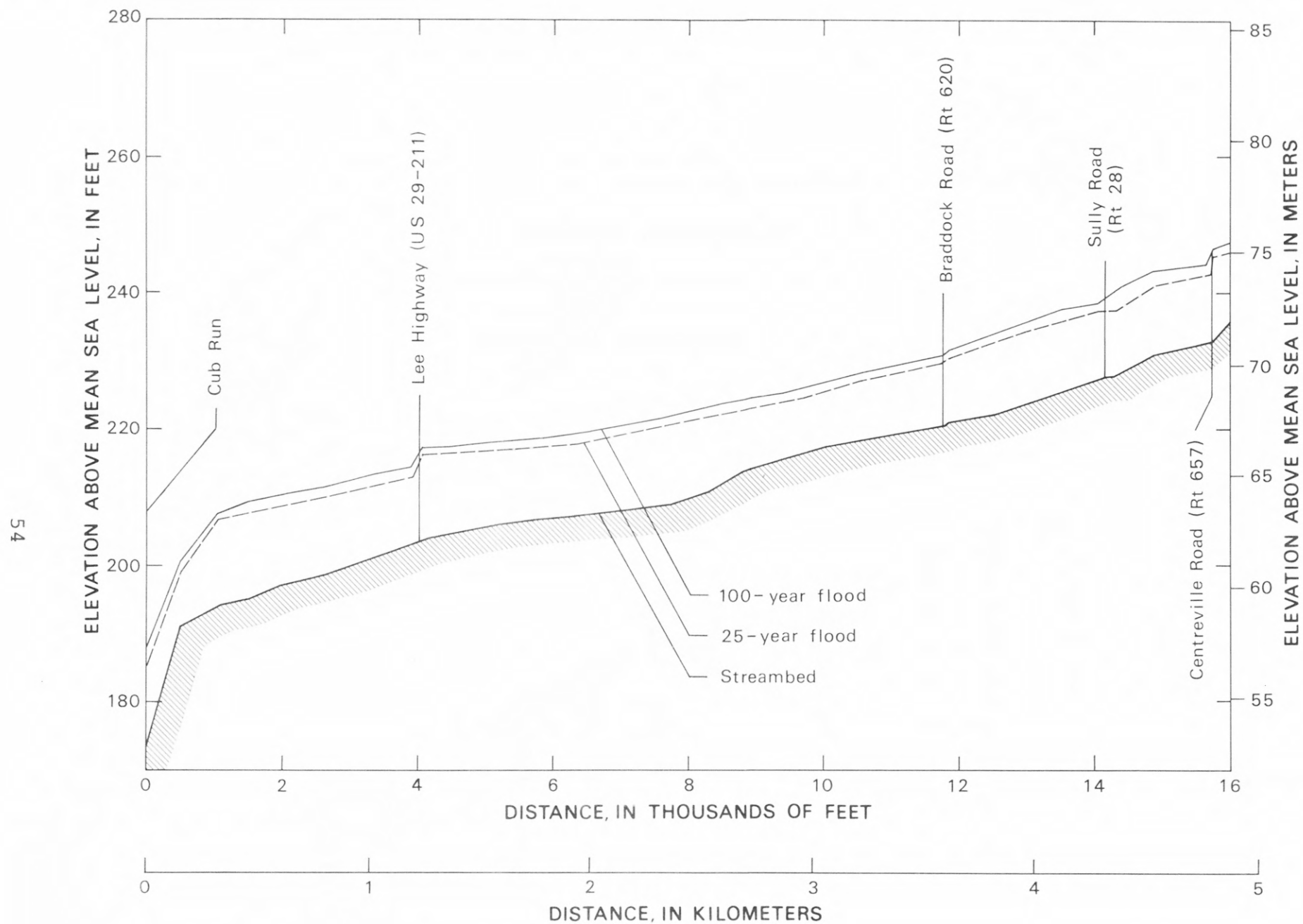


Figure 14. Flood profiles for 25-year and 100-year recurrence interval discharges, Big Rocky Run, Mouth to Centreville Road

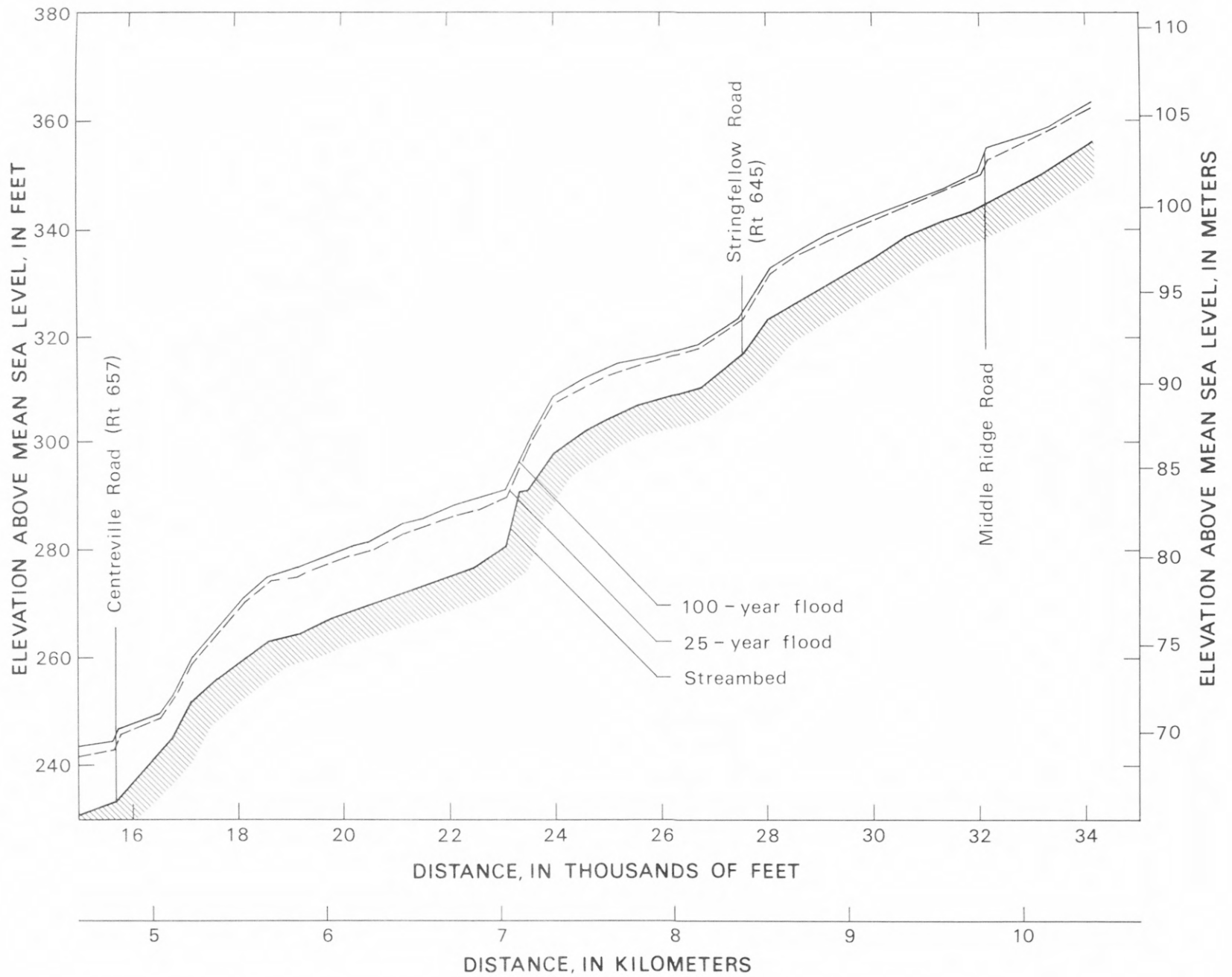


Figure 15. Flood profiles for 25-year and 100-year recurrence interval discharges, Big Rocky Run, Centreville Road to above Middle Ridge Road

FLOOD-PLAIN DELINEATION FOR CUB RUN BASIN

Boundaries for 25-, 50-, and 100-year floods, assuming ultimate development, are delineated on 61 special large scale maps that were reduced to page size for this report (figs. 17-77). Copies of the maps at original scale of 1 inch (2.54 cm) equals 100 feet (30.5 m) can be obtained from Fairfax County. Figure 16 is the index of sheets for Cub Run basin.

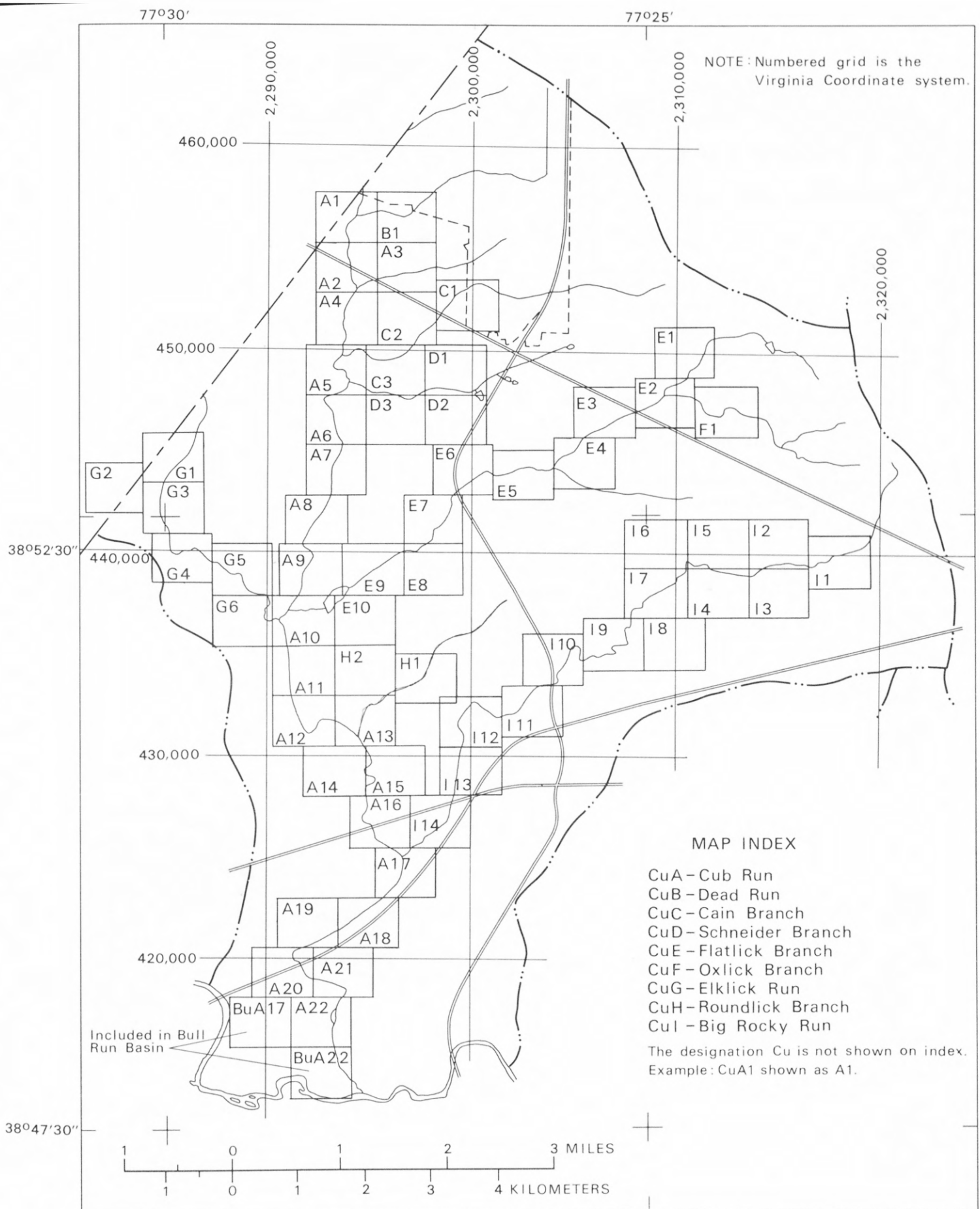


Figure 16. Index of flood maps

DELINEATION OF FLOOD AREAS

CUB RUN BASIN

Flood plain delineation by U.S. Geological Survey in cooperation with Fairfax County as a part of a study of urbanization effects upon flood discharges.

Topography from aerial photographs taken 1965 and 1974
250-foot grid based on Virginia coordinate system north zone.

Maps compiled by photogrammetric methods.
Control and photogrammetric surveys are in accordance with National Map Accuracy Standards.

SYMBOLS

●	MANHOLE
●—	UTILITY POLE
—X—X—X—	FENCE
-----	STREAM
⊠	TRANSMISSION TOWER
---25---	FLOOD-DELINEATION AND RECURRENCE INTERVAL



Figure 17. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-1



Figure 18. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-2

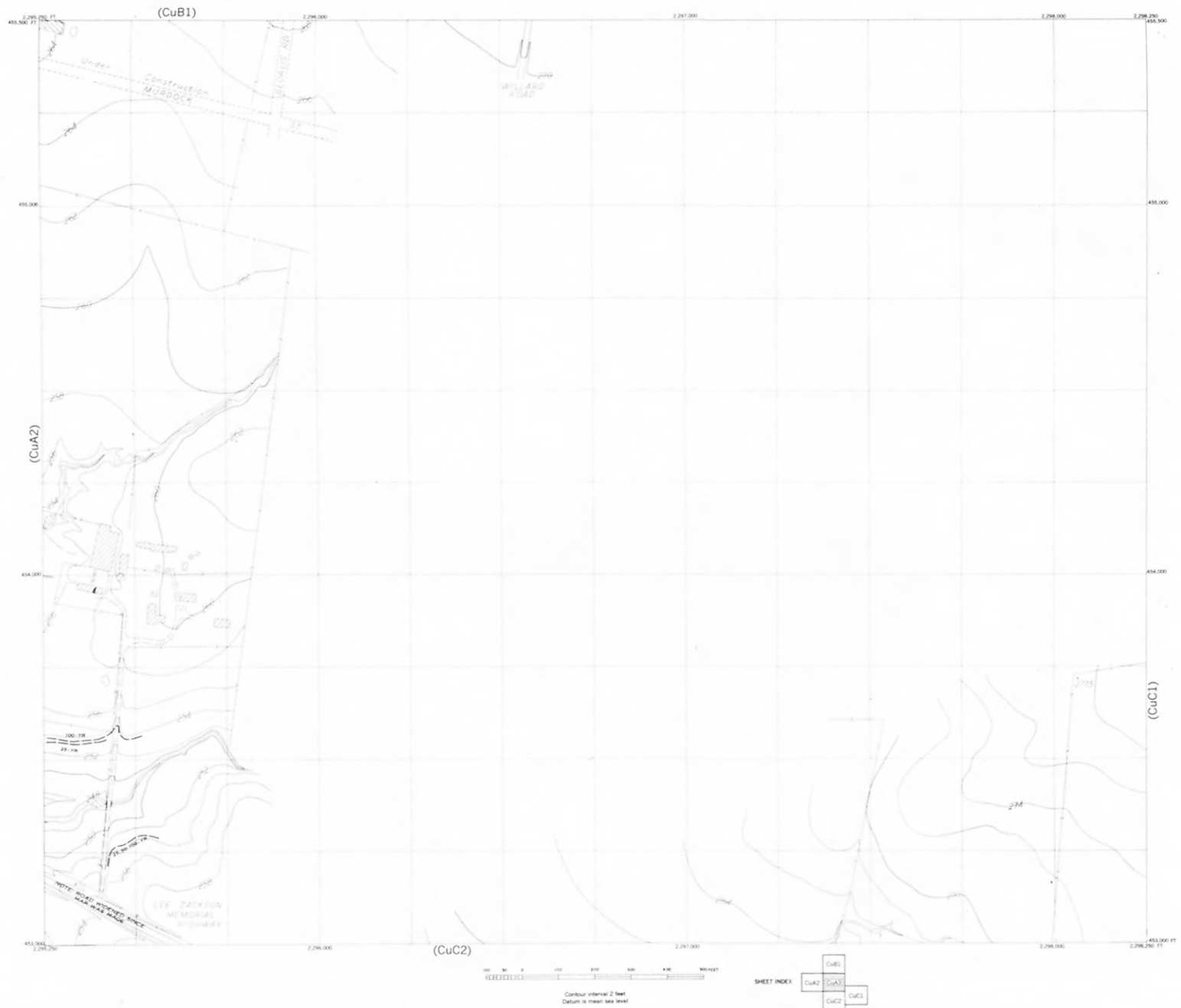


Figure 19. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-3



Figure 20. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-4

Figure 21. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-5

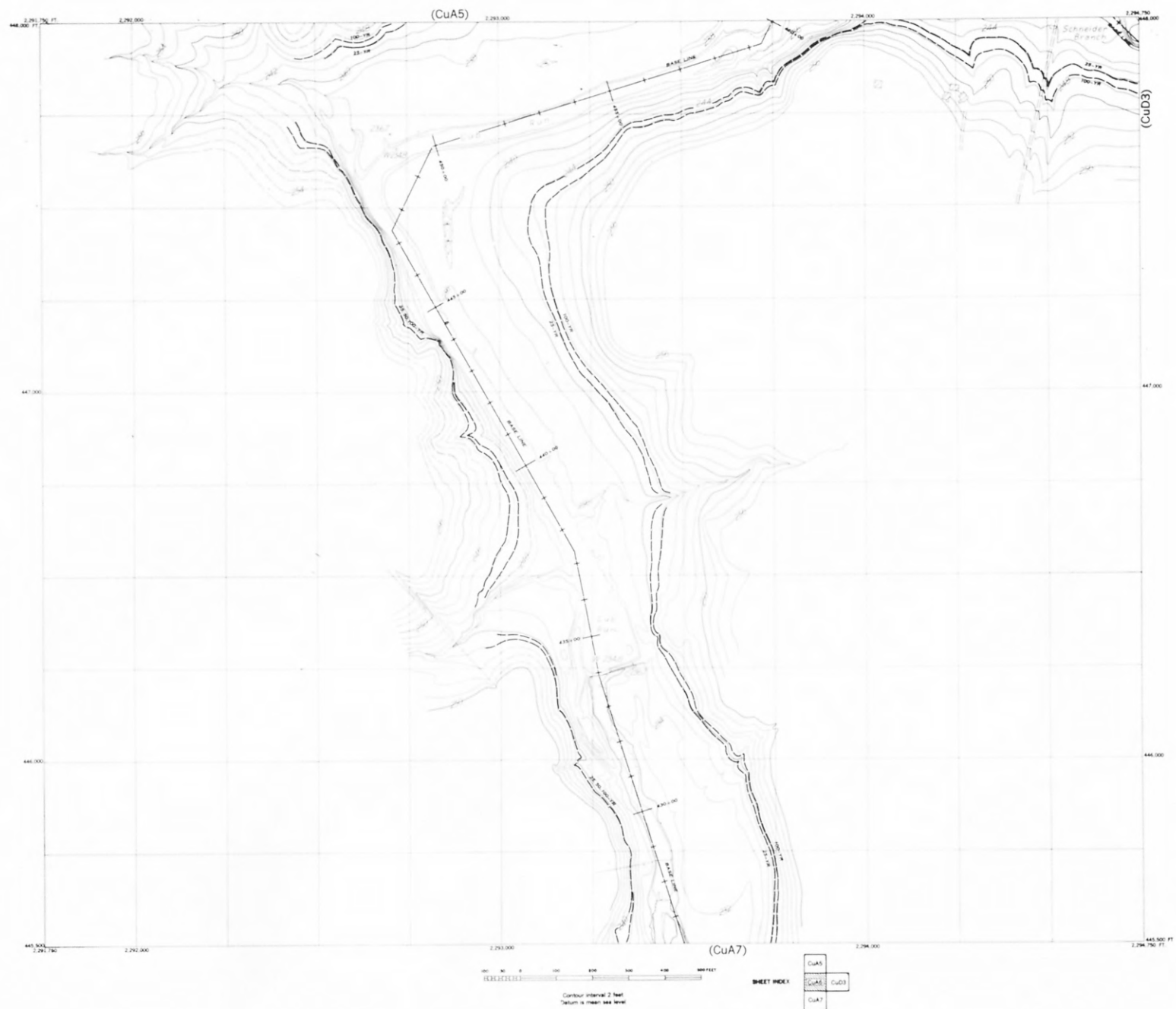




Figure 23. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-7



Figure 24. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-8



Figure 25. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-9

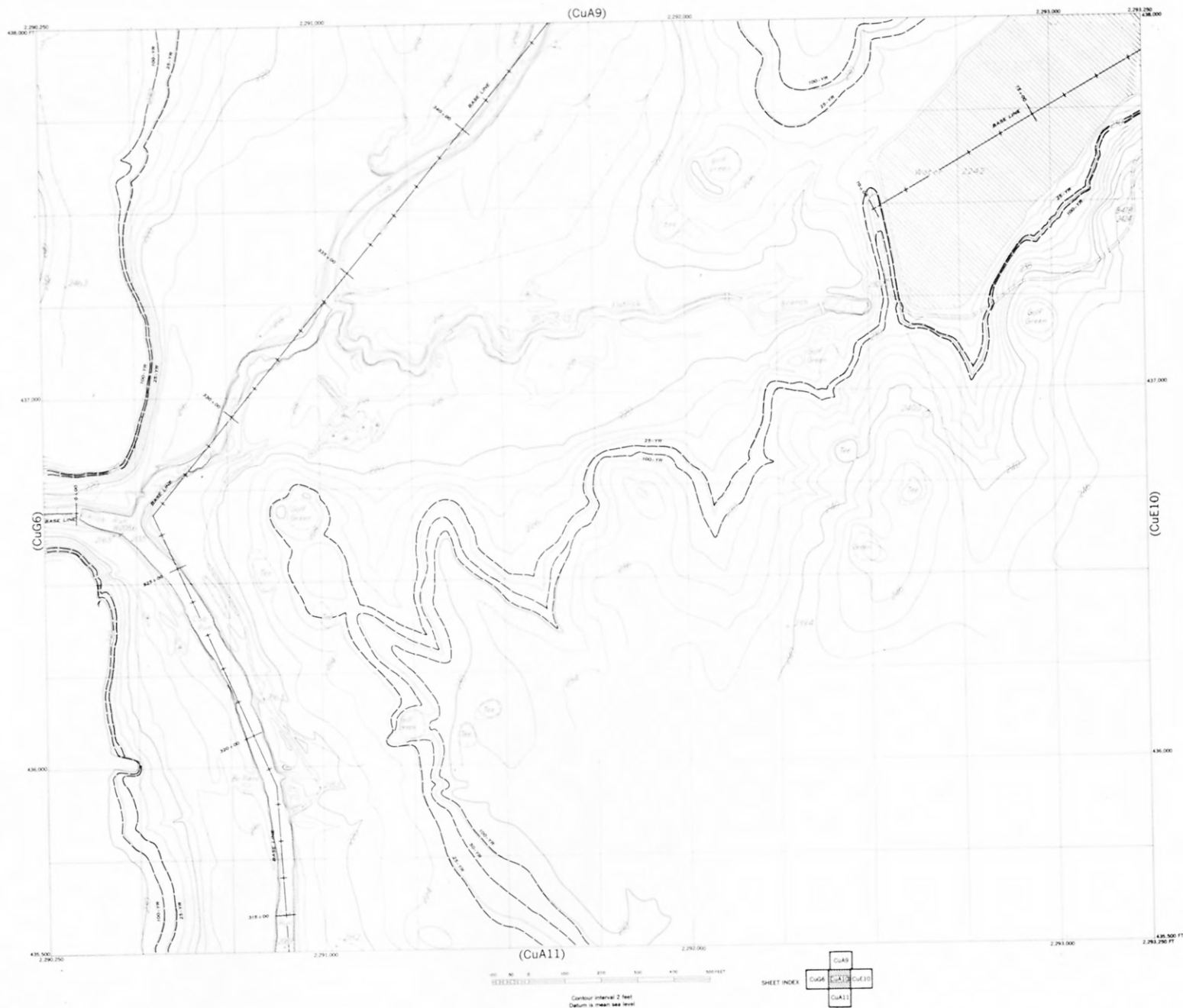


Figure 26. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-10

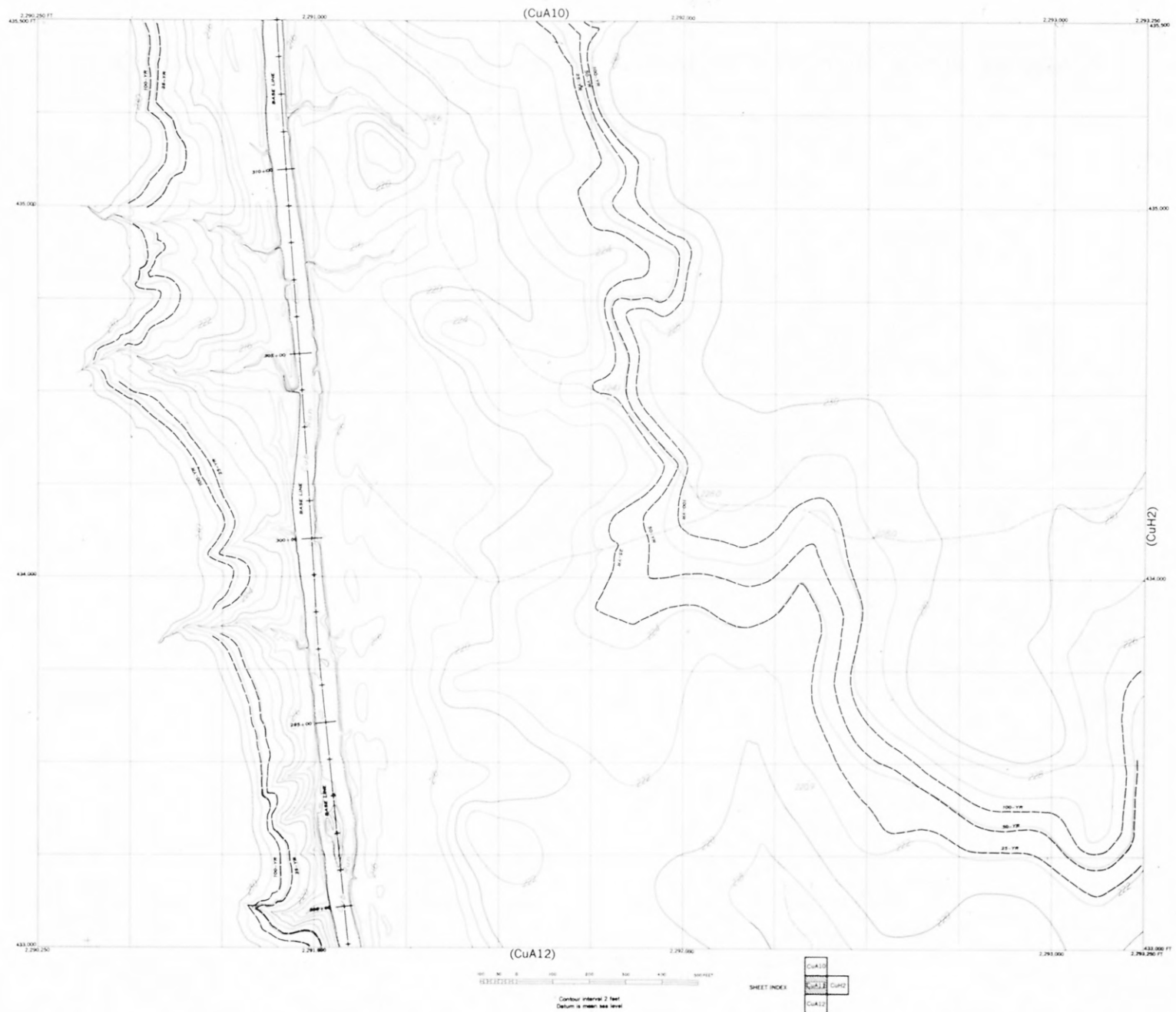


Figure 27. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-11



Figure 28. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-12



Figure 29. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-13



Figure 30. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-14

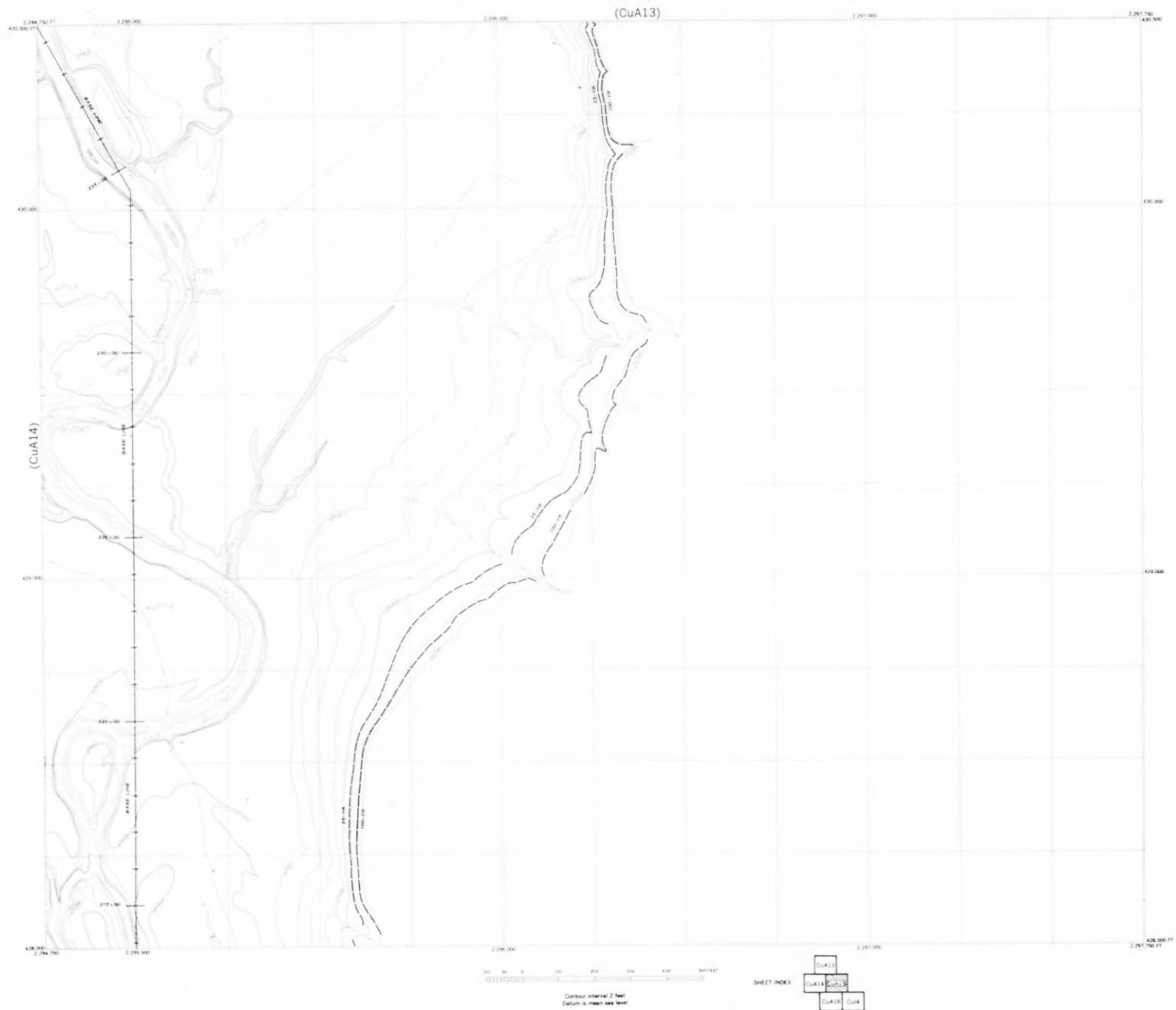


Figure 31. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-15

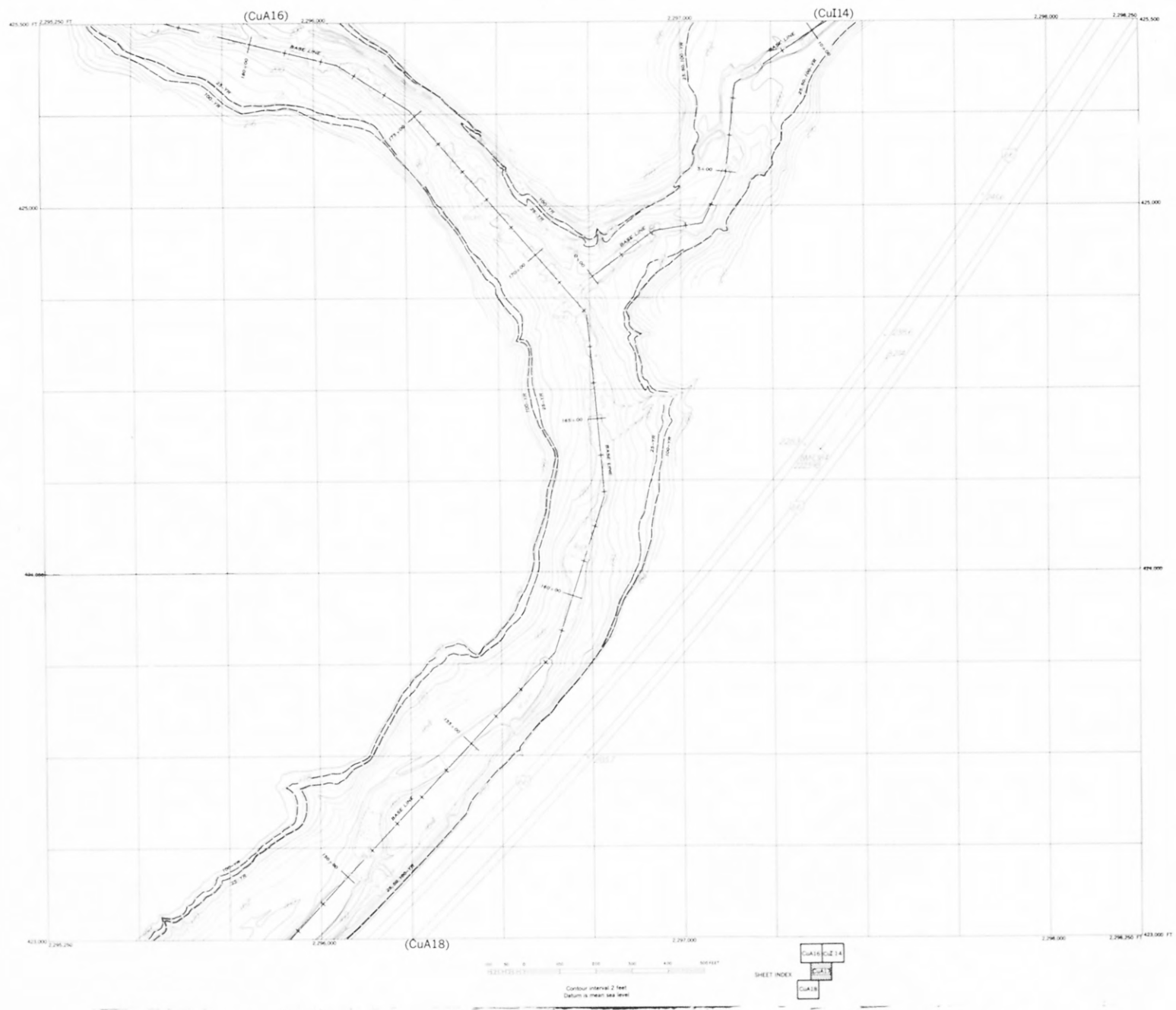


Figure 33. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-17

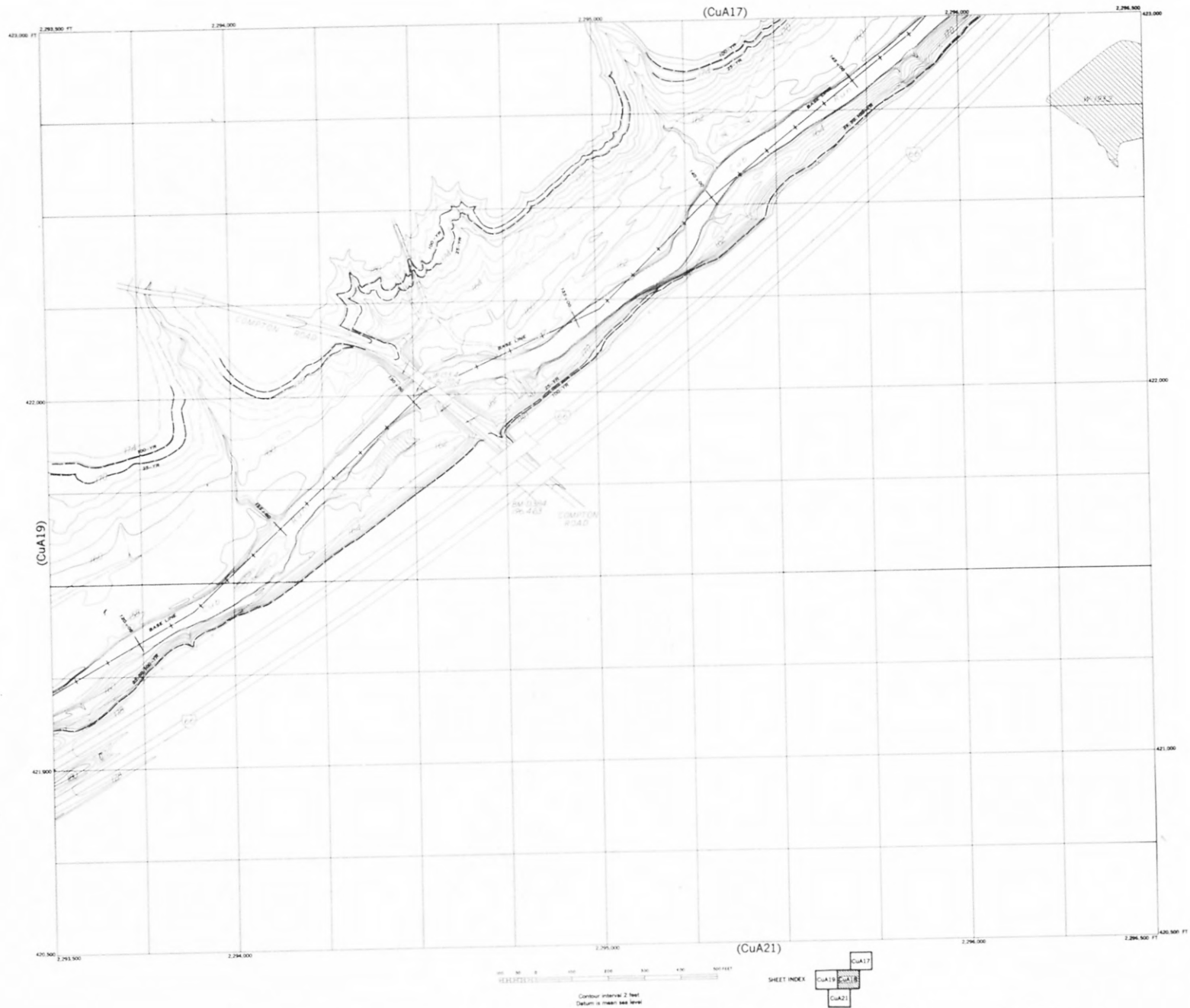


Figure 34. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-18

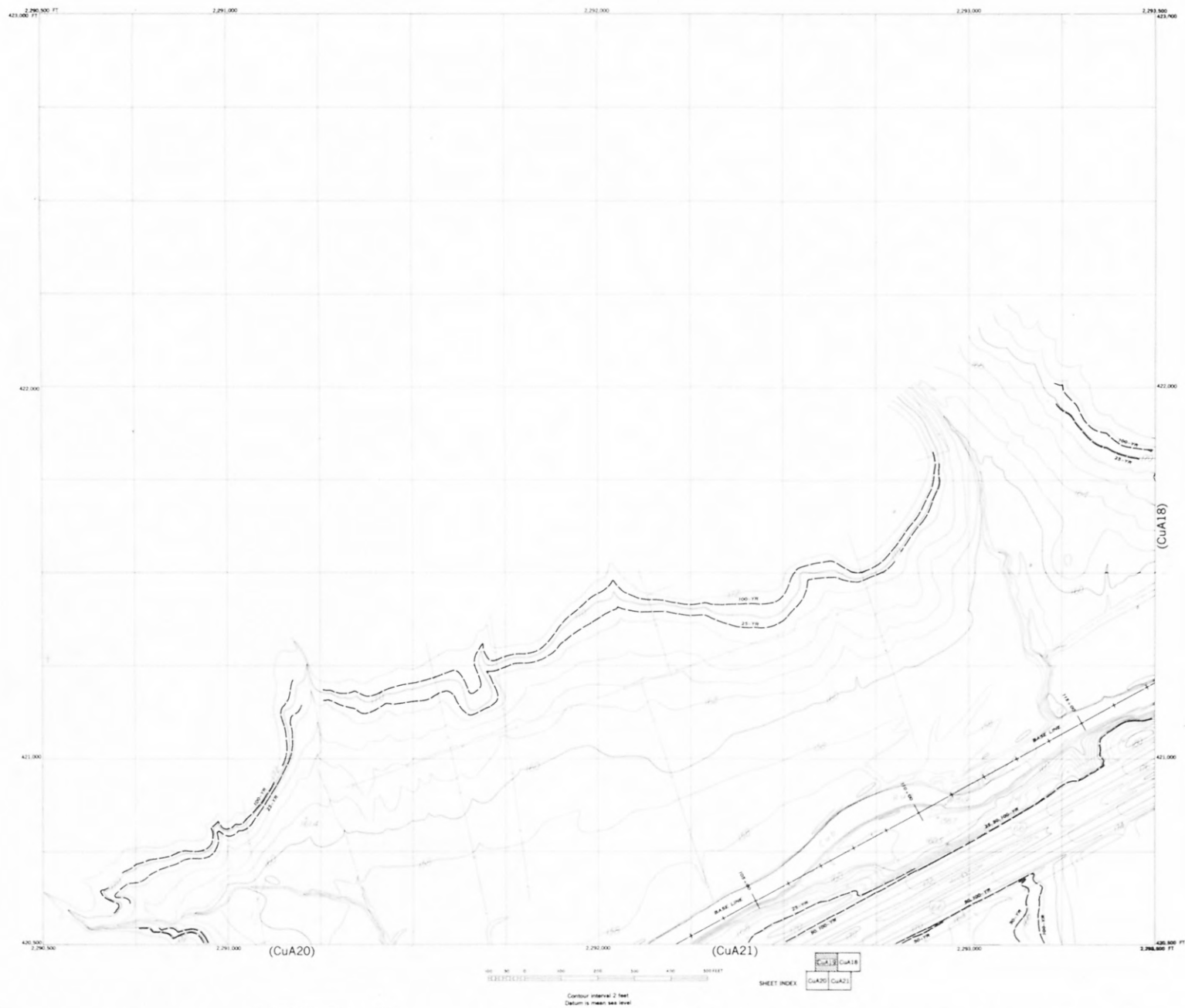


Figure 35. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-19

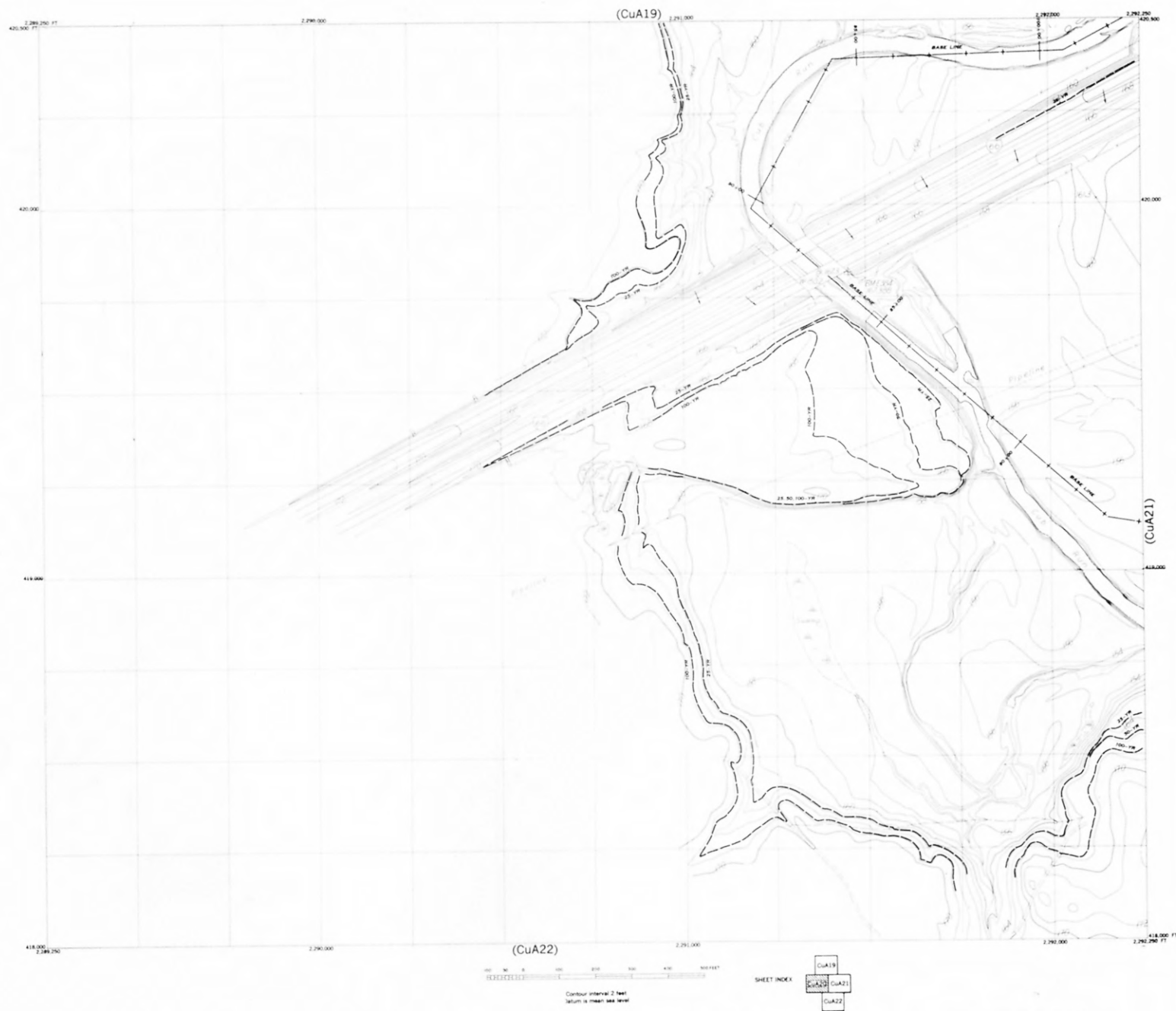


Figure 36. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-20



Figure 37. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-21

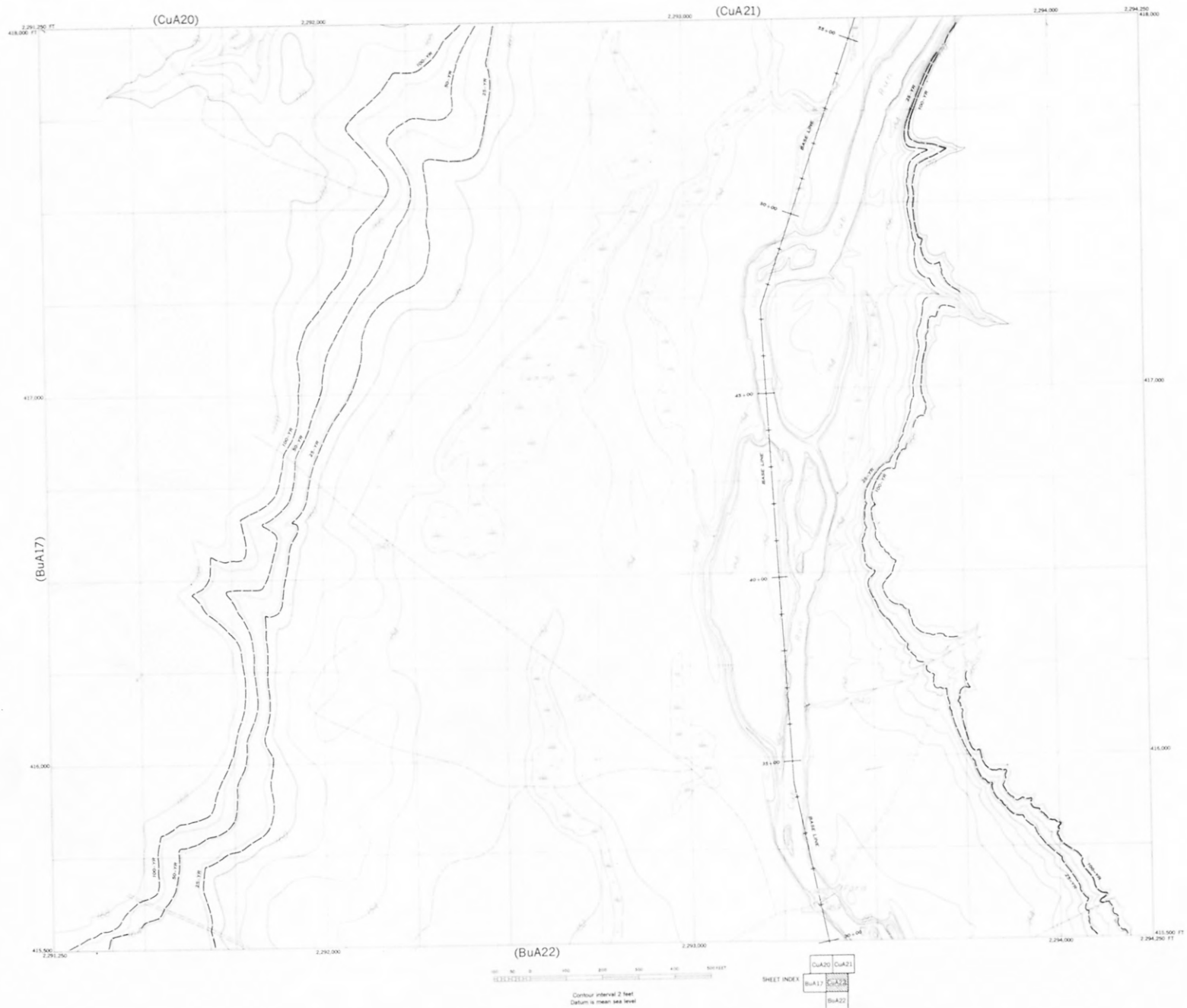


Figure 38. Topographic map of stream valley showing flood boundary delineation, Cub Run; CuA-22

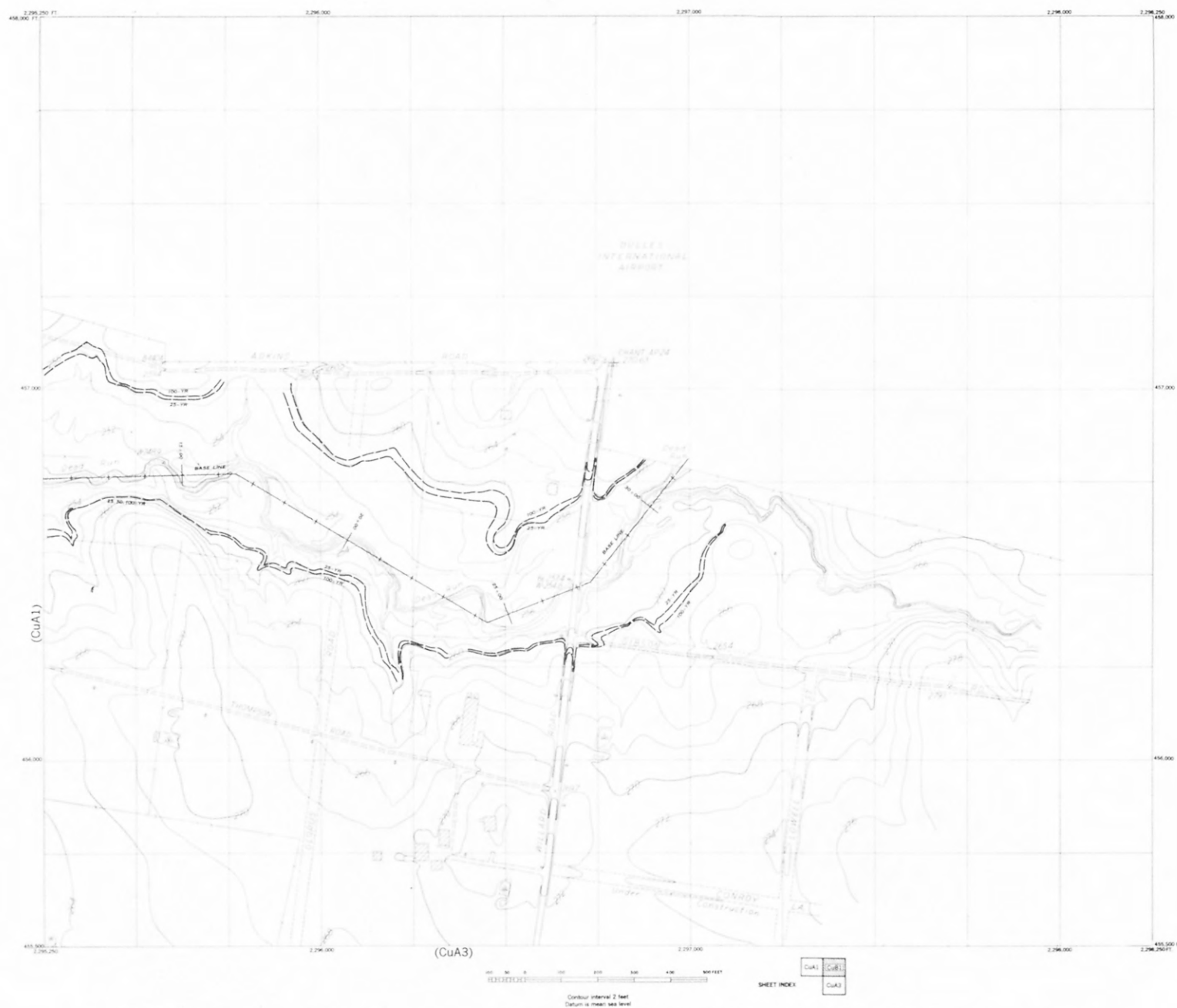


Figure 39. Topographic map of stream valley showing flood boundary delineation, Dead Run; CuB-1

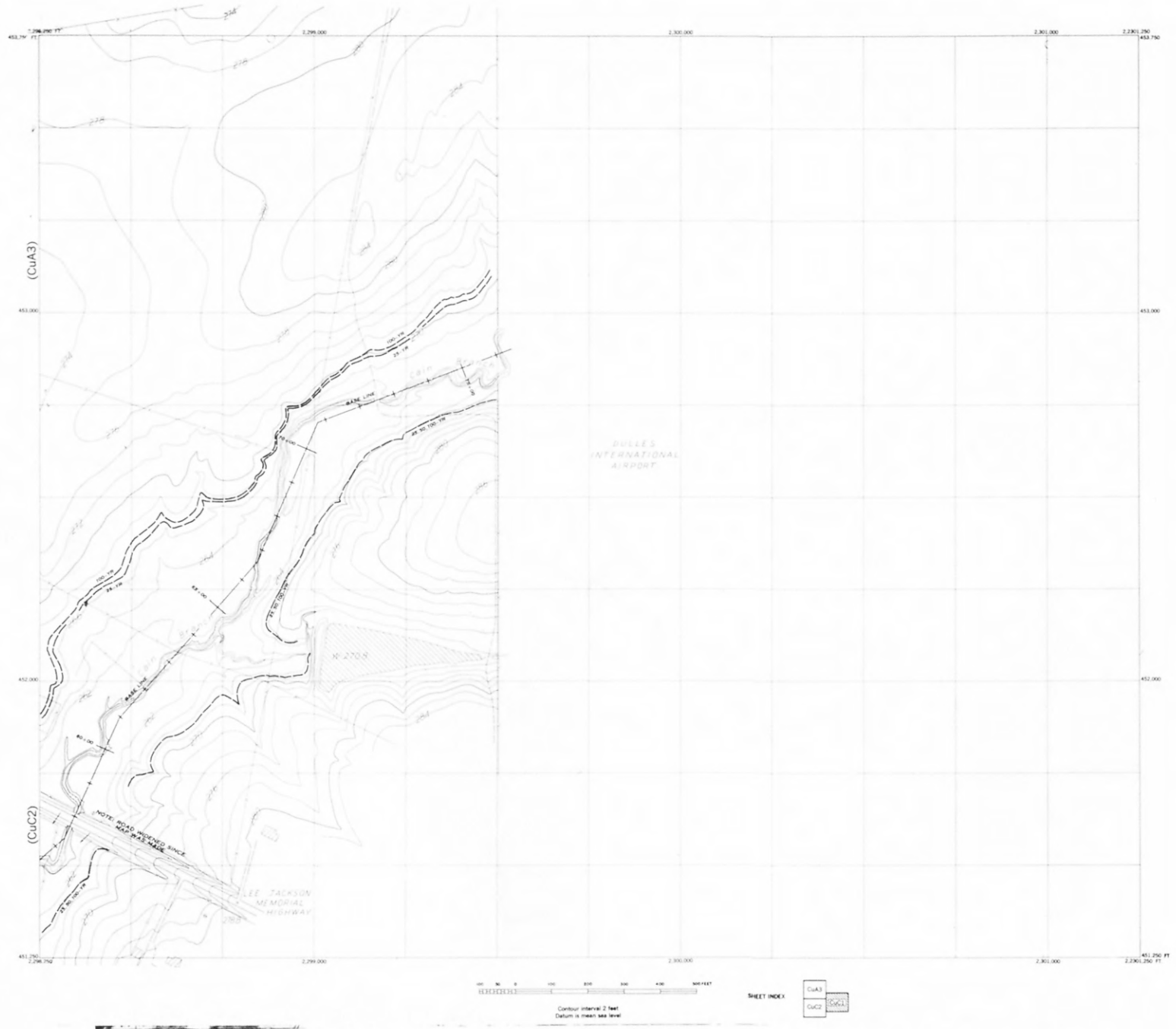


Figure 40. Topographic map of stream valley showing flood boundary delineation, Cain Branch; CuC-1

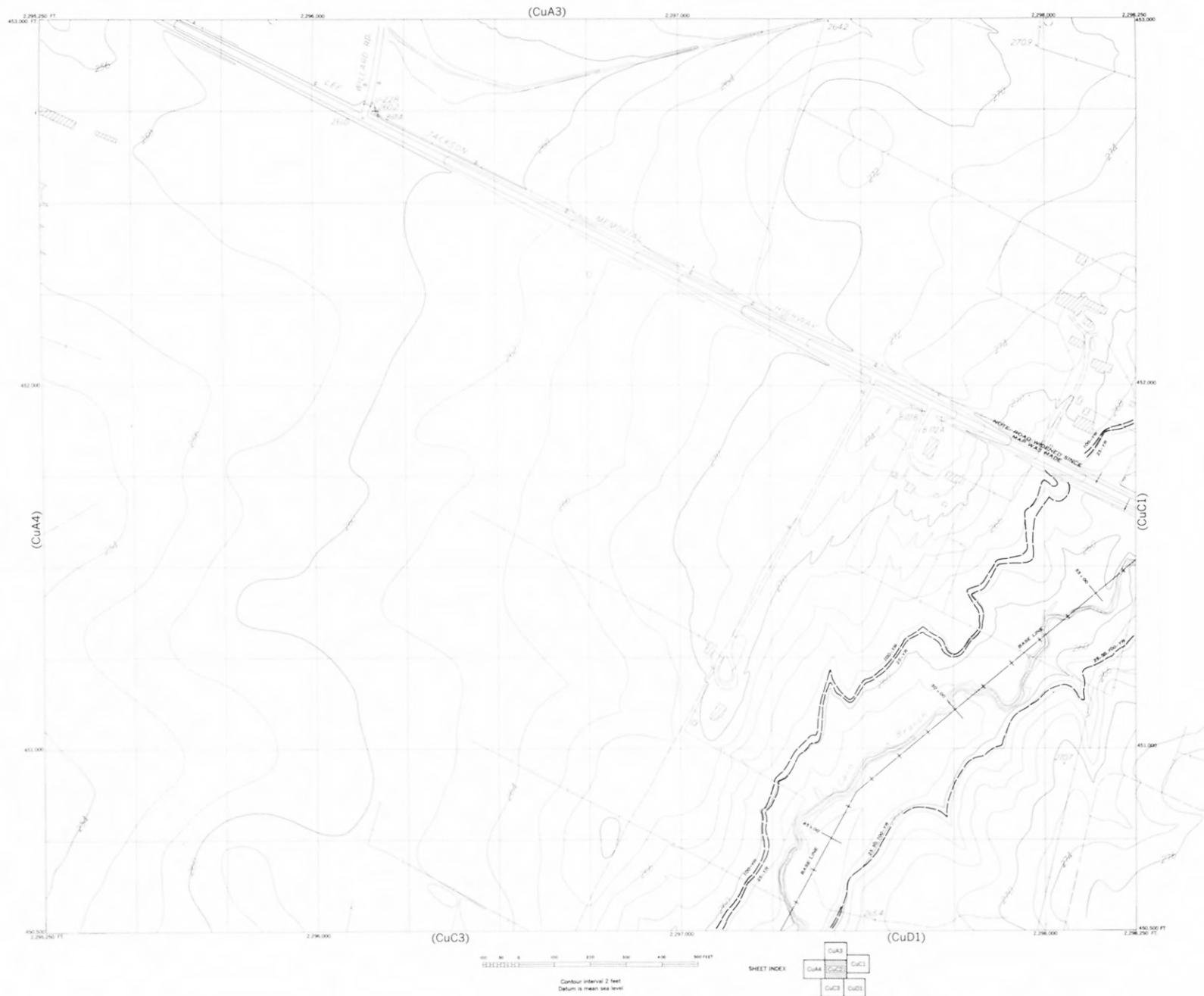


Figure 41. Topographic map of stream valley showing flood boundary delineation, Cain Branch; CuC-2

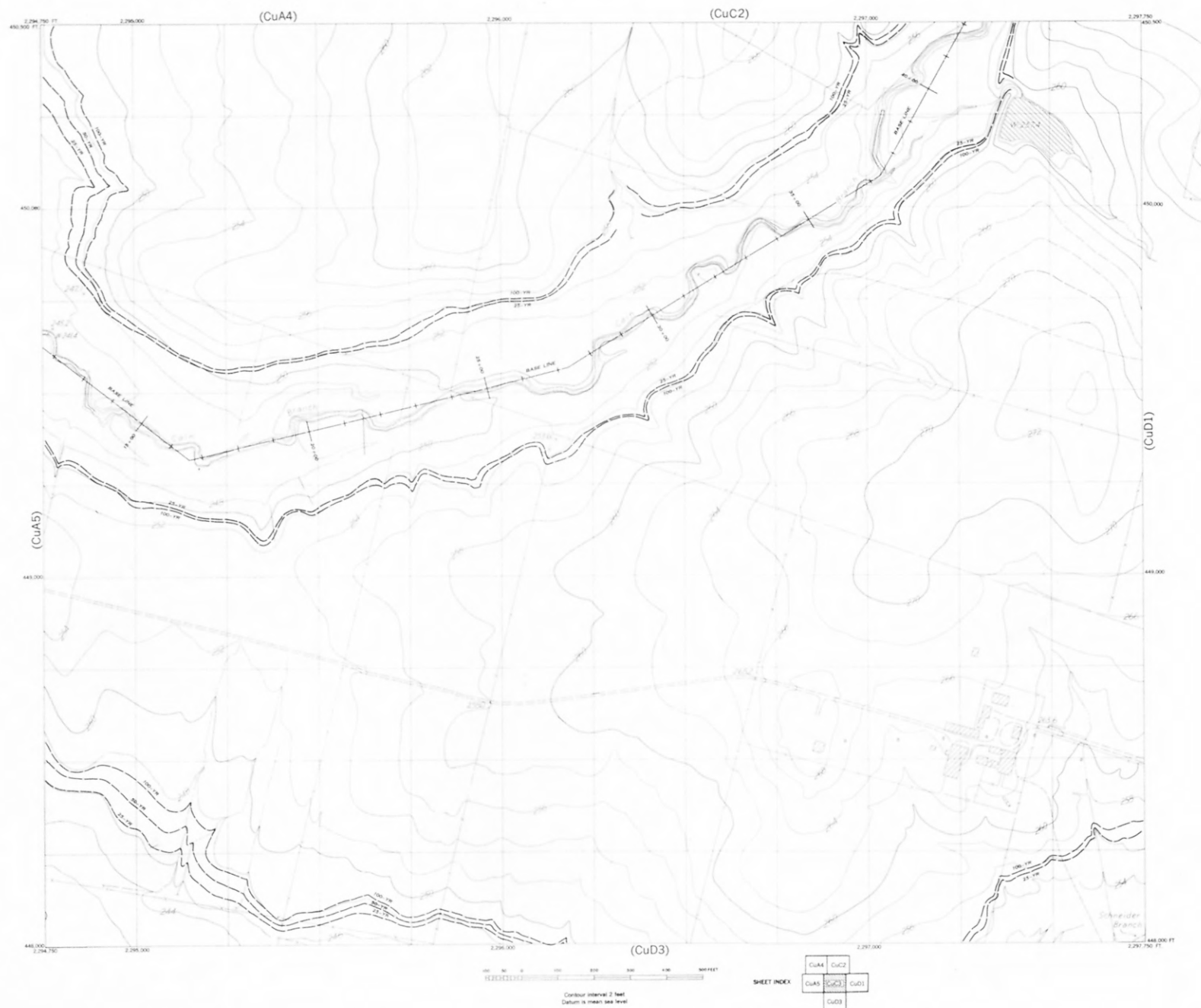


Figure 42. Topographic map of stream valley showing flood boundary delineation, Cain Branch; CuC-3

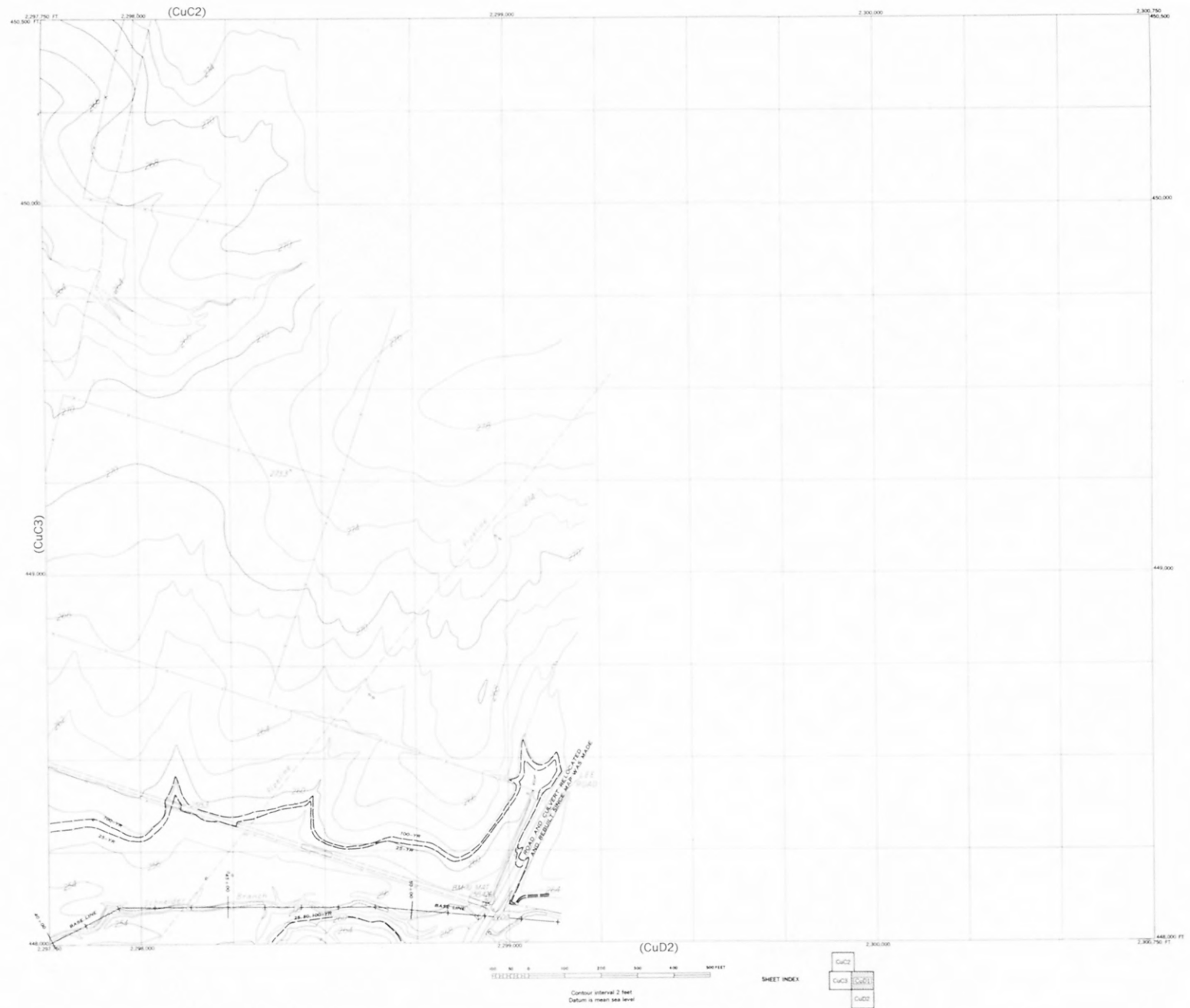


Figure 43. Topographic map of stream valley showing flood boundary delineation, Scheider Branch; CuD-1

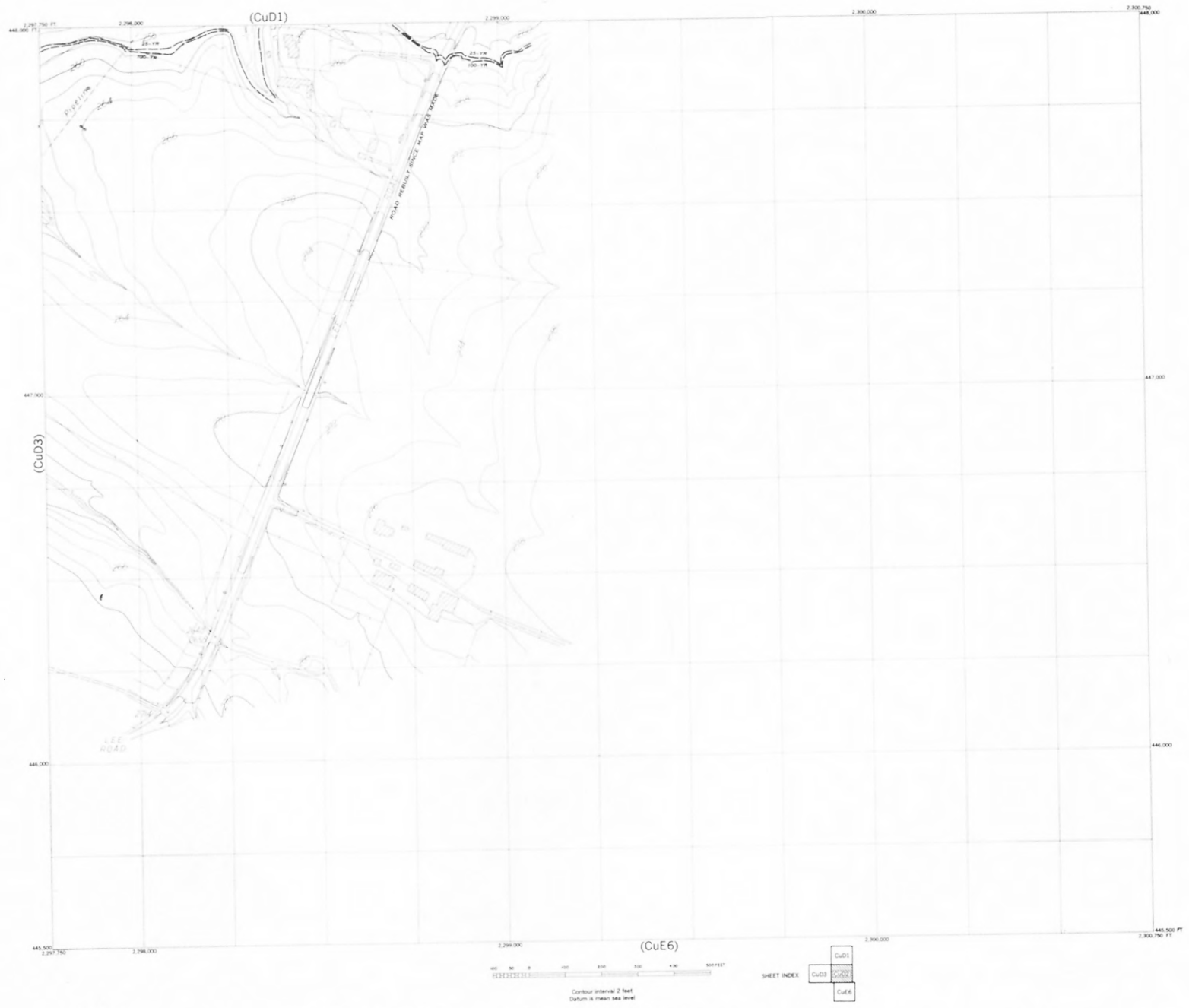


Figure 44. Topographic map of stream valley showing flood boundary delineation, Scheider Branch; CuD-2

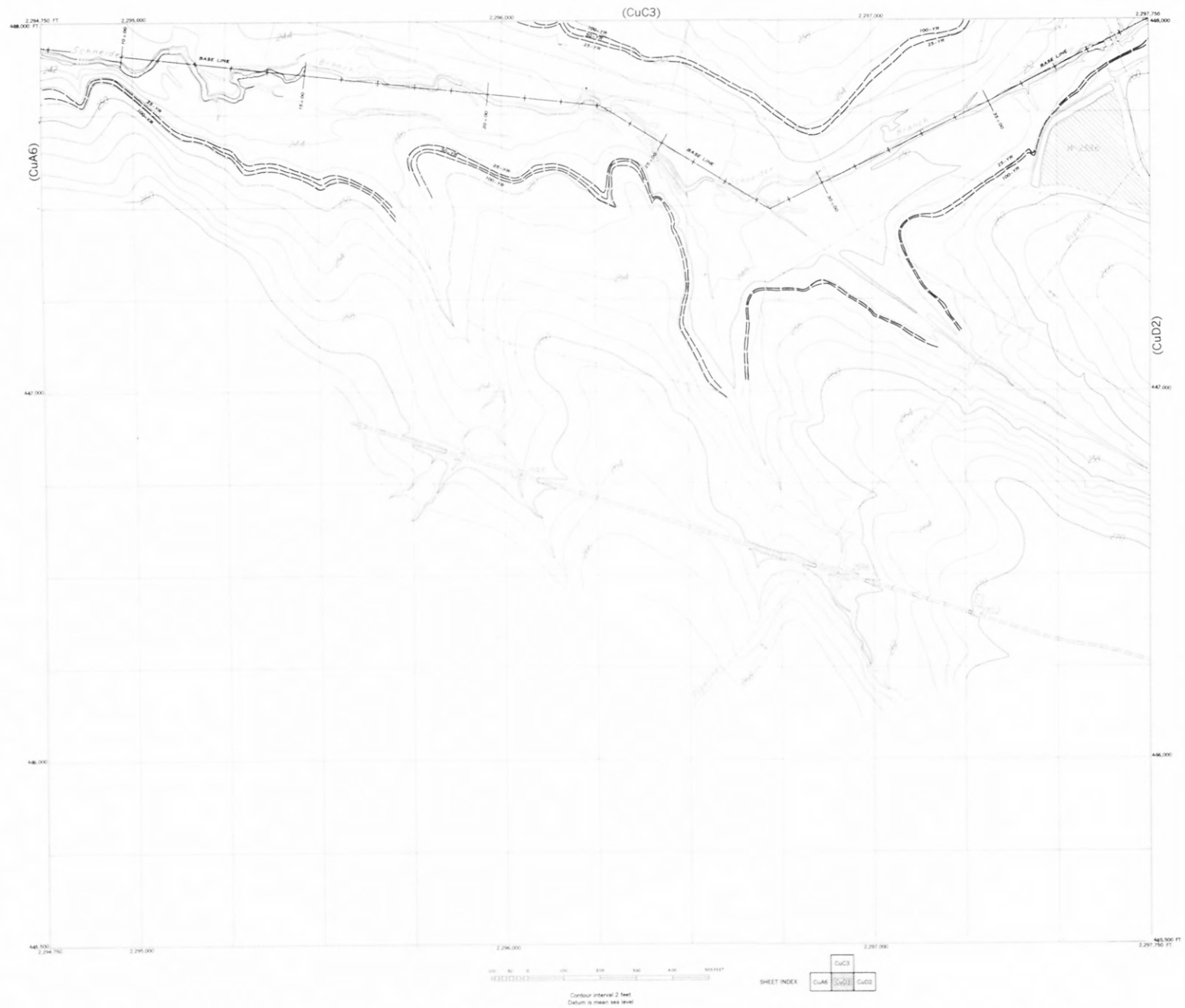


Figure 45. Topographic map of stream valley showing flood boundary delineation, Scheider Branch; CuD-3

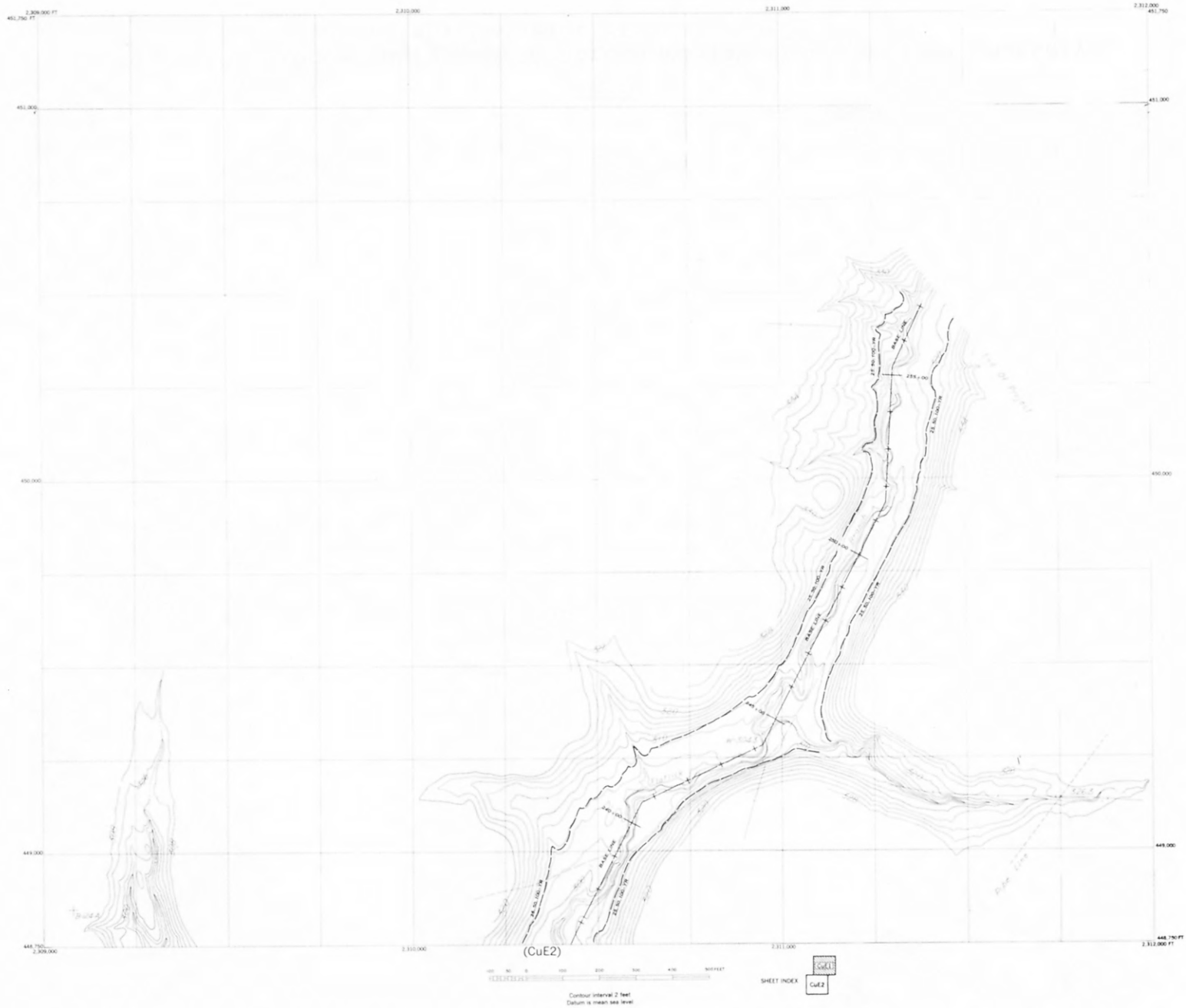


Figure 46. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-1



Figure 47. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-2

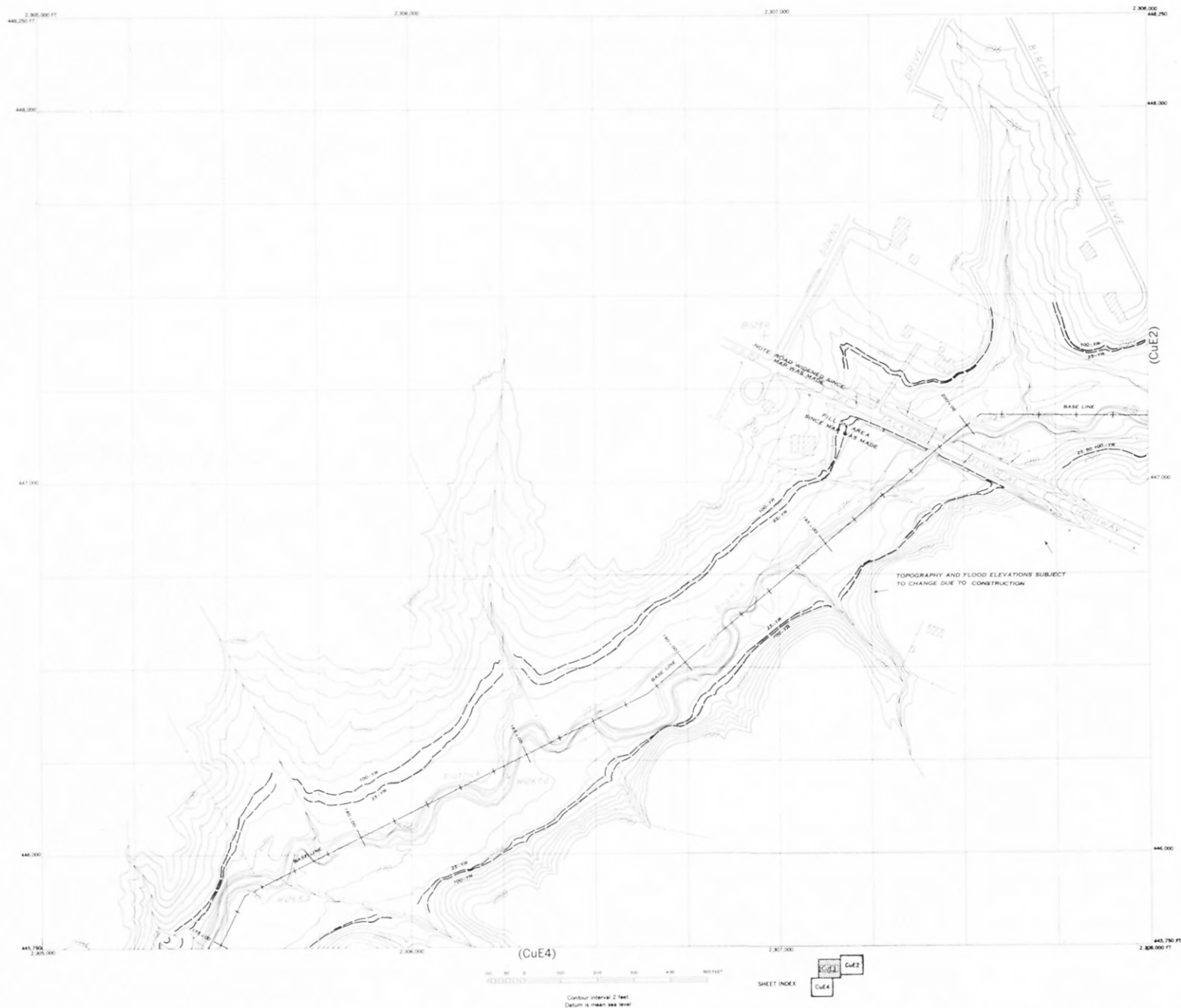


Figure 48. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-3

T6

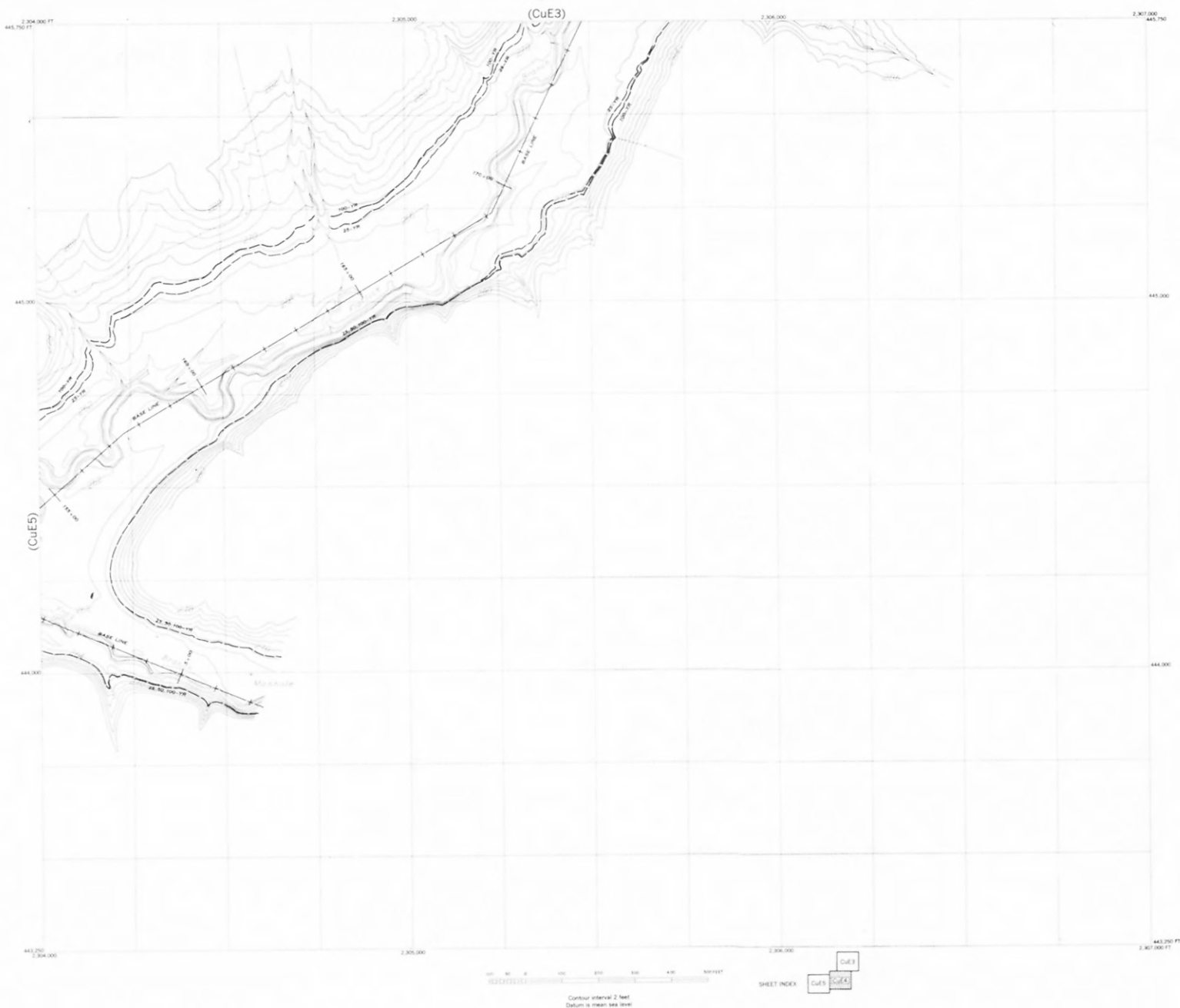


Figure 49. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-4

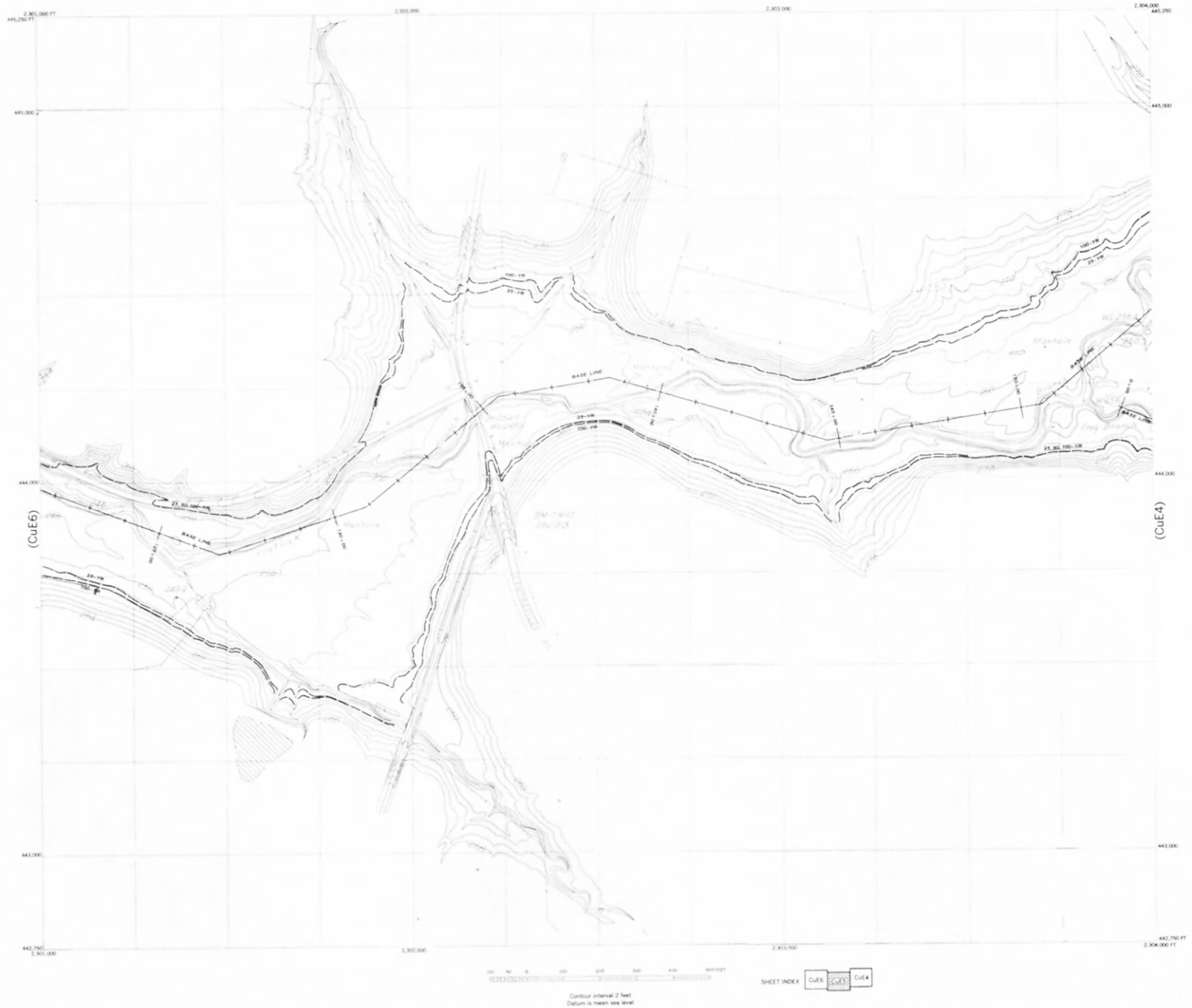


Figure 50. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-5

Figure 51. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-6

Figure 52. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-7

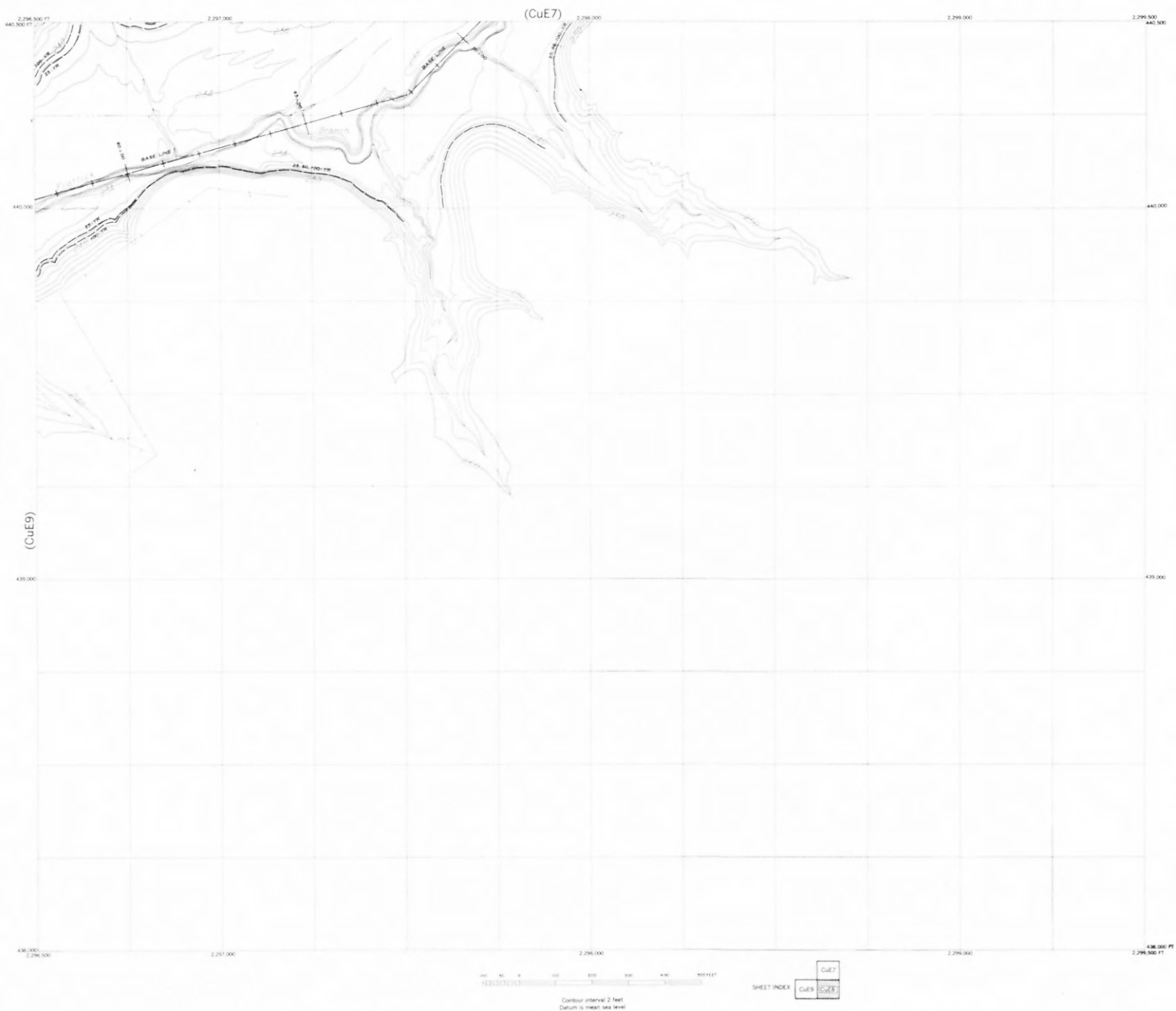


Figure 53. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-8

Figure 54. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-9

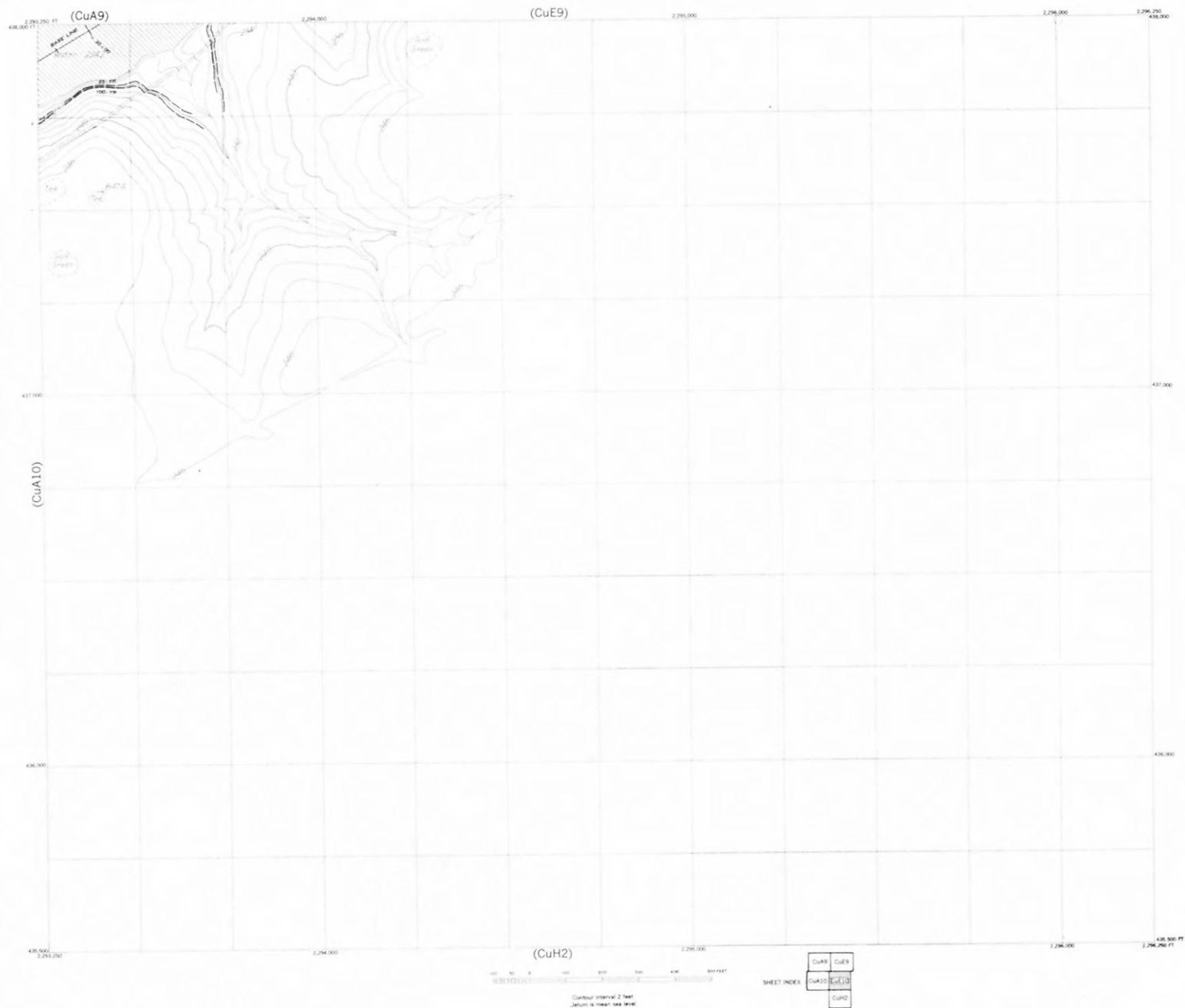


Figure 55. Topographic map of stream valley showing flood boundary delineation, Flatlick Branch; CuE-10

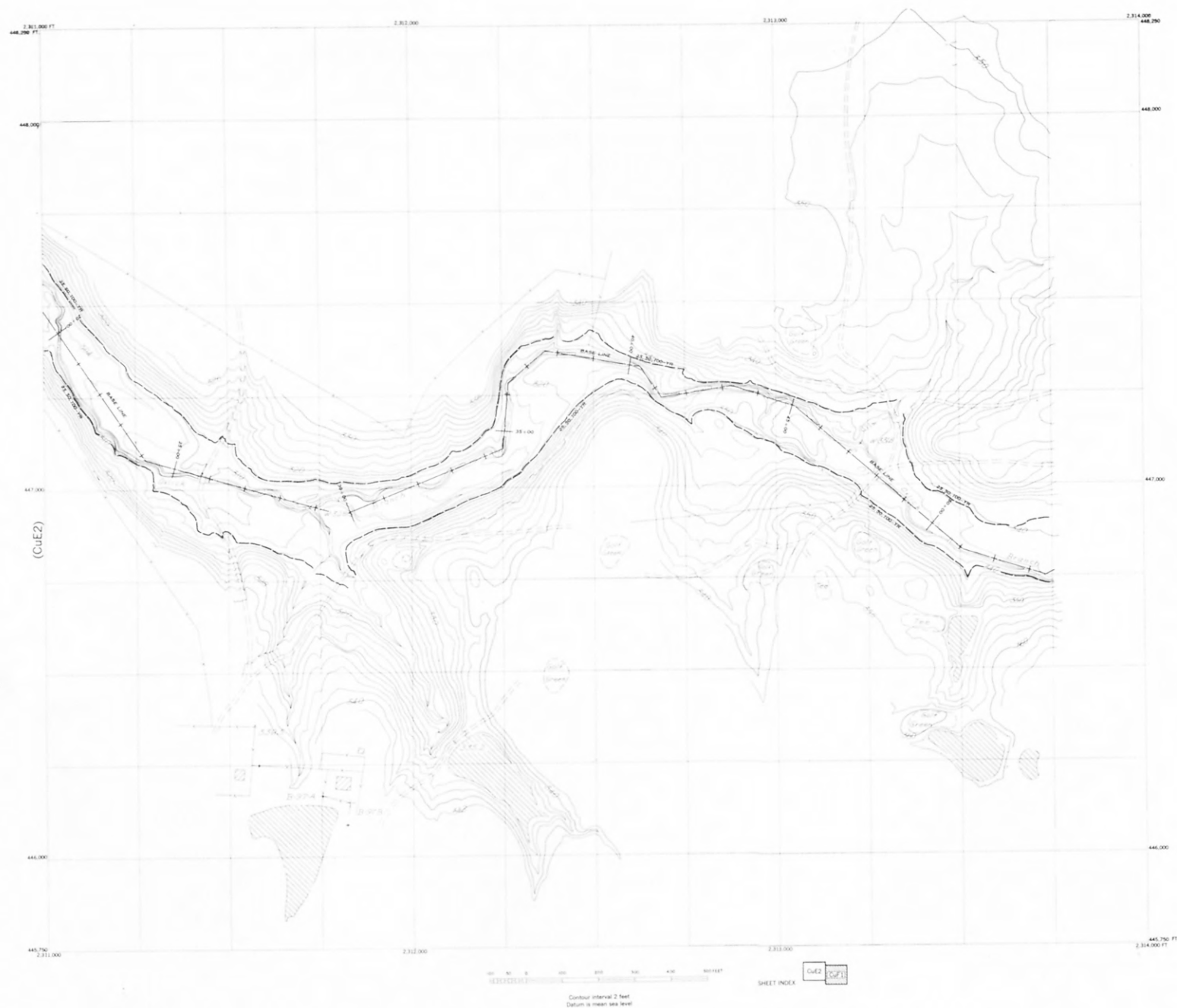


Figure 56. Topographic map of stream valley showing flood boundary delineation, Oxlick Branch; CuF-1

100

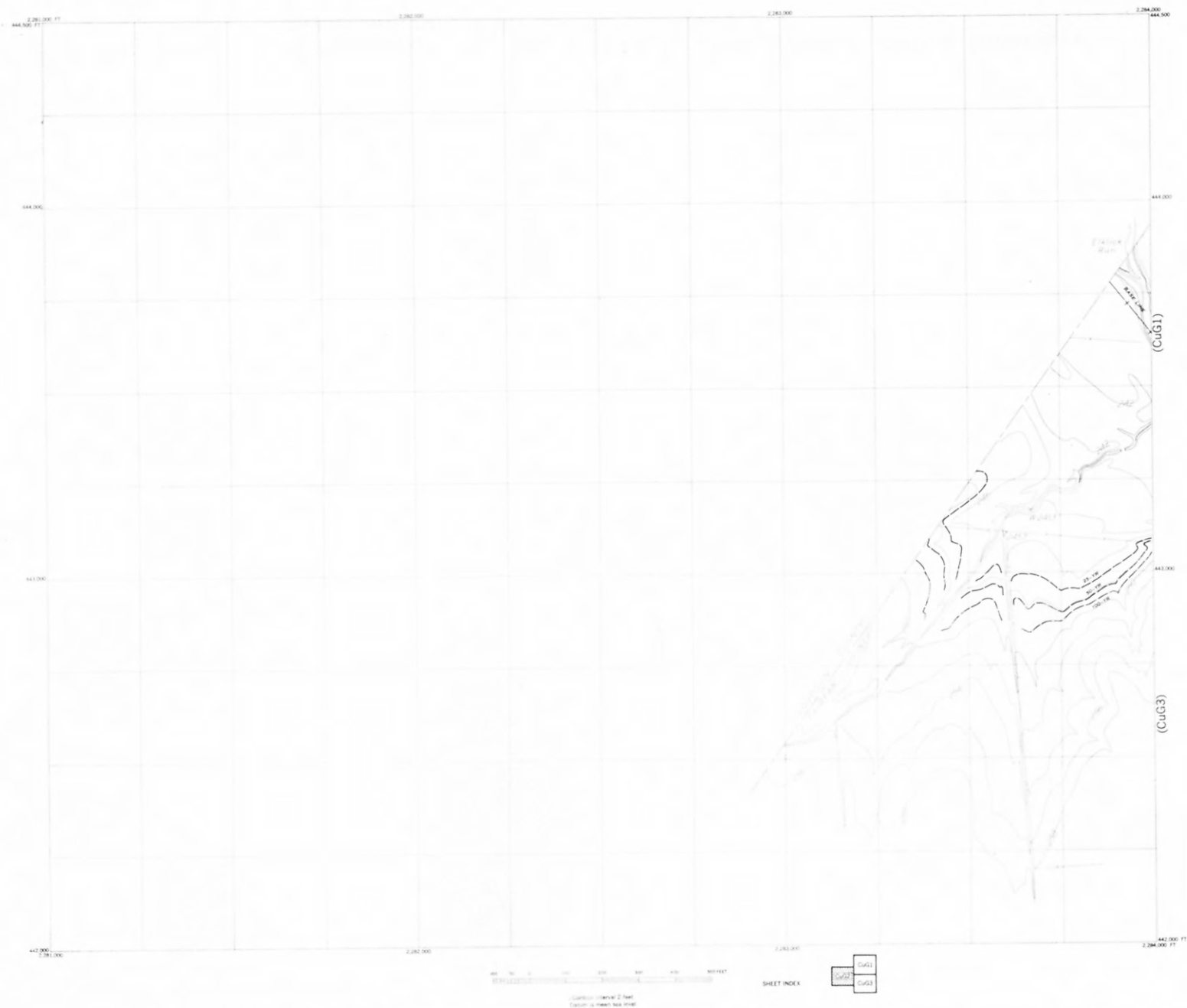


Figure 58. Topographic map of stream valley showing flood boundary delineation, Elklick Run; CuG-2



Figure 59. Topographic map of stream valley showing flood boundary delineation, Elklick Run; CuG-3

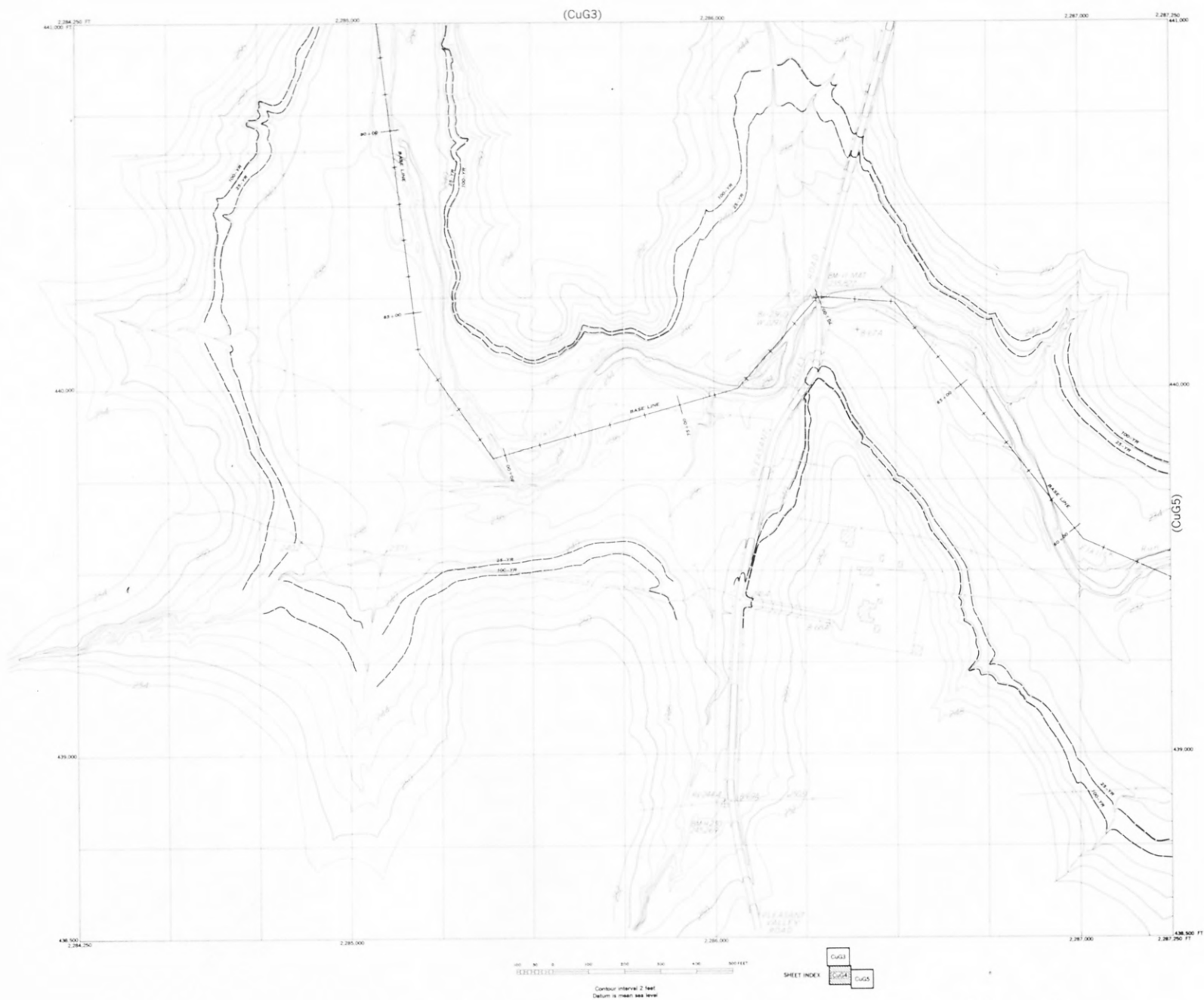


Figure 60. Topographic map of stream valley showing flood boundary delineation, Elklick Run; CuG-4

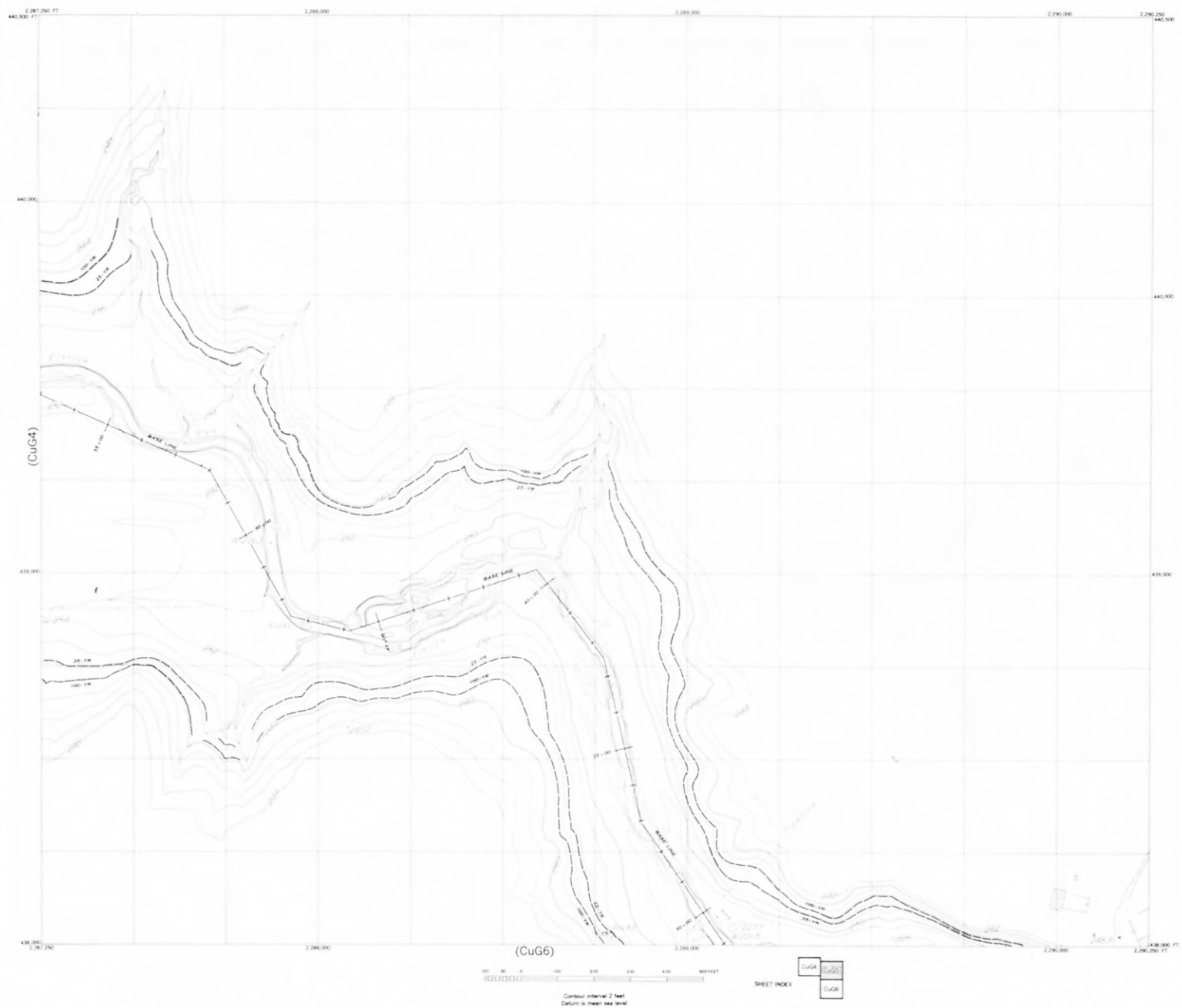


Figure 61. Topographic map of stream valley showing flood boundary delineation, Elklick Run; CuG-5

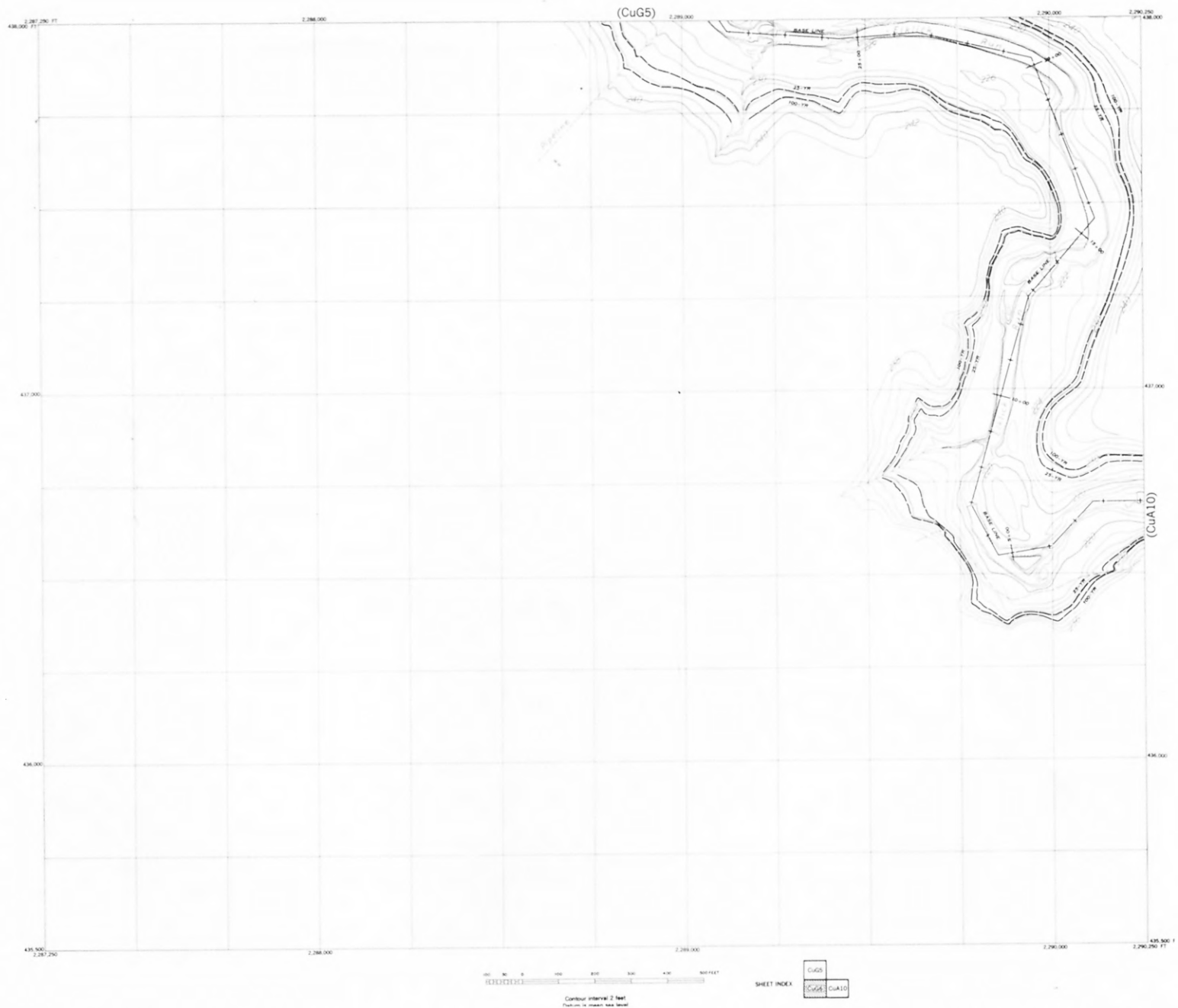


Figure 62. Topographic map of stream valley showing flood boundary delineation, Elklick Run; CuG-6

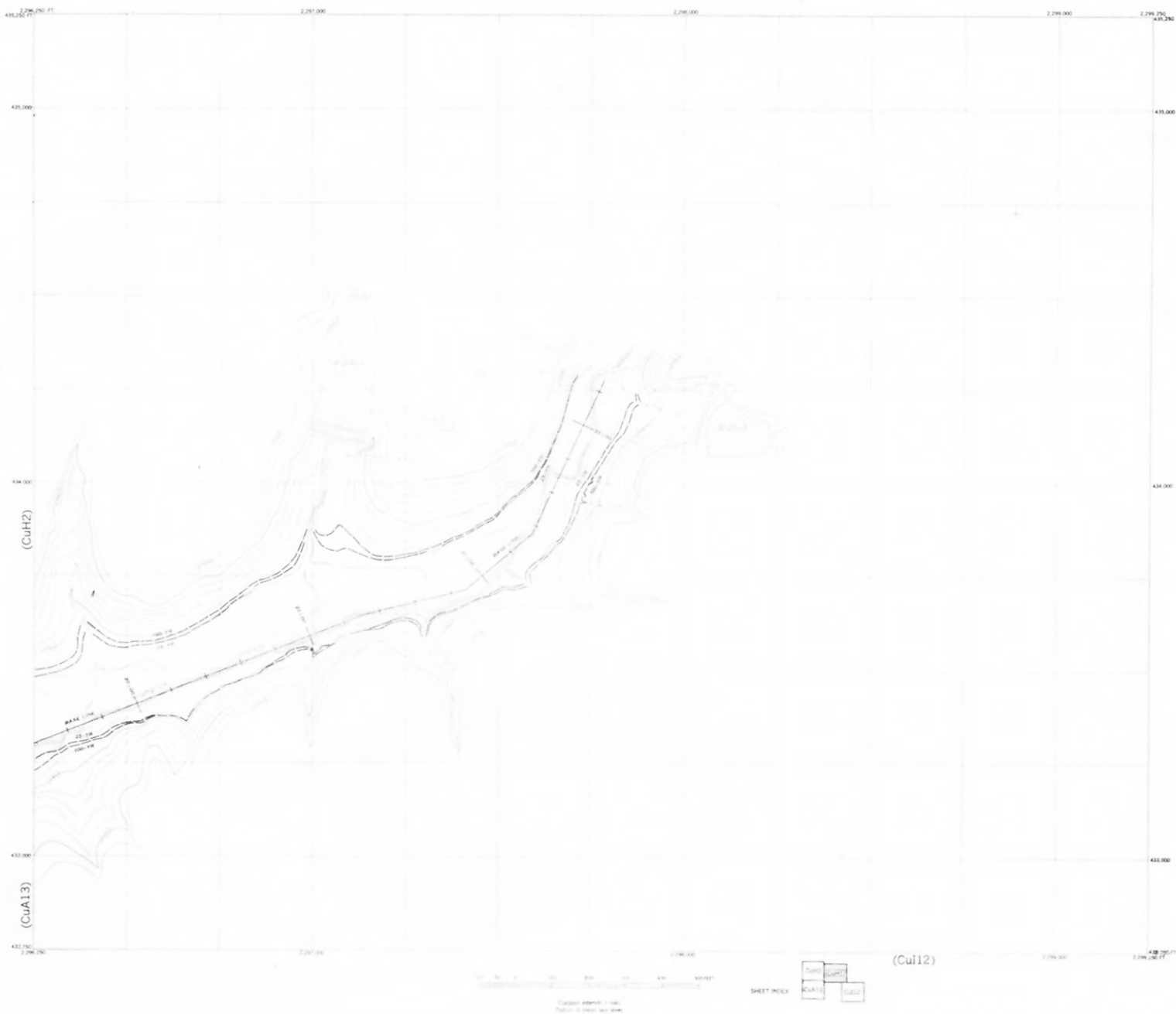


Figure 63. Topographic map of stream valley showing flood boundary delineation, Roundlick Branch; CuH-1

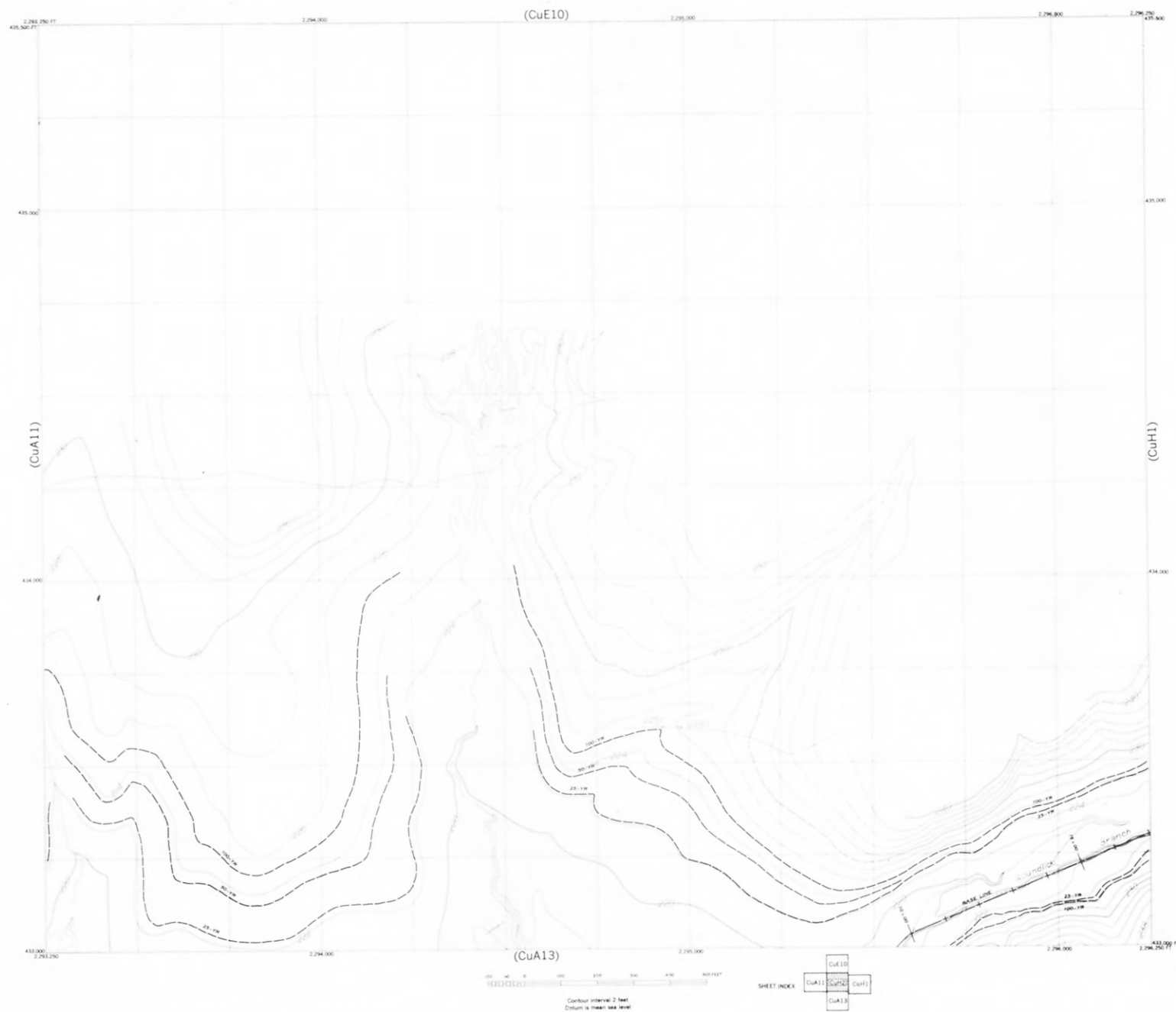


Figure 64. Topographic map of stream valley showing flood boundary delineation, Roundlick Branch; CuH-2

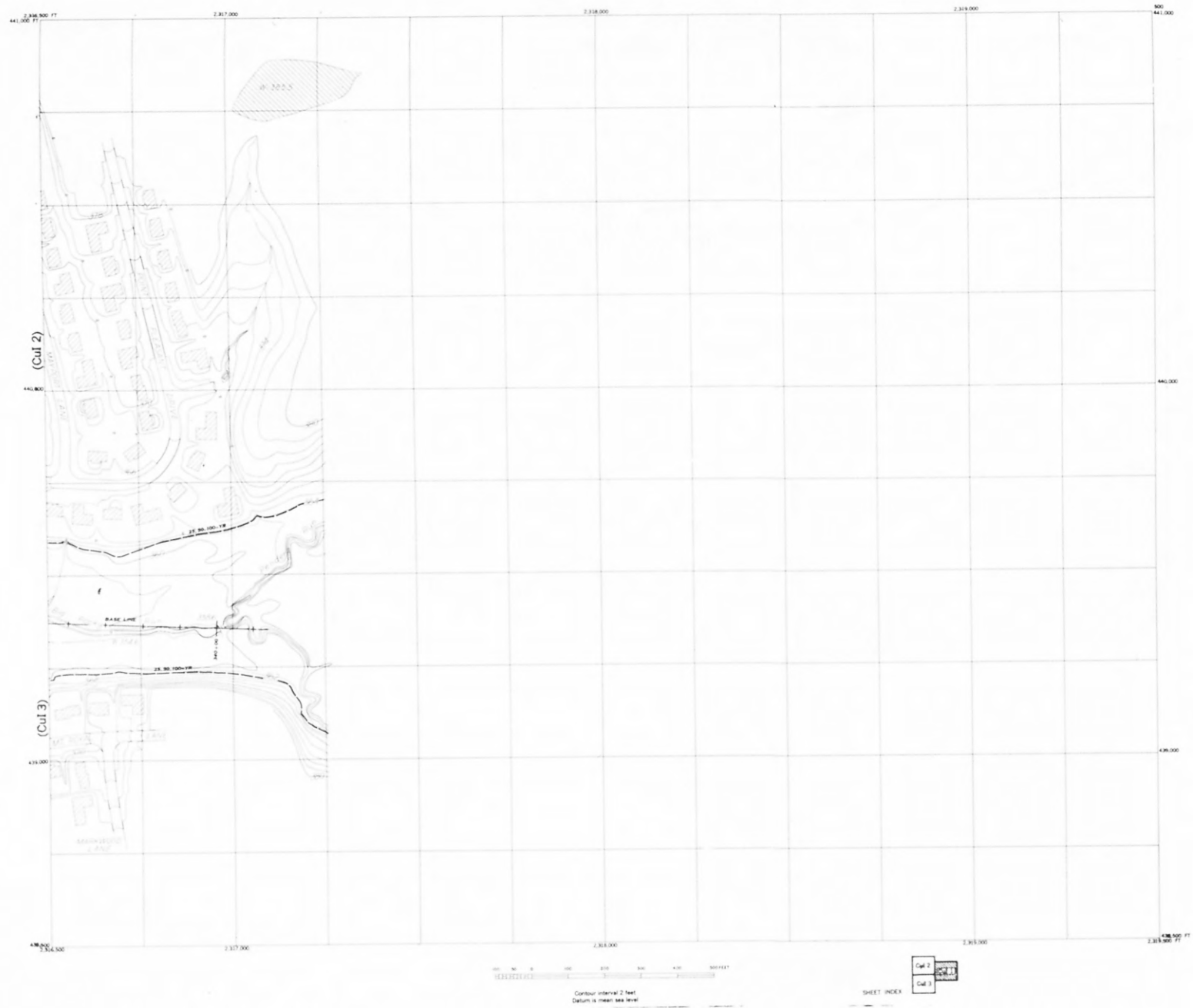


Figure 65. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-1

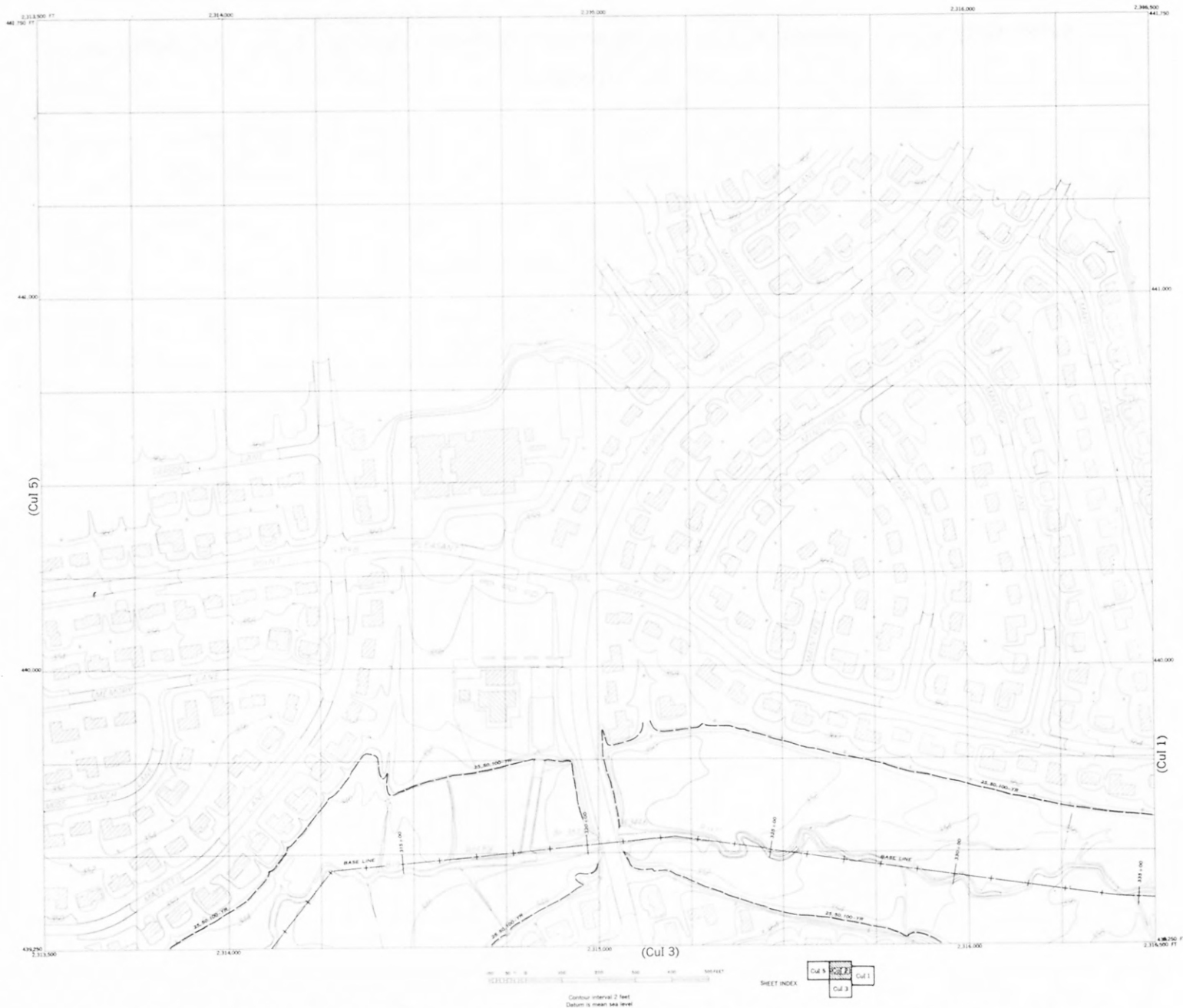


Figure 66. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-2

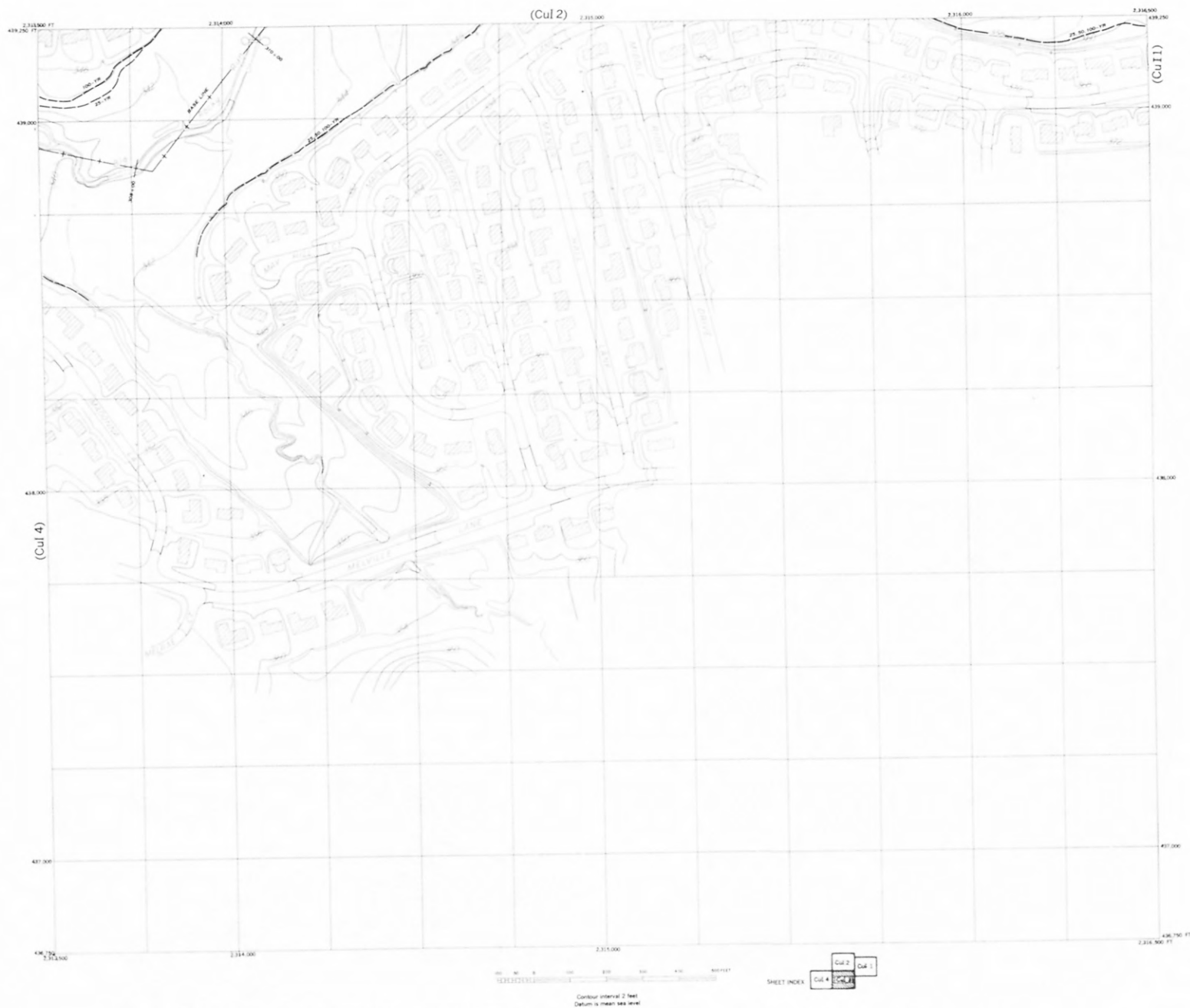


Figure 67. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-3

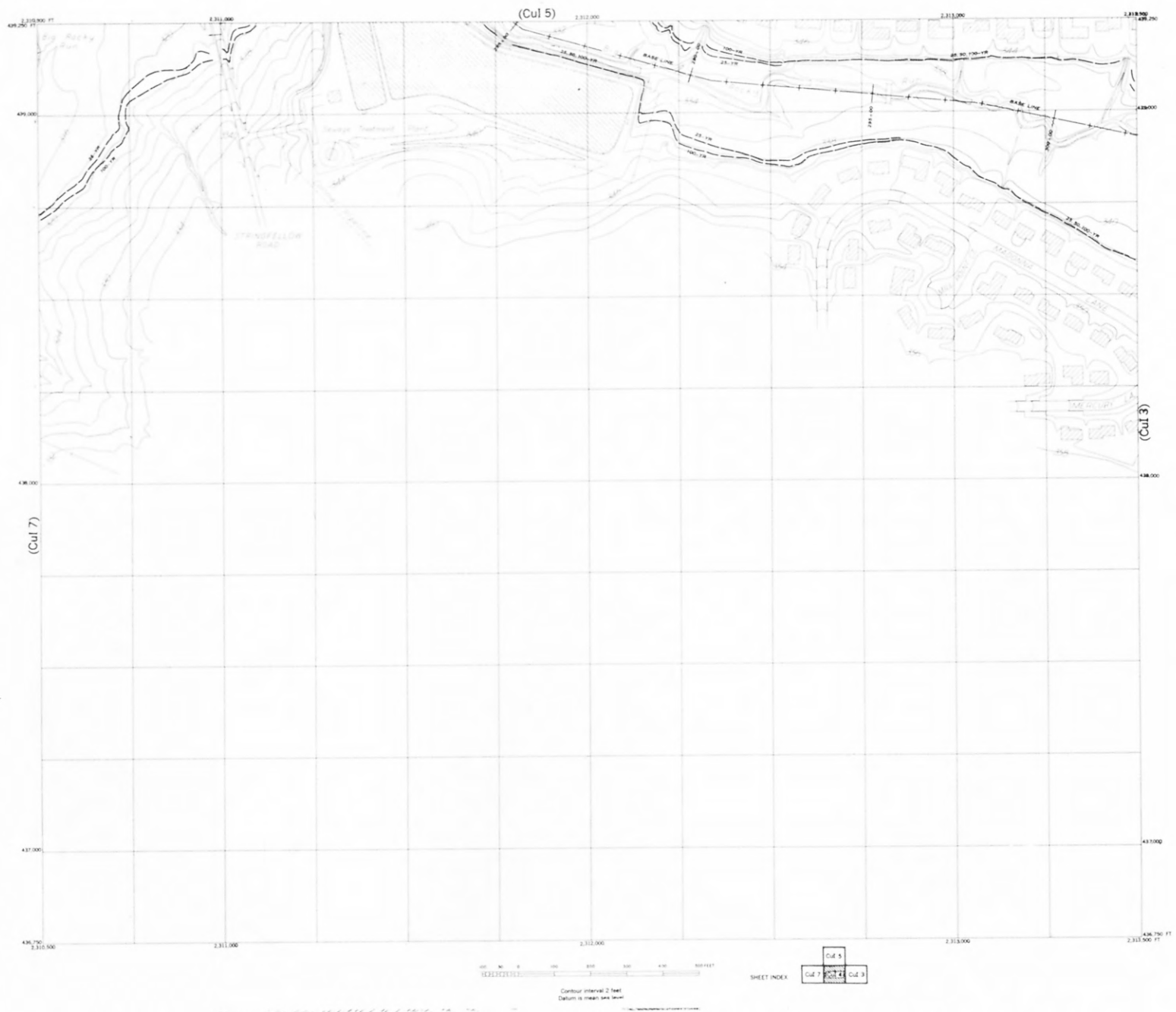


Figure 68. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-4

111

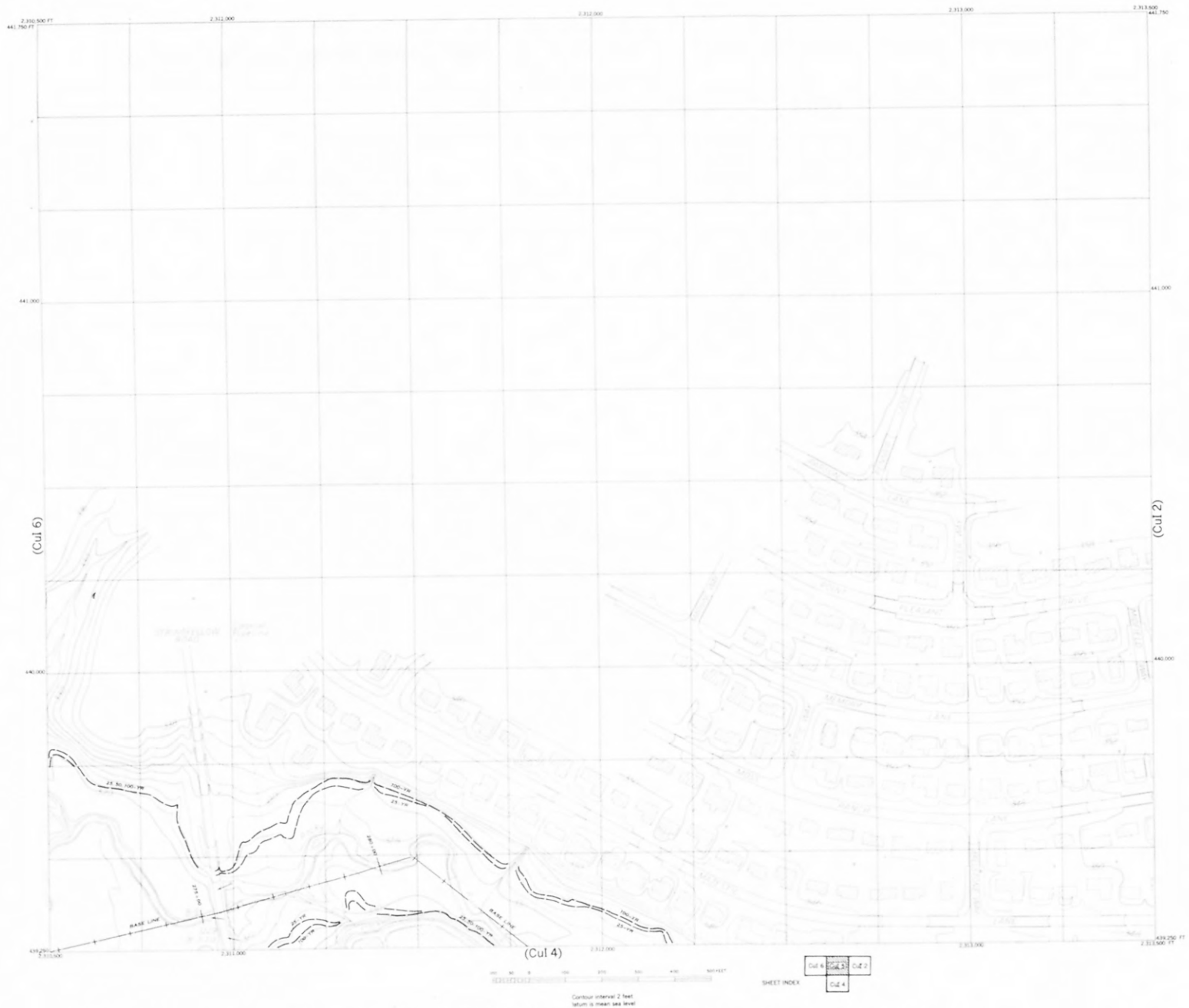


Figure 69. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-5



Figure 70. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-6



Figure 71. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-7

114

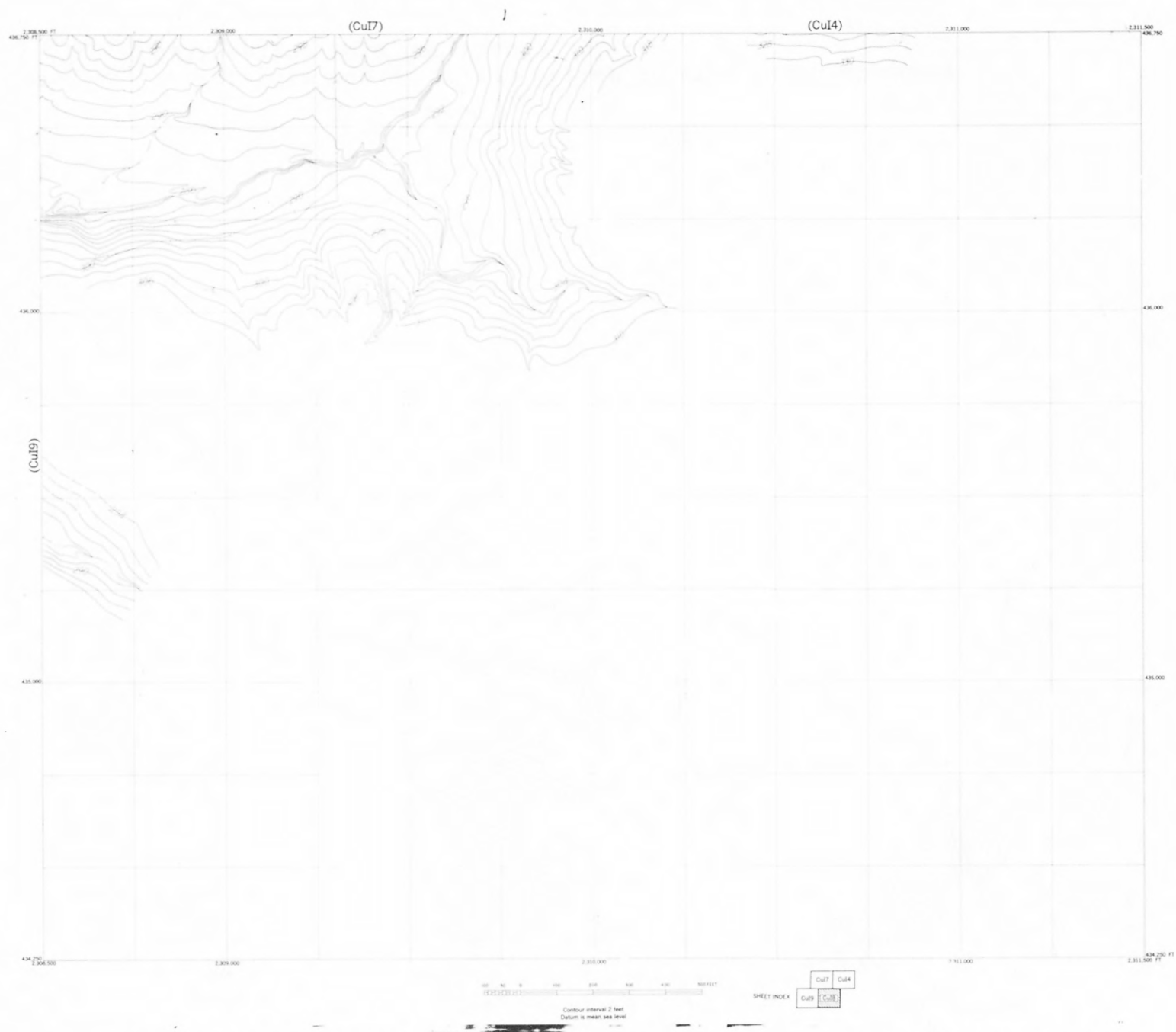


Figure 72. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-8

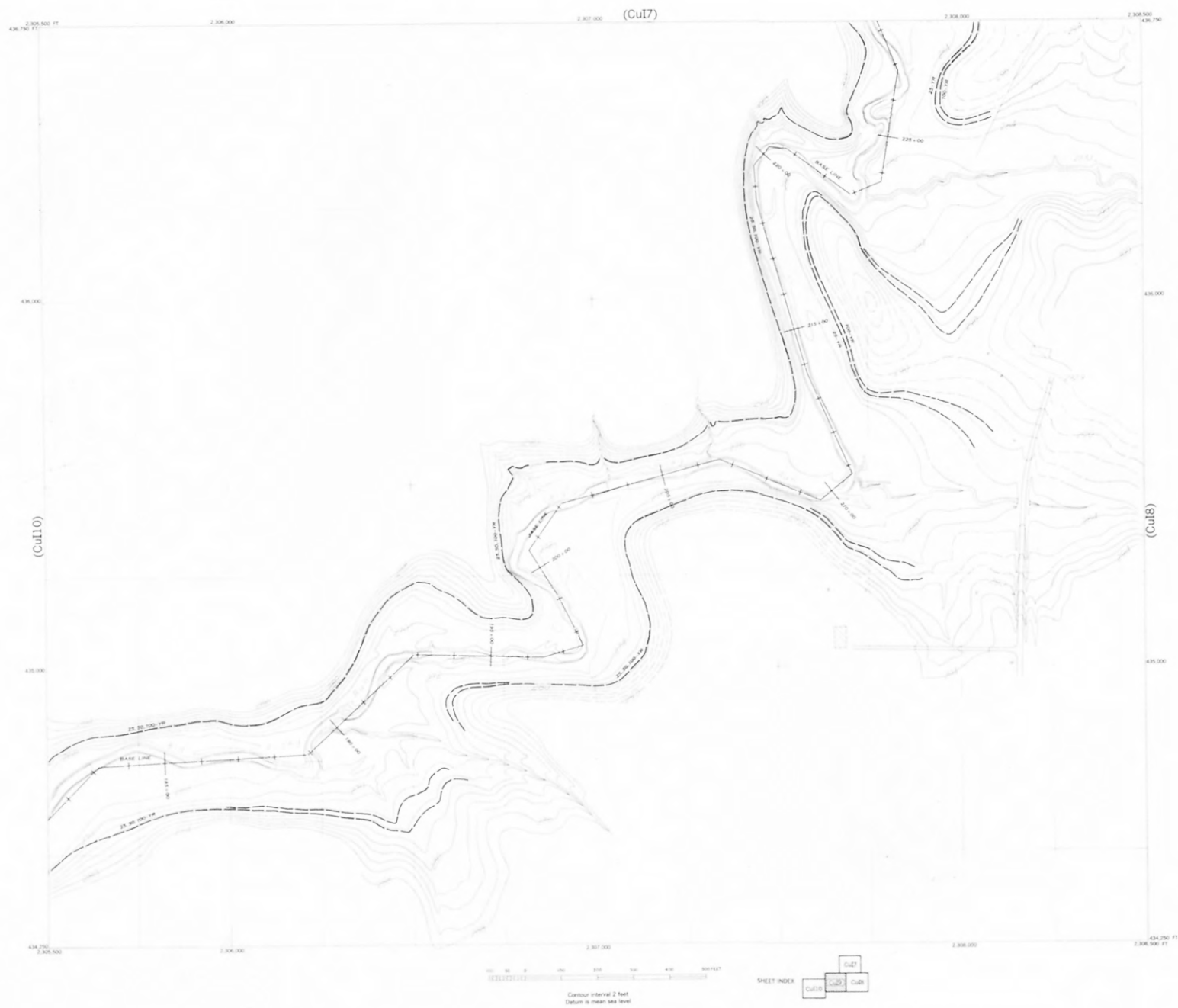


Figure 73. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-9

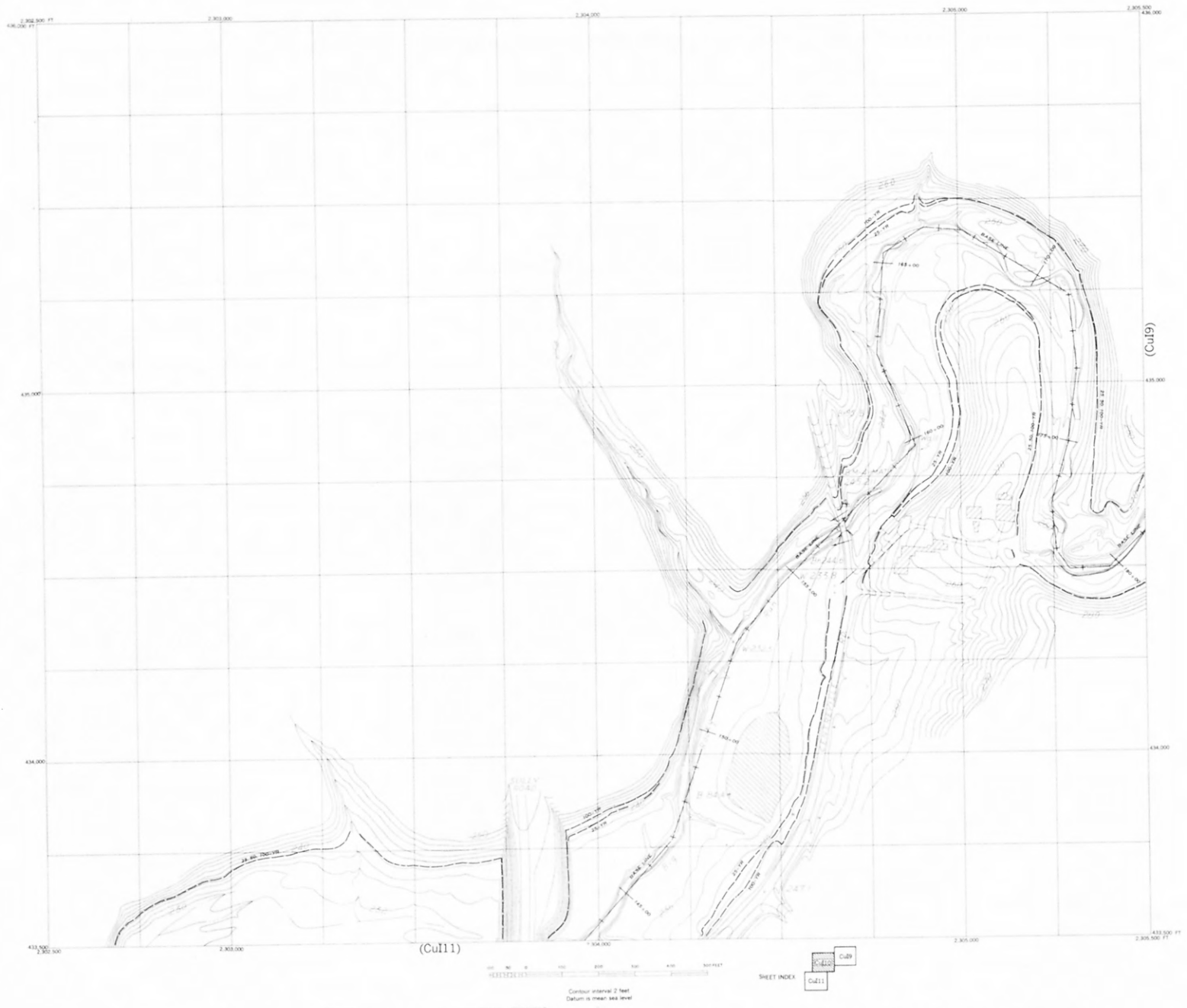


Figure 74. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-10

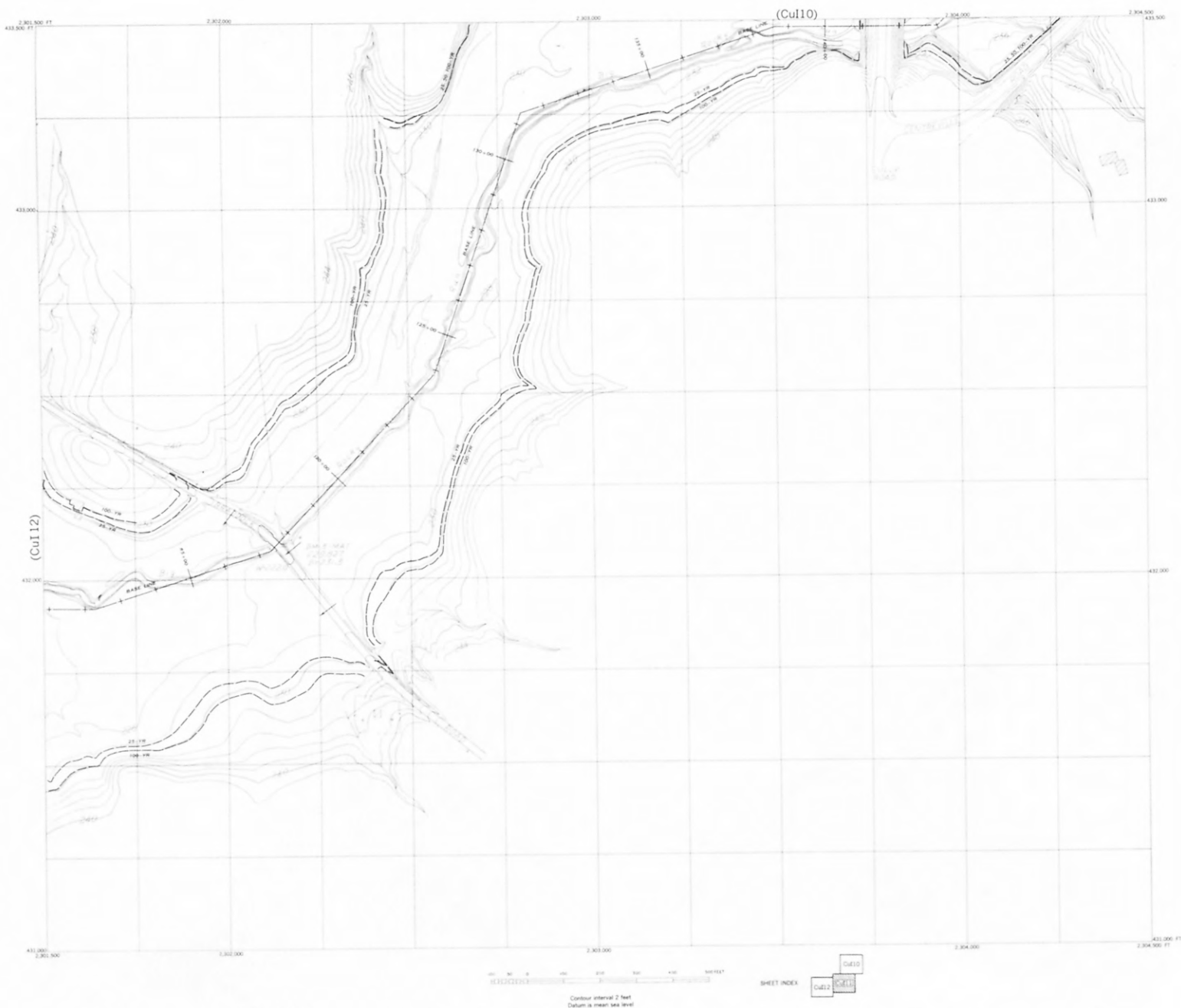


Figure 75. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-11

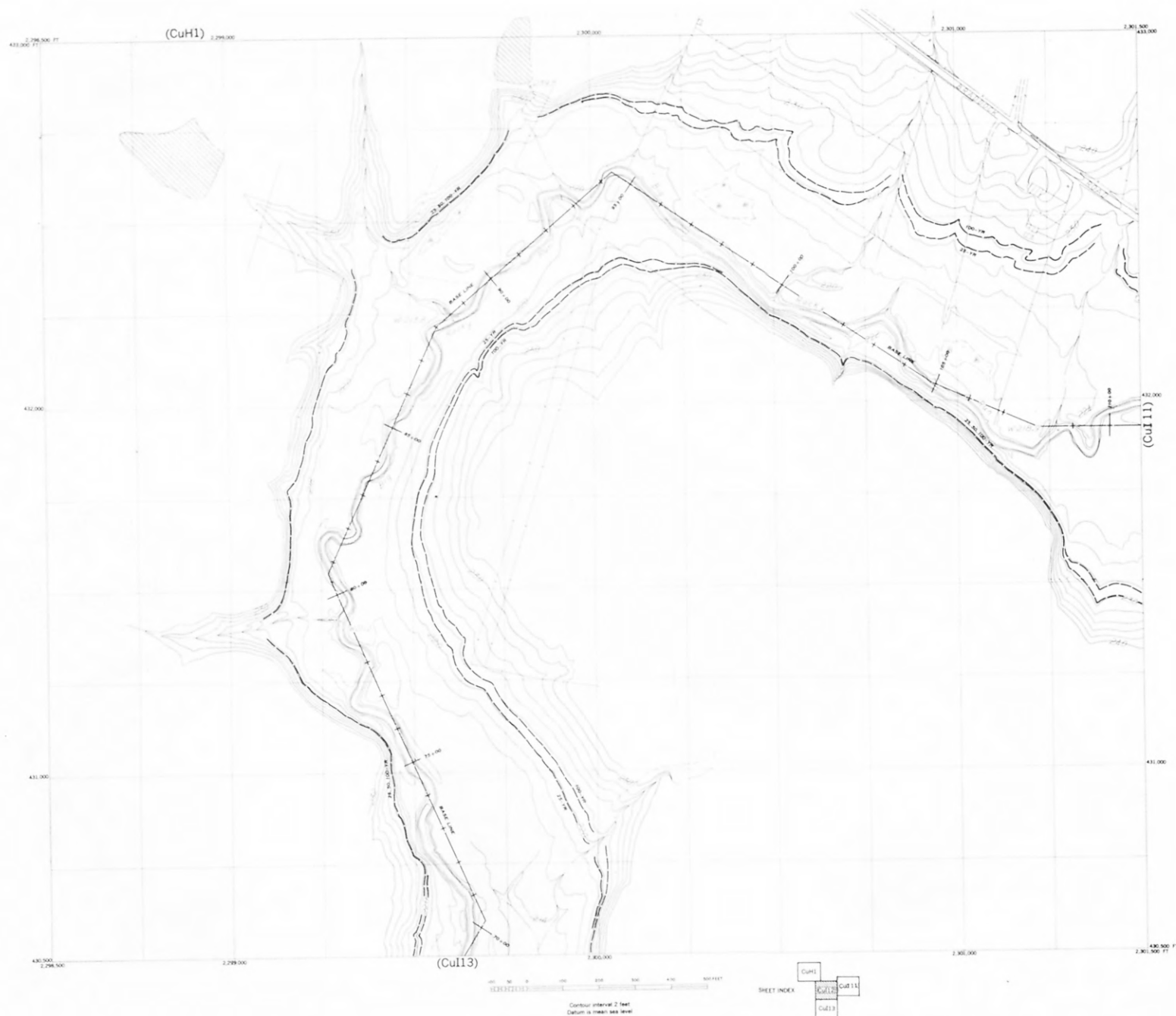


Figure 76. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-12



Figure 77. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-13

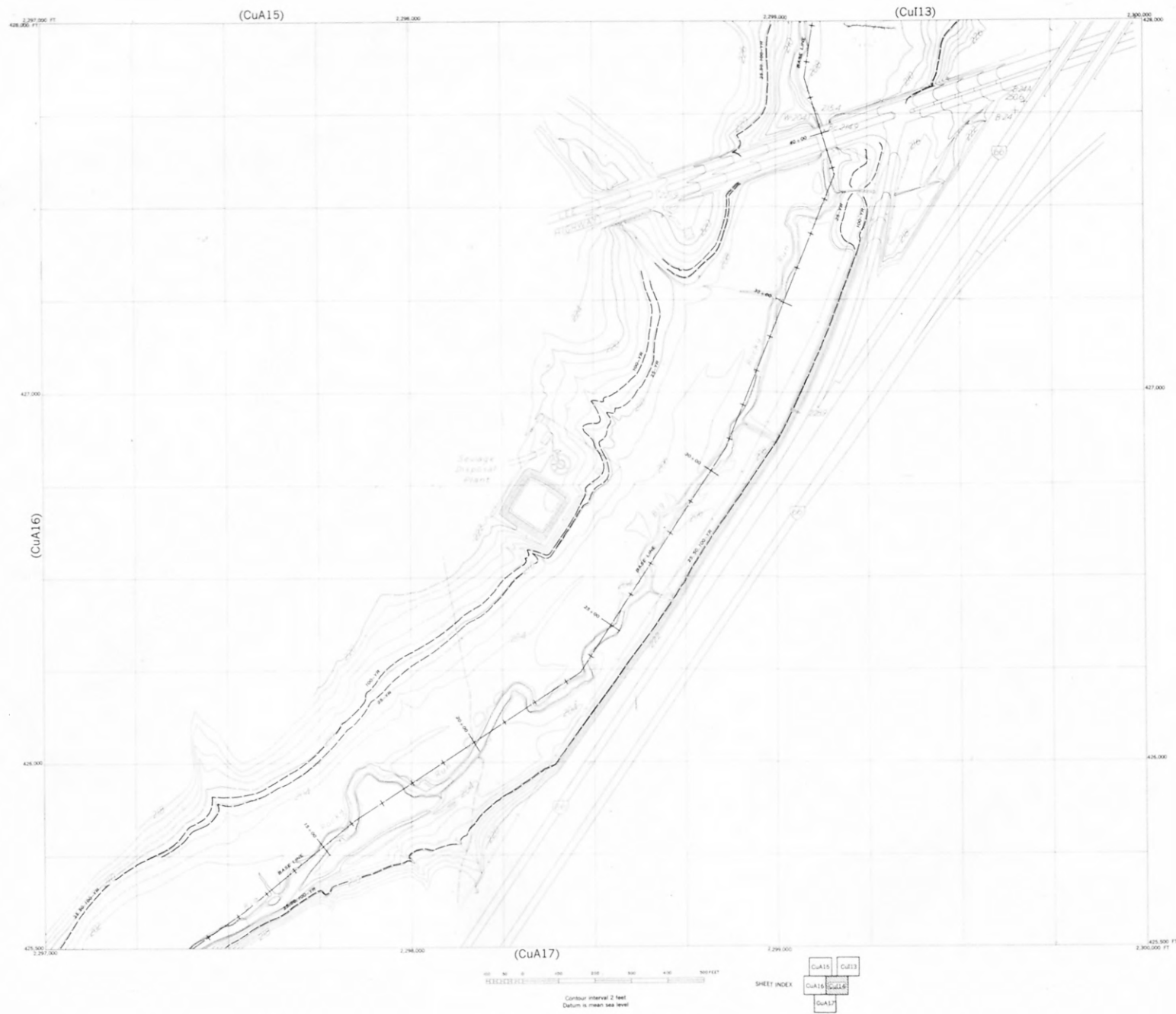


Figure 78. Topographic map of stream valley showing flood boundary delineation, Big Rocky Run; CuI-14

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