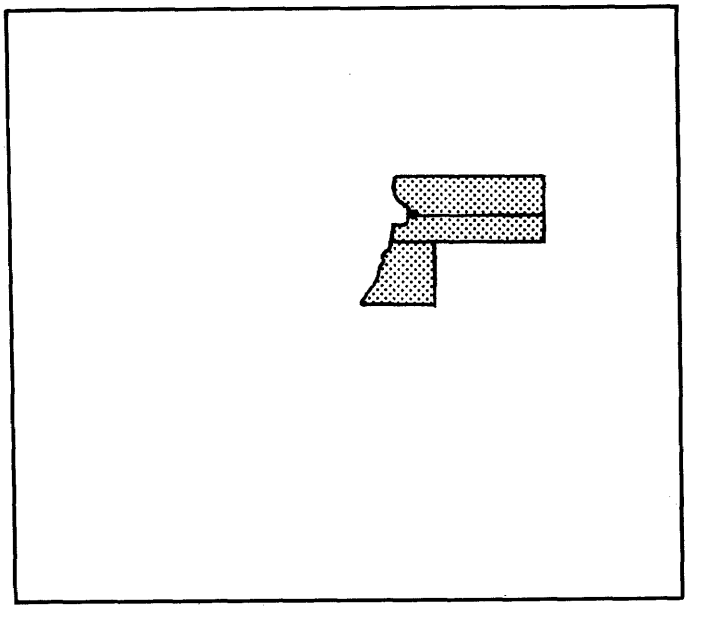
FLOOD INSURANCE STUDY

CITY OF AURORA, COLORADO

ADAMS, DOUGLAS, AND ARAPAHOE COUNTIES



SEPTEMBER 7, 1998

Federal Emergency Management Agency

COMMUNITY NUMBER - 080002

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 10.0.

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FLOOD INSURANCE STUDY
CITY OF AURORA, ADAMS, ARAPAHOE, AND DOUGLAS
COUNTIES, COLORADO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of the flood hazards in The City of Aurora and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map (FIRM) for the City of Aurora. This information will be used by the City of Aurora to update existing floodplain regulations as part of the Regular Phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

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

1.2 Authority and Acknowledgments

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

The original hydrologic and hydraulic analyses for this study were performed by Gingery Associates, Inc., Englewood, Colorado, under Contract No. H-3716. This work, which was completed in March 1977, covered all significant flooding sources affecting the City of Aurora.

The revised hydraulic analyses for portions of East Toll Gate Creek and West Toll Gate Creek were performed by Merrick and Company, Greiner Engineering, and the City of Aurora Engineering Division (References 1, 2, 3, 4, and 5).

The hydraulic analysis for a portion of Unnamed Creek was performed by Holland Corporation in 1984 (Reference 6).

1.3 Coordination

Community base map selection and the identification of streams requiring detailed study were accomplished in meetings attended by personnel of Gingery Associates, Inc., the Federal Emergency Management Agency (FEMA), and officials of the City of Aurora on December 5, 1975, and June 8, 1976. Further meetings were held with the Colorado Water Conservation Board, the Urban Drainage and Flood Control District, FEMA, Gingery Associates, Inc., and the City of Aurora on May 26, 1976, to discuss study areas and procedures.

On June 8, 1976, a meeting and field review were held to discuss and inspect the floodplains in the City of Aurora. As a direct result of the field trip, proposed studies on Side Creek, Side Creek Tributary, West Toll Gate Tributary between Hampden and Yale, and Columbia Creek were changed from a detailed analysis to an approximate floodplain delineation. This change in study scope was agreed to by FEMA, Gingery Associates, Inc., and the City of Aurora.

On May 5, 1977, the results of the work by Gingery Associates, Inc., were reviewed at a public meeting attended by personnel of Gingery Associates Inc., FEMA, and officials of the City of Aurora, Colorado. There was concern expressed over the width of the floodplain in the Morris Heights addition, just south of Peoria. Gingery Associates, Inc., reviewed the area before submitting the study.

Numerous other agencies and individuals were contacted for background information; these agencies included the Colorado Water Conservation Board (Reference 7), the Colorado Highway Department, the Union Pacific Railroad, and the U.S. Soil Conservation Service.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Aurora. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1991.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope

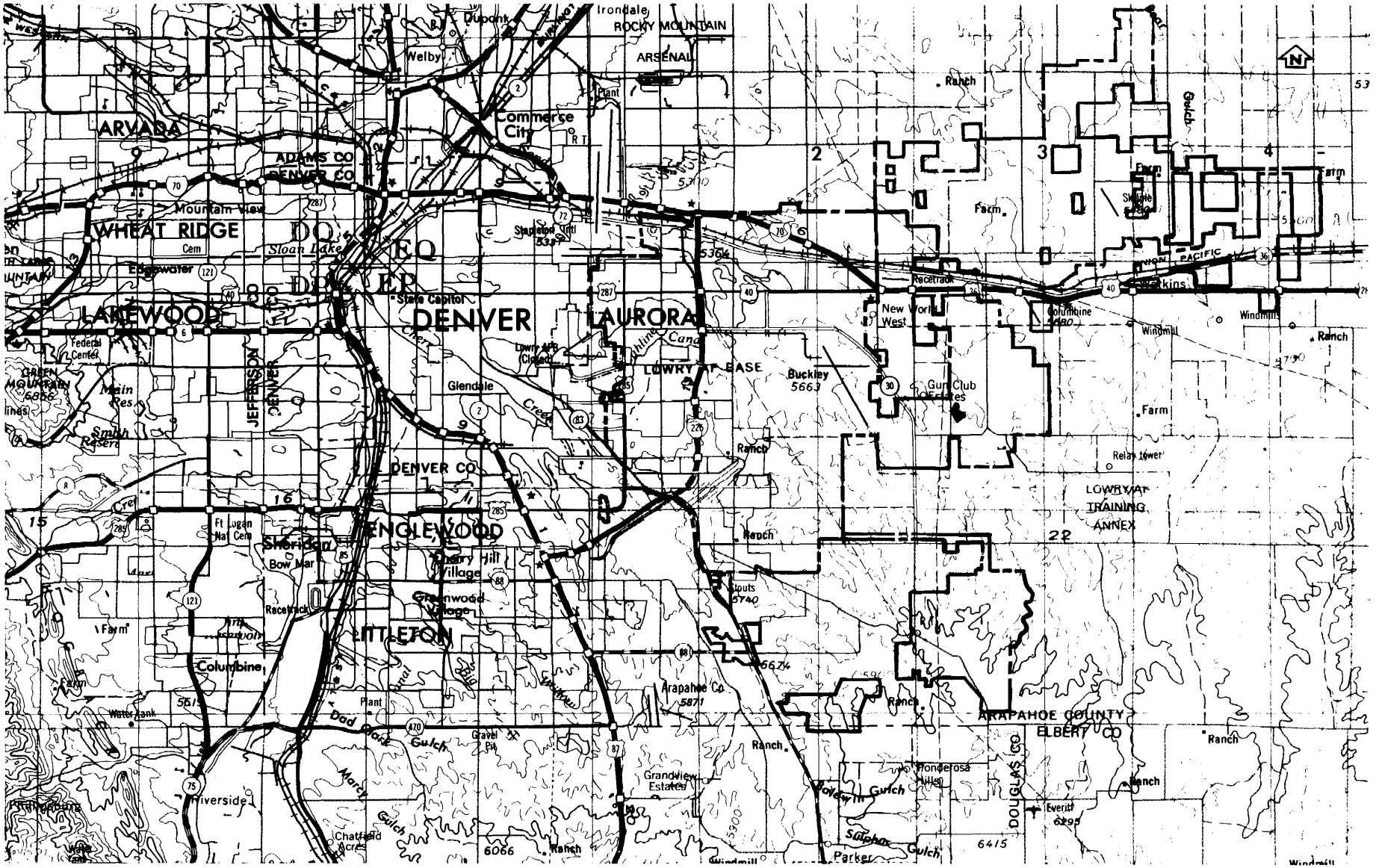


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

and methods of study were proposed to, and agreed upon by, FEMA and the City of Aurora.

The streams and drainageways studied by detailed methods include Sand Creek, Westerly Creek, Toll Gate Creek, East Toll Gate Creek, West Toll Gate Creek, Cherry Creek Spillway Drain, West Toll Gate Creek Tributary, Unnamed Creek, Sable Ditch, and Granby Ditch. The streams and drainageways studied by approximate methods include Columbia Creek, Senac Creek, Side Creek, First Creek, West Toll Gate Creek, and West Toll Gate Creek Tributary.

2.2 Community Description

The City of Aurora is located immediately east of the City and County of Denver, in the southwest corner of Adams County and the northwest corner of Arapahoe County. The city is bounded by the City and County of Denver to the west, northwest, and southwest; and the unincorporated areas of Arapahoe County to the south and east.

The City of Aurora is one of the fastest growing cities in Colorado. Its population has increased by approximately 51,800 persons from the 1970 estimate of 78,200 to the 1976 estimate of 130,000 (Reference 8). Its population in 1987 was estimated to be 220,066. The economy of the area is based on commercial and agricultural industries.

The upper portions of all streams studied, with the exception of Westerly and Sand Creeks, are relatively undeveloped. Sand Creek floodplain development consists of a mobile home park and isolated buildings. Urban development is more extensive in the lower reaches, especially in the shared floodplain of Sand and Toll Gate Creeks at their confluence. The Westerly Creek basin is heavily developed for residential and industrial uses for its entire length.

The average annual temperature in Aurora is approximately 50 degrees Fahrenheit and the average annual precipitation is 15.5 inches (Reference 9).

The streams within Aurora are intermittent, and the channel banks are typically eroded or covered with weeds and other vegetative cover. The major soil types within the floodplain consist of sandy clay loam, silt loam, sand loam, and silty clay loam to silty clay (References 10 and 11).

Sand Creek, which is the major drainageway through Aurora, flows in a northwesterly direction through the city. The channel is well defined through the study reach and has an average channel slope of 26 feet per mile.

Toll Gate Creek and West Toll Gate Creek have an average channel slope of 18 feet per mile from Interstate Highway 225

to the confluence of Unnamed Creek. Upstream from the confluence, the channel slope increases to 39 feet per mile.

The average slope of East Toll Gate Creek is 22 feet per mile. The channel averages about six feet in depth and 30 to 40 feet in width.

West Toll Gate Creek Tributary has an average channel slope of 60 feet per mile.

Unnamed Creek, a tributary of West Toll Gate Creek, has an average channel slope of 25 feet per mile. The channel is irregular in size and shape, ranging from very shallow depths to depths of approximately 6 feet; widths are from 20 to 30 feet.

Westerly Creek, Sable Ditch, and Granby Ditch have almost fully developed basins which result in more frequent flooding damages. In many places, these drainageways have been filled in or severely encroached upon, leaving little flood conveyance capacity.

2.3 Principal Flood Problems

The main causes of floods in Aurora are cloudbursts which normally occur during the months of May through August.

There have been approximately eleven floods in the Sand and Toll Gate Creek basins since 1896. These floods occurred in 1896, 1912, 1917, 1921, 1933, 1938, 1948, 1957, 1963, 1965, and 1973. The following frequencies have been assigned to historic floods: 1) 1948 flood on Sand Creek--15-year flood; 2) 1957 flood on Toll Gate Creek--35-year flood; 3) 1965 flood on Toll Gate Creek--70-year flood; and 4) 1965 flood on Sand Creek--40-year flood. The following is a documentation of the major recorded floods:

"On May 30, 1948, a localized thunderstorm dropped 8 inches of rain and hail in four hours on the lower basin of Sand and Toll Gate Creeks. Flooding resulted downstream of Colfax Avenue. Estimated discharges on Sand Creek of 7,720 cubic feet per second (cfs) and 10,500 cfs, respectively, at Colfax Avenue and at the mouth caused overbank stages from 4 to 8 feet deep. Tourist cabins near Colfax Avenue and an oil refinery near the mouth were damaged, but farms and livestock feed lots in the flood plain suffered the most. On May 8 and 9, 1957, intense rains occurred over Toll Gate Creek and the middle of Sand Creek Basin. The rains began about 11:00 p.m. on May 8 and Toll Gate Creek crested at 3:30 a.m. on May 9 at Colfax Avenue. The estimated peak discharge on Toll Gate Creek was 10,500 cfs at 6th Avenue, while 25,500 cfs was estimated for Sand Creek at Yosemite Street."

"...heavy to torrential rainfall occurred over the Sand and Toll Gate Creek Basins on June 16, 1965. Rainfall averaged between 2 to 4 inches over the Sand Creek Basin. Toll Gate Creek flow was estimated to be 17,000 cfs at 6th Avenue, and Sand Creek downstream from Toll Gate Creek was estimated to be 18,900 cfs. Nearly every bridge crossing the creeks was damaged or destroyed. The flooding caused extensive damages in the Aurora vicinity. The downstream 6 miles of Toll Gate Creek overflowed from 300 to 1,000 feet wide; the downstream 10 miles of Sand Creek flooded 500 to 1,500 feet wide. Transportation and urban damages on Sand and Toll Gate Creek was estimated at $3,060,000.00. Additional rainstorm in July of 1965 seriously hampered recovery efforts and destroyed temporary bridges" (References 12 and 13).

Photographs of historic flooding are shown in Figures 2 through 9. There is little documentation of historic floods and damage estimates on the other tributary streams within Aurora. The tributary streams have caused overland inundation of homes and streets to depths of as much as 4 to 4.5 feet, but there are no recorded discharges or damage estimates (References 12 and 14).

2.4 Flood Protection Measures

A major flood control structure in Aurora is Quincy Dam on Toll Gate Creek, which was completed in 1974. The dam and reservoir serve as a water storage facility and provide approximately 4,500 acre feet of storage for flood control. The dam controls the upper 4.5 square miles of the drainage basin (Reference 15).

There are two significant storm water detention ponds along Westerly Creek. The pond located between Alameda and Exposition, constructed in 1972, will contain approximately 67 percent of the 100-year flood. The other facility, Kelley Dam, constructed in 1953, would contain the 11-year flood, although during a large magnitude flood in excess of a 40-year flood, the pond might fail and increase flow downstream (Reference 14). Other flood protection measures consist of channel improvements on the Cherry Creek Spillway Drain and West Toll Gate Creek.

A major drainageway planning report has been completed for Sand Creek (Reference 16). This report designates various structural measures and nonstructural actions that would be appropriate for alleviating potential flood damage along this stream.

FIGURE 2 Looking North Along Peoria Street; Sand Creek Flooding Destruction in 1965 (Arden Hartzler Photograph).

FIGURE 3 Near Dallas Street and Stapelton Airport; Westerly Creek Flood of 1965 (Arden Hartzler Photograph).

FIGURE 4 View of Twisted Railroad Tracks along Toll Gate Creek Flood of June 1965 (Colorado State Historical Society Photograph).

FIGURE 5 A View of Dallas Arms Apartments; Westerly Creek Flood of 1965 (Arden Hartzler Photograph).

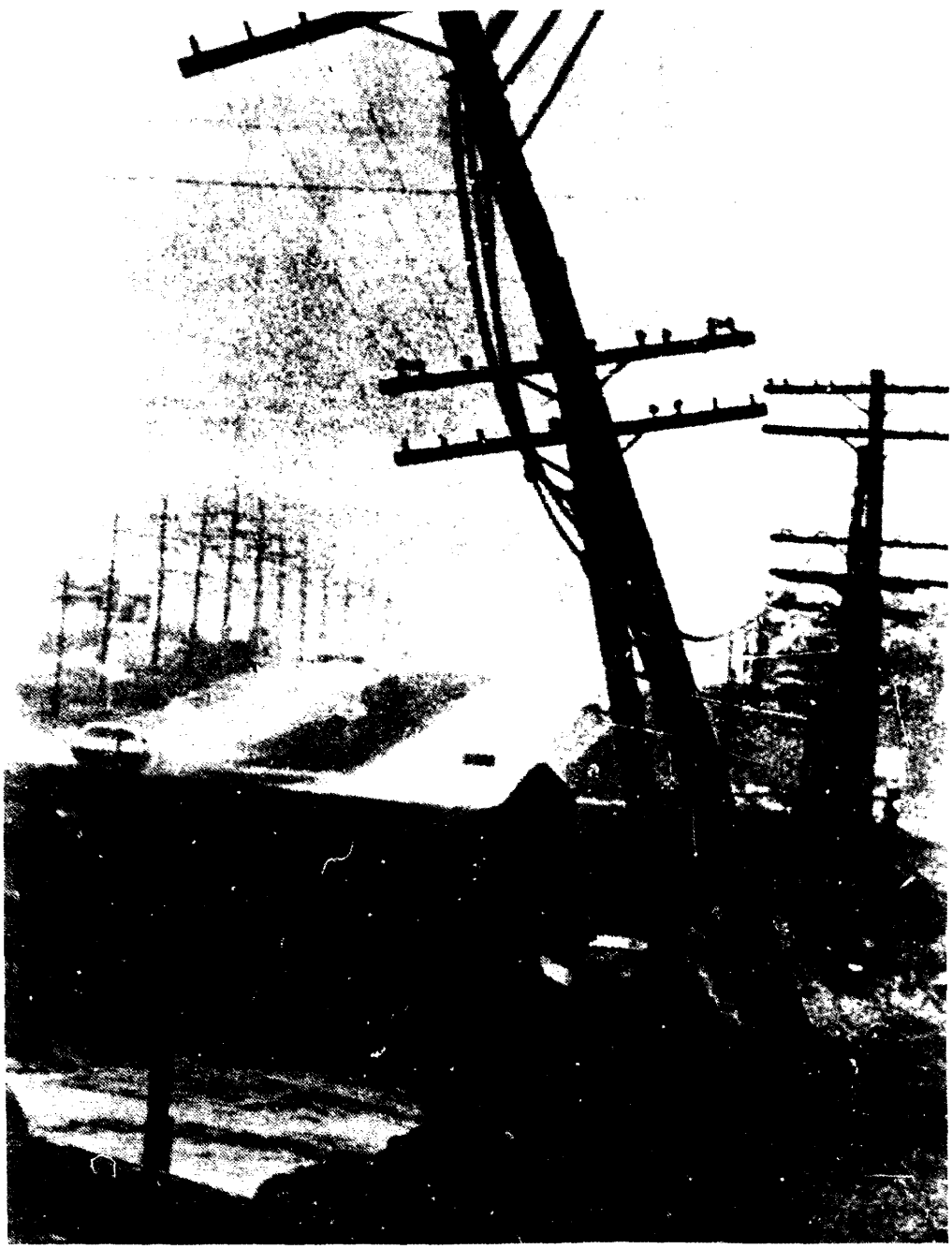


FIGURE 6 View of Sand Creek Near Colfax Avenue Bridge; Sand Creek Flood of May 1973 (Colorado State Historical Society Photograph).

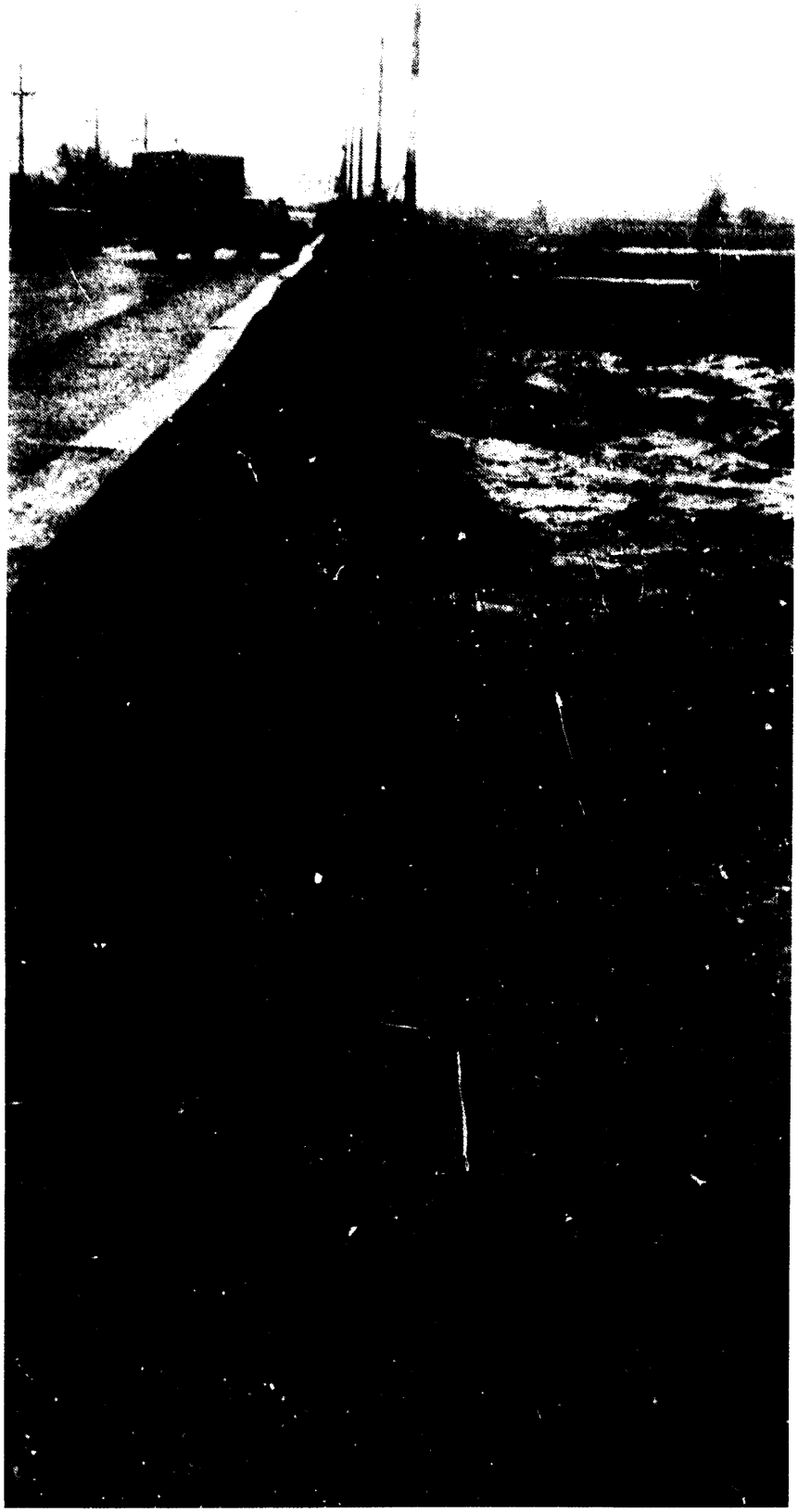


FIGURE 7 View of Sable Street Bridge as debris collects and threatens structure; Sand Creek Flood of May 9, 1973 (Colorado State Historical Society Photograph).

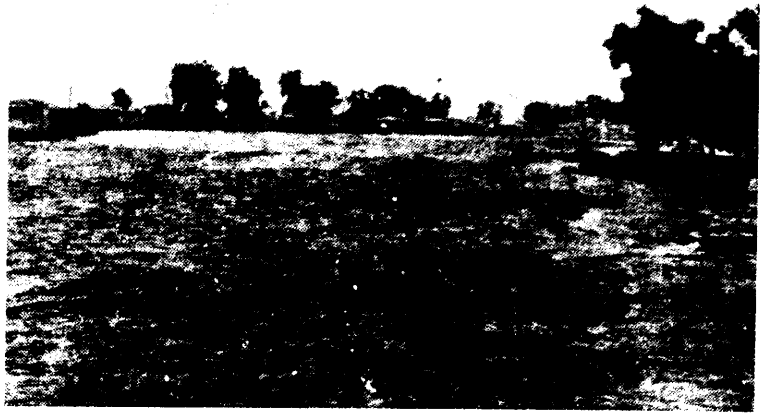


FIGURE 8 View of Toll Gate Creek near Morris Heights Area; Toll Gate Creek Flood of June 1965 (Colorado State Historical Society Photograph).

FIGURE 9 Looking North at 8th and Hannibal; Granby Ditch Flood of May 1973 (Colorado State Historical Society Photograph).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied by detailed methods in the community.

The U.S. Army Corps of Engineers (COE), Omaha District, provided the flood discharge characteristics of Sand Creek, determined as part of a Flood Control District (Reference 18). The hydrologic analysis of Sand Creek was based on the development of a surface runoff model of the Sand Creek basin using the runoff block of the Environmental Protection Agency's Storm Water Management Program (Reference 19).

Toll Gate Creek drains approximately 40 square miles at its confluence with Sand Creek and receives runoff from two major tributaries. The first tributary, West Toll Gate Creek, originates south of Quincy Dam, approximately three miles east of Cherry Creek Reservoir. The second tributary, East Toll Gate Creek, extends into Arapahoe County southeast of Buckley Air National Guard Base. Runoff calculations for the 10-, 25-, and 100-year and Standard Project Floods were made by the COE, Omaha District, for both major tributaries. The intermediate regional or 100-year flood discharges, which were computed by the COE, are given in the June 1973 Special Flood Hazard Information Report for Upper Toll Gate Creek and Tributaries (Reference 13). Discharges for the other

frequencies were obtained from the COE during the preparation of the 1973 Special Flood Hazard Information Report.

The discharges developed in 1973 by the COE for East Toll Gate Creek were used in this study. Due to the more recent construction of Quincy Dam, the discharges developed by the COE for Upper West Toll Gate Creek were reevaluated. The 500- and 100-year flood hydrographs for West Toll Gate Creek, obtained from the Omaha District office, were routed through the Quincy Dam Spillway. By routing these hydrographs through Quincy Dam the 100-year flood discharge is reduced from 4,840 cfs to 2,300 cfs; the 500-year discharge is reduced from 7,600 cfs to 5,300 cfs. Because of a perimeter channel around the reservoir with a capacity of approximately 1,000 cfs, the 50-year and 10-year flood discharges are not changed significantly from those computed for the uncontrolled condition.

Runoff predictions for the West Toll Gate Creek Tributary, the Cherry Creek Spillway Drain and Unnamed Creek were made by the COE and are represented in the 1973 Special Flood Hazard Information Report (Reference 13). The 50- and 500-year discharges were determined by extrapolating the data computed for the 10-, 25-, and 100-year floods.

The discharges for Westerly Creek were taken from the Phase A Report of the Westerly Creek Master Plan completed in January 1976, by Camp, Dresser & McKee, Inc., for the Denver Region Urban Drainage and Flood Control District (Reference 14). The Colorado Urban Hydrograph Procedure, as outlined in the Urban Storm Drainage Criteria Manual (Reference 17), was used to determine the peak discharges for the 2-, 10-, and 100-year storms. The 50- and 500-year discharges were determined by interpolating and extrapolating the data computed for the 2-, 10-, and 100-year floods.

The discharges for Sable and Granby Ditches were determined utilizing the Colorado Urban Hydrograph Procedure, as outlined in the Urban Storm Drainage Criteria Manual (Reference 17). Peak discharges were determined for the 10- and 100-year floods. The 50- and 500-year discharges were estimated by assuming a straight line log probability relationship between the 10- and 100-year floods.

Frequency-discharge drainage-area data for the above-mentioned streams are shown in Table 1.

Discharges used for the approximate studies of Side Creek Tributary, and Columbia Creek were taken from the drainage area discharge relationship developed from the COE information on East Toll Gate Creek.

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Cherry Creek Spillway Drain					
At Mouth	1.9	610	2,100	3,180	7,700
First Creek					
At a Point Upstream of Smith Road	--[1]	1,930	--[1]	4,000	--[1]
Granby Ditch					
At Mouth	3.74	1,800	2,460	2,775	3,450
At a Point Above Sable Ditch Confluence	2.28	935	1,280	1,445	1,800
At Colfax Avenue	1.96	800	1,200	1,380	1,710
At Laredo Street	1.38	675	950	1,085	1,380
Sable Ditch					
At a Point Above Granby Ditch Confluence	1.46	910	1,250	1,405	1,760
At Colfax Avenue	1.02	730	1,030	1,030	1,410
Sand Creek					
At Mouth of Toll Gate Creek	147.00	10,000	22,000	29,000	55,000
At Colfax Avenue	97.00	6,700	15,900	21,500	45,000
Toll Gate Creek					
At Mouth	41.0	4,400	15,500	24,000	57,000
At East 6th Avenue	34.7	4,050	13,900	21,200	52,000

[1]Not available

Table 1. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
East Toll Gate Creek					
At a Point Above West Toll Gate Creek	10.8	1,420	4,800	7,500	18,500
At Confluence of Side Creek	8.9	1,600	5,400	8,100	19,300
West Toll Gate Creek Tributary					
At Mouth	2.6	610	1,950	3,100	7,400
Unnamed Tributary					
At Mouth	6.1	1,150	3,900	6,000	14,200
Westerly Creek					
At Mouth	--[1]	3,680	5,780	6,790	9,150
At Colfax Avenue	--[1]	570	870	1,000	1,320
At Havana Street	6.9	--[1]	--[1]	2,050	--[1]
Westerly Creek Overflow					
At Confluence with Westerly Creek	--[1]	--[1]	--[1]	471	--[1]
West Toll Gate Creek					
At East Mississippi Avenue	17.9	2,950	10,000	15,200	37,000
At a Point Below West Toll Gate Creek Tributary	16.9	2,800	9,400	14,400	35,000
At Buckley Road	14.8	2,150	7,300	11,200	27,400
At a Point Below Unnamed Creek	13.1	1,100	3,650	5,900	14,000
At East Quincy Avenue	4.5	1,100	3,650	4,500	14,000

[1]Not available

Table 1. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Cherry Creek					
At Downstream Limit of Study	340	10,300	31,000	51,000	150,000
At Upstream Limit of Study	169	3,300	9,300	13,300	63,000
First Creek					
Upstream of Smith Road	--[1]	1,930	--[1]	4,000	--[1]

[1]Not available

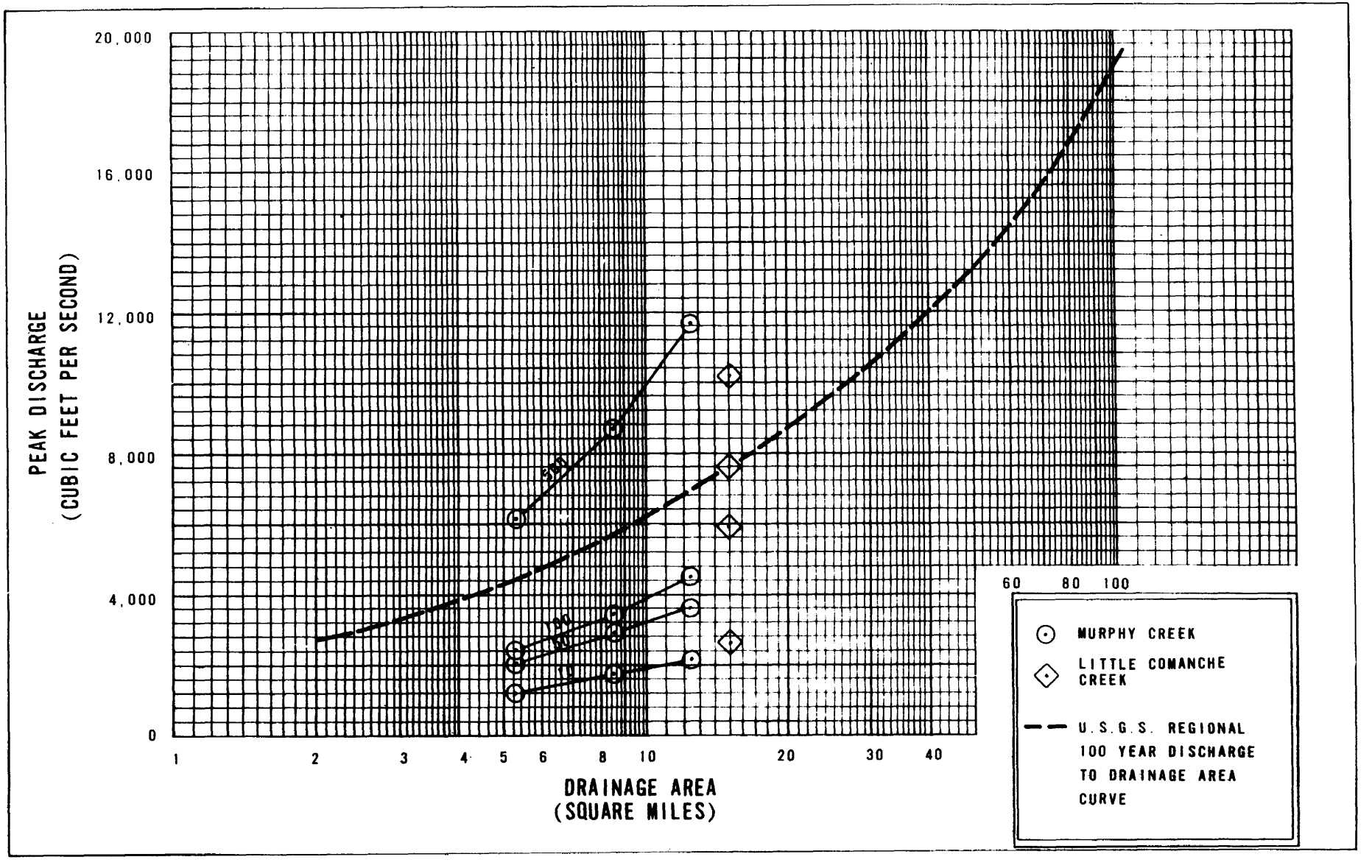


FIGURE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

MURPHY CREEK, LITTLE COMANCHE CREEK

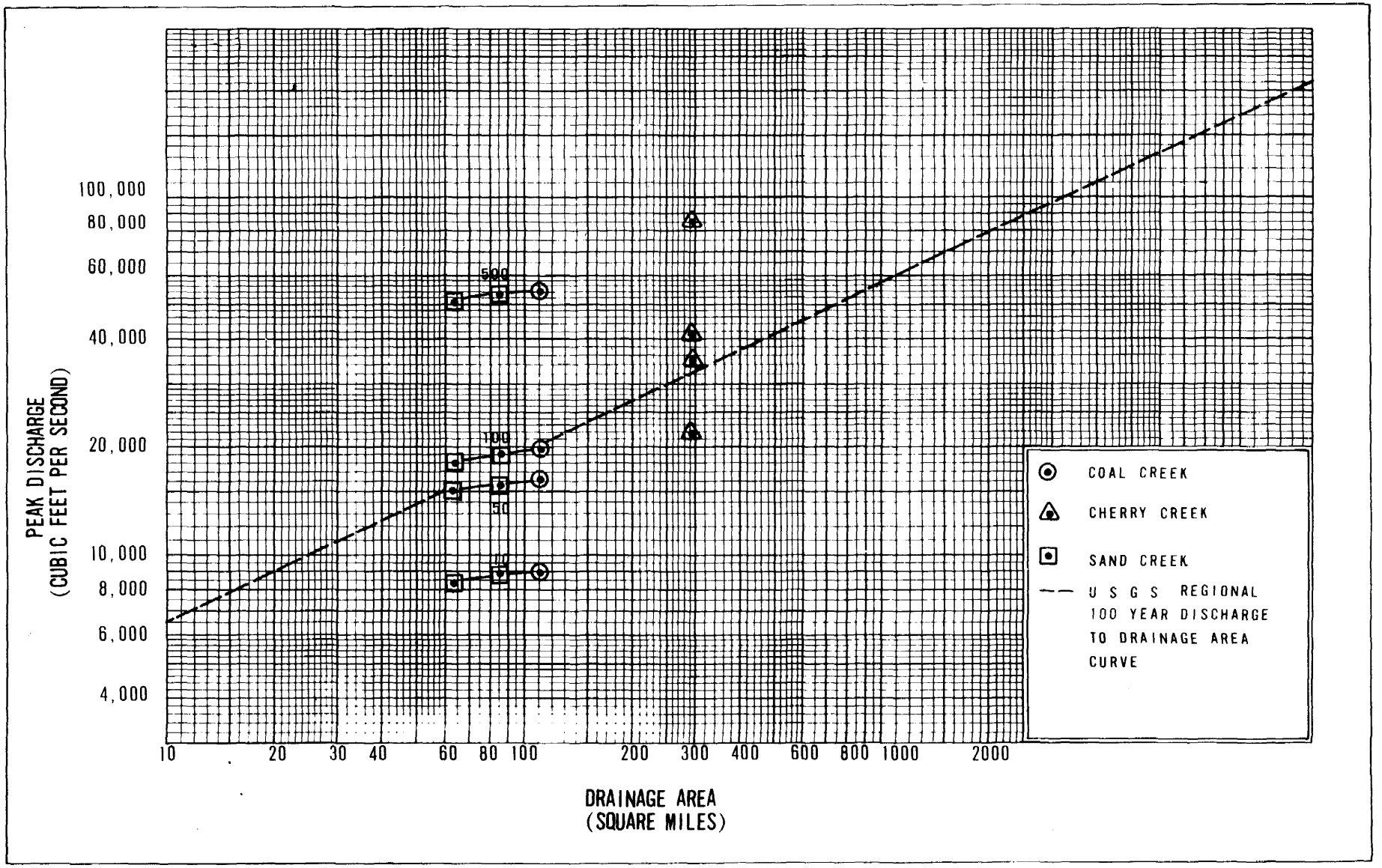


FIGURE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

COAL CREEK, CHERRY CREEK, SAND CREEK

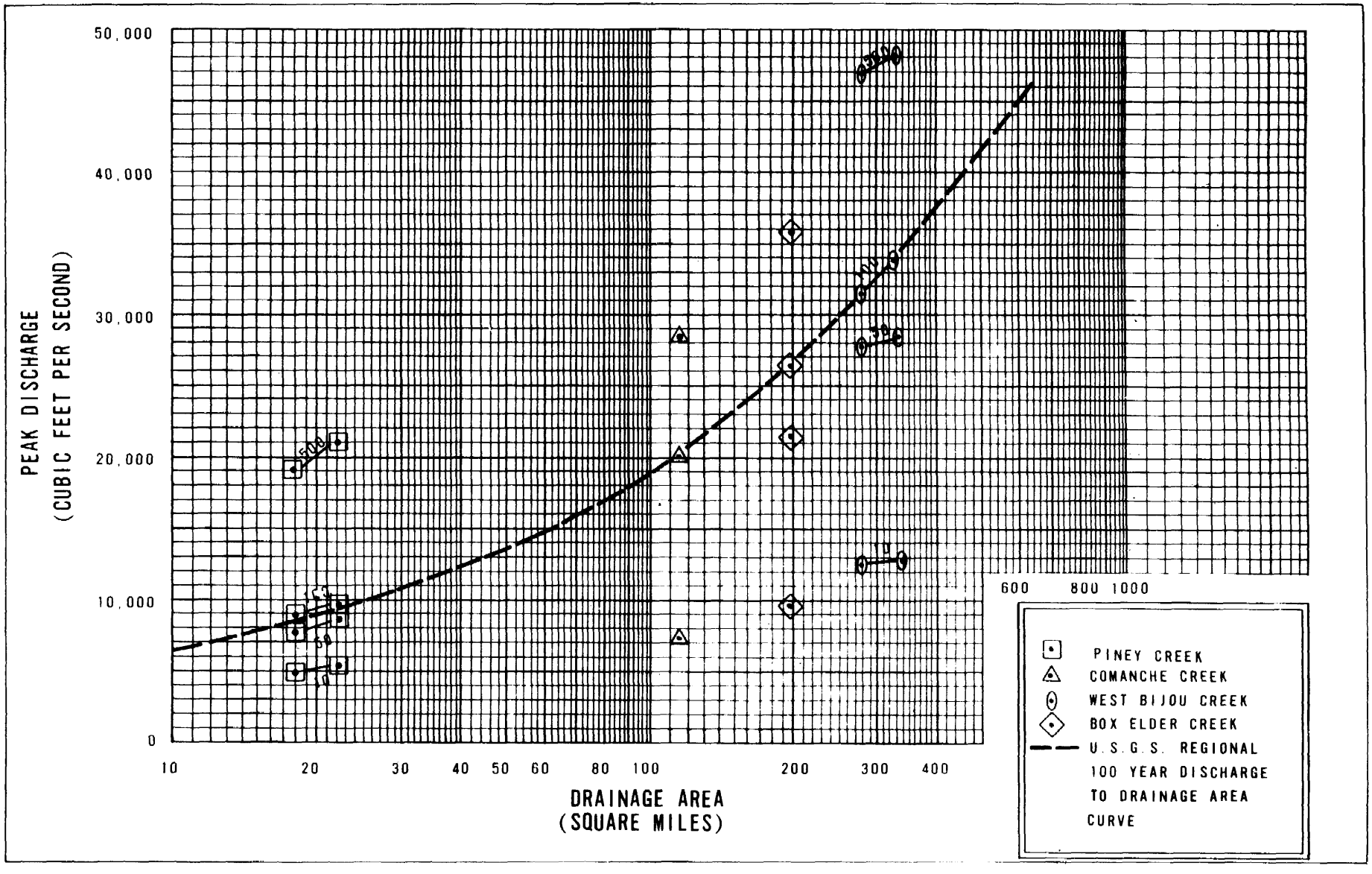


FIGURE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

PINEY CREEK , COMANCHE CREEK
WEST BIJOU CREEK , BOX ELDER CREEK

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for Sand Creek were taken from topographic maps at a scale of 1:1200 (Reduced to 1:6,000), with a contour interval of 2 feet (Reference 20). Toll Gate Creek cross sections were taken from 1:1,200 scale (reduced to 1:2,400), 2-foot contour interval topographic maps, and were supplemented with field cross sections (References 21 and 22).

The West Toll Gate Creek and East Toll Gate Creek cross section data were taken from topographic maps at a scale of 1:1,200 (reduced to 1:2,400), with a contour interval of 2 feet (Reference 22), and were supplemented with field cross sections in areas of new developement. The West Toll Gate Tributary, Cherry Creek Spillway, and Unnamed Creek cross section data were obtained by field survey. The cross section data for Westerly Creek were taken from topographic maps at a scale of 1:1,200 (reduced to 1:6,000), with a contour interval of 2 feet (Reference 23). The cross section data for Sable Ditch, Sable Ditch Overflow, and Granby Ditch were taken from topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (Reference 24). All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

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

Roughness coefficients (Manning's "n") for all streams studied were estimated by field inspection. Roughness values used for the channels ranged from .025 to .050 and from .030 to .070 for the overbanks.

Water-surface profiles were developed using the HEC-2 Computer Step-Backwater Model (Reference 25). Profiles were determined for the 10-, 50-, 100-, and 500-year floods and are shown in Exhibit 1.

The approximate studies for Columbia Creek, Side Creek, and West Toll Gate Creek Tributary between Yale and Hampden were developed using normal depth calculations. This analysis consisted of obtaining cross section data from U.S. Geological Survey topographic maps, aerial topographic maps, and using Manning's equation to develop elevation discharge curves.

The shallow flooding areas were determined using topographic mapping and field reconnaissance (References 20-24, 26).

Hydraulic analyses for portions of First Creek and Senac Creek were performed using topographic maps at a scale of 1:2,400, with a contour interval of 10 feet (Reference 27). Field surveyed cross sections were used and normal-depth calculations were performed in order to obtain top widths at the selected cross sections.

A revised hydraulic analysis was performed for a reach of West Toll Gate Creek between Chambers Road and a point approximately 1,600 feet downstream (Reference 28). As a result of the channel improvements along this reach, the 100-year flood is contained within the channel. This improvement was the basis for a Letter of Map Revision issued on July 19, 1988.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study and their descriptions are shown on the Flood Insurance Rate Map.

4.0 FLOODPLAIN MANAGEMENT APPLICATION

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (References 21 and 22).

The boundaries for Sand Creek and Westerly Creek were interpolated using topographic maps at a scale of 1:6,000, with contour intervals of 2 feet (References 20, 23, and 24). The floodplain boundaries for Cherry Creek Spillway and Unnamed Creek were interpolated by field survey spot

elevations, and the use of topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 23). Planimetric features for Cherry Creek Spillway and Unnamed Creek were obtained from the City of Aurora Quarter Section Plat Book. Some areas of shallow flooding were interpolated using topographic maps at a scale of 1:24,000, with contour intervals of 10 feet (Reference 26).

The 100- and 500-year floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundary are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the FIRM (Exhibit 2). The top widths were obtained from elevation-discharge curves and were plotted at selected cross section locations and the 100-year floodplain boundaries were interpolated using topographic maps (Reference 26). The approximate 100-year floodplain boundary for First Creek was delineated from the information contained in the Phase A report, Aurora Water and Drainage of First Creek, (Reference 29).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this table 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. The results of the floodway computations are tabulated at selected cross sections (Table 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 13.

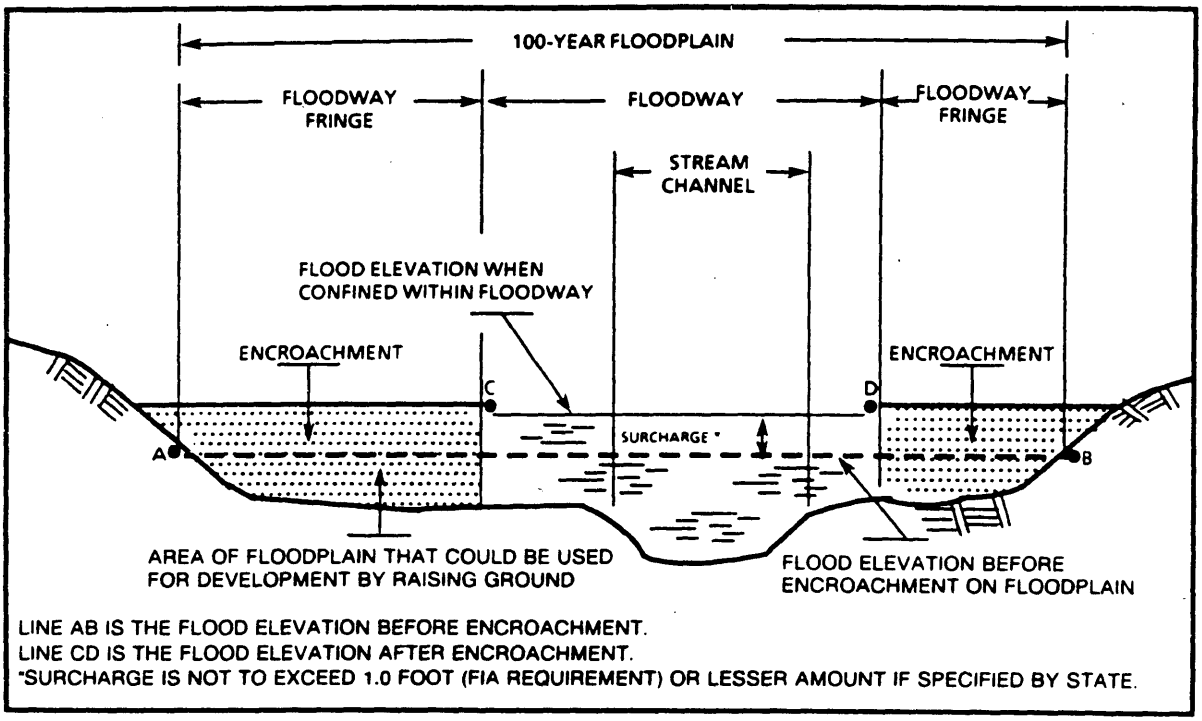


Figure 13. Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
East Toll Gate Creek								
A	1,500	361	992	8.3	5,410.4	5,410.4	5,410.6	0.2
B	2,520	140	1,044	7.8	5,416.9	5,416.9	5,417.0	0.1
C	3,695	120	733	11.0	5,422.2	5,422.2	5,422.9	0.7
D	4,250	55	628	12.9	5,424.0	5,424.0	5,424.3	0.3
E	4,940	120	1,803	4.5	5,431.5	5,431.5	5,431.5	0.0
F	5,890	115	609	13.3	5,433.4	5,433.4	5,433.4	0.0
G	7,300	493	2,163	3.8	5,446.2	5,446.2	5,446.2	0.0
H	8,500	344	1,762	4.6	5,451.2	5,451.2	5,451.2	0.0
I	9,700	131	643	12.6	5,462.1	5,462.1	5,462.1	0.0
J	11,100	374	891	9.1	5,471.3	5,471.3	5,471.8	0.5
K	11,900	309	1,434	5.6	5,477.9	5,477.9	5,478.7	0.8
L	13,040	370	1,763	4.6	5,487.4	5,487.4	5,487.5	0.1
M	13,625	418	898	9.0	5,491.4	5,491.4	5,491.4	0.0
N	14,300	368	1,389	5.8	5,497.4	5,497.4	5,498.3	0.9
O	14,500	492	1,270	6.2	5,499.0	5,499.0	5,499.9	0.9
P	15,150	262	1,173	6.5	5,501.5	5,501.5	5,502.2	0.7
Q	16,675	70	479	14.8	5,510.7	5,510.7	5,510.7	0.0

[1]Feet Above Confluence With West Toll Gate Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

EAST TOLL GATE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
West Toll Gate Creek								
AB	19,824	800	2,450	4.4	5,409.8	5,409.8	5,409.8	0.0
AC	21,044	510	3,390	5.0	5,413.6	5,413.6	5,413.6	0.0
AD	23,184	740	2,730	5.6	5,422.8	5,422.8	5,422.8	0.0
AE	23,594	1,110	5,110	3.0	5,427.0	5,427.0	5,427.3	0.3
AF	24,654	430	2,620	5.8	5,430.5	5,430.5	5,430.5	0.0
AG	26,274	860	2,373	6.4	5,441.1	5,441.1	5,441.1	0.0
AH	31,950	142	1,372	11.1	5,472.5	5,472.5	5,472.5	0.0
AI	32,105	152	1,080	14.1	5,471.9	5,471.9	5,471.9	0.0
AJ	32,495	220	1,662	9.1	5,475.5	5,475.5	5,475.5	0.0
AK	33,800	223	1,627	9.3	5,478.3	5,478.3	5,478.3	0.0
AL	35,202	234	1,886	8.1	5,481.5	5,481.5	5,481.5	0.0
AM	35,445	119	1,101	13.8	5,481.8	5,481.5	5,481.5	0.0
AN	35,491	235	2,350	6.5	5,489.0	5,489.0	5,489.0	0.0
AO	35,927	441	2,692	5.6	5,489.7	5,489.7	5,489.7	0.0
AP	36,310	826	3,109	4.9	5,501.3	5,501.3	5,501.3	0.0
AQ	36,540	648	2,233	6.8	5,502.0	5,502.0	5,502.0	0.0
AR	37,111	613	2,119	9.2	5,505.6	5,505.6	5,505.6	0.0
AS	38,103	704	2,012	12.6	5,512.1	5,512.1	5,512.1	0.0
AT	38,511	549	2,014	11.7	5,513.6	5,513.6	5,513.6	0.0
AU	39,333	342	1,910	11.2	5,517.3	5,517.3	5,517.3	0.0
AV	40,123	149	884	16.4	5,518.6	5,518.6	5,518.6	0.2
AW	40,609	258	1,008	12.5	5,524.9	5,524.9	5,524.9	0.0
AX	41,009	142	881	12.7	5,529.0	5,529.0	5,529.0	0.0
AY	41,455	158	763	14.7	5,531.5	5,531.5	5,531.5	0.0
AZ	42,705	284	881	12.7	5,535.9	5,535.9	5,535.9	0.0

[1]Feet Above Confluence With Sand Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

WEST TOLL GATE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
West Toll Gate Creek (Cont'd)								
BA	43,358.5	78	431	26.0	5,537.5	5,537.5	5,537.5	0.0
BB	44,208.5	321	826	13.6	5,545.3	5,545.3	5,545.3	0.0
BC	45,508.5	296	815	13.7	5,551.6	5,551.6	5,551.6	0.0
BD	46,938.5	103	245	22.9	5,566.7	5,566.7	5,566.7	0.0
BE	48,438.5	96	238	22.4	5,578.3	5,578.3	5,578.3	0.0
BF	49,938.5	47	208	23.0	5,589.6	5,589.6	5,589.6	0.0
BG	51,583.5	100	335	13.4	5,604.2	5,604.2	5,604.2	0.0
BH	52,439.5	274	712	6.3	5,612.1	5,612.1	5,612.1	0.0
BI	53,939.5	344	948	4.7	5,624.7	5,624.7	5,624.7	0.0
BJ	55,739.5	148	615	7.3	5,639.1	5,639.1	5,639.1	0.0
BK	56,239.5	368	1,724	2.6	5,645.8	5,645.8	5,645.8	0.0
BL	57,239.5	223	518	8.7	5,647.5	5,647.5	5,647.5	0.0
BM	58,239.5	72	354	12.7	5,658.0	5,658.0	5,658.0	0.0

[1]Feet Above Confluence With Sand Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

WEST TOLL GATE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
West Toll Gate Creek Tributary								
A	776	126	334	9.3	5,523.3	5,523.3	5,523.3	0.0
B	3,750	169	1,069	2.3	5,570.9	5,570.9	5,570.9	0.0
C	4,040	224	1,195	2.0	5,571.0	5,571.0	5,571.0	0.0

[1]Feet Above Confluence With West Toll Gate Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

WEST TOLL GATE TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Westerly Creek								
A	7,000	1,670	7,146	0.3	5,306.1	5,306.1	5,306.1	0.0
B	7,620	275	2,285	1.7	5,306.1	5,306.1	5,306.1	0.0
C	10,000	363	1,993	1.2	5,313.8	5,313.8	5,314.7	0.9
D	11,500	165	254	3.8	5,319.3	5,319.3	5,319.8	0.5
E	13,774	85	50	0.3	5,330.6	5,330.6	5,330.6	0.0
F	29,400	347	738	2.8	5,431.7	5,431.7	5,432.5	0.8
G	30,360	377	349	4.7	5,441.5	5,441.5	5,441.6	0.1
H	30,710	105	191	6.8	5,442.4	5,442.4	5,442.4	0.0
I	31,410	294	245	4.9	5,459.7	5,459.7	5,459.7	0.0
J	31,650	150	300	5.5	5,469.0	5,469.0	5,469.0	0.0
K	34,645	32	152	2.9	5,469.0	5,469.0	5,469.0	0.0

[1]Feet Above Mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

WESTERLY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Box Elder Creek								
A	284,000	3,381	9,776	7.9	5,512.3	5,512.3	5,512.3	0.0
B	285,005	2,293	4,393	6.1	5,516.3	5,516.3	5,516.3	0.0
C	286,255	2,147	6,777	3.9	5,522.2	5,522.2	5,522.2	0.0
D	286,755	501	2,205	11.9	5,525.2	5,525.2	5,525.2	0.0
E	286,925	513	2,761	9.5	5,529.0	5,529.0	5,529.0	0.0
F	287,075	467	2,748	9.5	5,530.1	5,530.1	5,530.1	0.0
G	288,585	3,198	10,031	2.6	5,536.7	5,536.7	5,536.7	0.0
H	290,085	672	2,401	10.9	5,547.5	5,547.5	5,547.5	0.0

[1]Feet Above Mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

BOX ELDER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Cherry Creek Spillway Drain								
A	1,775	323	306	10.4	5,521.7	5,521.7	5,521.7	0.0
B	3,140	164	1,030	2.4	5,558.7	5,558.7	5,558.8	0.1
C	3,780	175	322	7.1	5,572.5	5,572.5	5,572.5	0.0
D	4,030	68	180	9.3	5,588.9	5,588.9	5,588.9	0.0
E	5,632	149	341	4.6	5,612.1	5,612.1	5,612.1	0.0

[1]Feet Above Confluence With West Toll Gate Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

CHERRY CREEK SPILLWAY DRAIN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Granby Ditch								
A	315	190	228	5.8	5,346.5	5,346.5	5,346.5	0.0
B	500	115	392	3.7	5,347.6	5,347.6	5,347.9	0.3
C	807	49	177	8.2	5,348.3	5,348.3	5,348.3	0.0
D	1,328	90	422	3.4	5,350.0	5,350.0	5,350.5	0.5
E	1,680	100	415	3.5	5,350.3	5,350.3	5,350.8	0.5
F	1,782	175	221	5.7	5,350.8	5,350.8	5,351.2	0.4
G	2,370	232	384	3.5	5,355.1	5,355.1	5,356.1	1.0
H	3,170	270	410	3.3	5,359.2	5,359.2	5,359.7	0.5
I	3,878	160	308	4.5	5,364.8	5,364.8	5,365.4	0.6
J	4,570	265	232	6.0	5,371.2	5,371.2	5,371.2	0.0
K	5,240	560	330	4.1	5,380.1	5,380.1	5,380.2	0.1
L	5,735	310	288	4.6	5,387.1	5,387.1	5,387.1	0.0
M	5,884	125	189	7.2	5,387.6	5,387.6	5,387.6	0.0
N	7,012	168	220	6.2	5,394.5	5,394.5	5,394.5	0.0
O	7,473	42	170	8.0	5,399.8	5,399.8	5,399.8	0.0
P	7,694	37	180	7.2	5,401.2	5,401.2	5,401.2	0.0
Q	7,775	109	253	4.3	5,402.2	5,402.2	5,402.2	0.0
R	8,354	62	131	8.3	5,406.2	5,406.2	5,406.2	0.0
S	8,433	135	441	2.5	5,407.4	5,407.4	5,407.4	0.0
T	8,512	89	315	3.5	5,407.4	5,407.4	5,407.4	0.0
U	8,798	83	154	6.8	5,407.6	5,407.6	5,407.6	0.0
V	8,958	145	177	6.5	5,410.2	5,410.2	5,410.2	0.0
W	9,246	133	175	6.6	5,415.0	5,415.0	5,415.0	0.0
X	9,840	165	214	5.4	5,421.1	5,421.1	5,421.1	0.0
Y	10,650	90	406	2.7	5,426.8	5,426.8	5,426.8	0.0
Z	11,150	200	366	2.9	5,429.2	5,429.2	5,429.3	0.1
AA	11,193	146	173	6.6	5,429.2	5,429.2	5,429.2	0.0
AB	11,420	140	363	3.2	5,430.7	5,430.7	5,430.7	0.0

[1]Feet Above Confluence With Sable Ditch

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

GRANBY DITCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Granby Ditch (Cont'd)								
AC	11,788	490	304	3.8	5,431.8	5,431.8	5,431.8	0.0
AD	12,022	790	2,802	0.4	5,445.1	5,445.1	5,445.1	0.0
AE	12,167	569	2,201	0.5	5,445.1	5,445.1	5,445.1	0.0
AF	12,540	260	996	1.1	5,445.1	5,445.1	5,445.1	0.0
AG	12,996	140	402	2.7	5,445.2	5,445.2	5,445.2	0.0
AH	13,152	120	512	2.1	5,449.2	5,449.2	5,449.2	0.0

[1]Feet Above Confluence With Sable Ditch

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

GRANBY DITCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Sable Ditch								
A	400	35	124	7.7	5,342.8	5,342.8	5,342.8	0.0
B	1,120	90	261	4.9	5,346.5	5,346.5	5,346.7	0.2
C	2,080	87	191	9.4	5,354.4	5,354.4	5,354.4	0.0
D	2,665	18	177	7.6	5,367.3	5,367.3	5,367.3	0.0
E	2,987	30	140	9.7	5,372.3	5,372.3	5,372.3	0.0
F	3,520	32	189	7.0	5,375.4	5,375.4	5,375.4	0.0
G	4,010	29	117	11.4	5,375.8	5,375.8	5,375.9	0.1
H	4,585	28	113	11.4	5,384.1	5,384.1	5,384.1	0.0
I	5,400	32	197	6.4	5,391.2	5,391.2	5,391.2	0.0
J	5,870	29	117	10.8	5,392.9	5,393.5	5,393.5	0.0
K	6,410	70	91	6.5	5,403.9	5,403.9	5,404.4	0.5
L	7,120	30	128	9.6	5,406.8	5,406.8	5,406.8	0.0
M	7,485	30	128	9.3	5,408.7	5,408.7	5,409.5	0.8
N	8,865	30	155	7.4	5,416.8	5,416.8	5,416.8	0.0
O	9,505	28	113	10.2	5,418.9	5,418.9	5,419.3	0.4
P	9,810	28	112	10.3	5,420.1	5,420.1	5,420.1	0.0

[1]Feet Above Confluence With Toll Gate Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

SABLE DITCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Sand Creek								
A	36,760	764	4,492	6.5	5,296.6	5,296.6	5,296.7	0.1
B	39,510	336	2,939	9.9	5,309.8	5,309.8	5,309.8	0.0
C	41,285	618	3,289	8.9	5,317.6	5,317.6	5,317.6	0.0
D	42,340	447	3,140	9.3	5,322.8	5,322.8	5,322.8	0.0
E	43,070	160	1,565	13.7	5,325.1	5,325.1	5,325.1	0.0
F	46,390	176	1,620	13.3	5,344.7	5,344.7	5,344.7	0.0
G	47,670	206	2,305	9.3	5,350.9	5,350.9	5,350.9	0.0
H	48,970	344	2,184	9.8	5,363.7	5,363.7	5,363.7	0.0
I	50,175	157	1,604	13.4	5,370.7	4,370.7	5,370.7	0.0
J	51,785	414	3,500	6.1	5,380.1	5,380.1	5,380.1	0.0
K	52,890	510	2,448	8.8	5,383.9	5,383.9	5,383.9	0.0
L	56,485	620	3,131	6.9	5,397.8	5,397.8	5,398.8	1.0
M	58,170	150	1,285	16.7	5,409.3	5,409.3	5,409.4	0.1
N	60,810	192	2,070	10.4	5,420.9	5,420.9	5,420.9	0.0
O	62,760	375	3,336	6.4	5,432.7	5,432.7	5,432.8	0.1
P	64,000	373	2,248	9.6	5,436.2	5,436.2	5,436.3	0.1
Q	65,160	550	4,650	3.9	5,439.4	5,439.4	5,439.5	0.1
R	66,140	398	1,848	9.9	5,440.6	5,440.6	5,440.8	0.2
S	68,025	317	1,477	12.4	5,450.4	5,450.4	5,450.4	0.0
T	68,640	326	2,530	7.3	5,455.7	5,455.7	5,455.7	0.0
U	69,350	507	2,840	6.5	5,557.7	5,457.7	5,457.8	0.1
V	70,065	340	2,274	8.1	5,461.9	5,461.9	5,462.1	0.2
W	72,230	810	3,695	5.0	5,473.0	5,473.0	5,473.4	0.4
X	75,010	1,394	4,500	4.1	5,486.0	5,486.0	5,486.0	0.0

[1]Feet Above Mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

SAND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Toll Gate Creek								
A-X[2]								
Y	15,100	171	2,150	9.9	5,395.4	5,395.4	5,396.4	1.0
Z	16,620	146	1,478	14.3	5,400.2	5,400.2	5,400.8	0.6
AA	18,860	427	3,281	6.5	5,407.9	5,407.9	5,408.5	0.6

[1]Feet Above Confluence With Sand Creek
[2]Floodway Contained in Channel - No Floodway Data Produced

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

TOLL GATE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Cherry Creek								
A	78,085	677/400[2]	5,452	9.4	5,620.0	5,620.0	5,620.7	0.7
B	78,855	717	5,313	9.5	5,623.7	5,623.7	5,624.3	0.6
C	79,135	571	4,853	10.4	5,625.4	5,625.4	5,626.1	0.7
D	79,945	1,344	10,546	4.8	5,629.5	5,629.5	5,630.5	1.0
E	80,540	1,053	8,462	5.9	5,630.8	5,630.8	5,631.6	0.8
F	81,475	1,362	7,945	6.3	5,633.8	5,633.8	5,634.6	0.8
G	81,930	1,087	5,481	9.2	5,635.8	5,635.8	5,636.5	0.7
H	82,485	921	7,150	7.0	5,639.7	5,639.7	5,640.5	0.8
I	83,025	1,831	14,806	3.3	5,645.9	5,645.9	5,646.6	0.7
J	83,295	1,795	12,488	4.0	5,646.1	5,646.1	5,646.8	0.7
K	83,755	1,919	8,953	5.5	5,646.4	5,646.4	5,647.1	0.7
L	85,175	2,730	13,432	3.6	5,649.1	5,649.1	5,649.8	0.7
M	86,145	2,178	9,670	5.0	5,650.1	5,650.1	5,650.9	0.8
N	86,615	2,010	9,465	5.1	5,651.2	5,651.2	5,652.2	1.0
O	87,465	1,390	6,987	6.9	5,654.8	5,654.8	5,655.6	0.8
P	88,255	1,220	6,248	7.6	5,659.1	5,659.1	5,659.8	0.7
Q	89,175	780	6,183	7.7	5,664.6	5,664.6	5,665.5	0.9
R	89,605	827	7,342	6.4	5,666.7	5,666.7	5,667.5	0.8
S	90,185	990	7,635	6.2	5,668.9	5,668.9	5,669.1	0.2
T	91,145	770	6,605	7.1	5,671.6	5,671.6	5,671.6	0.0
U	91,885	760	4,475	10.4	5,676.5	5,676.5	5,676.5	0.0
V	92,313	730	4,703	9.8	5,679.0	5,679.0	5,679.4	0.4
W	93,555	1,000	6,576	7.0	5,685.4	5,685.4	5,686.1	0.7
X	94,045	943	5,630	8.1	5,687.0	5,687.0	5,687.6	0.6
Y	94,625	1,020	6,836	6.7	5,690.8	5,690.8	5,691.4	0.6
Z	96,225	630	4,422	10.2	5,695.4	5,695.4	5,696.2	0.8

[1]Feet Above Confluence With South Platte River
[2]Width/Width Within City Limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

CHERRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Cherry Creek (Cont'd)								
AA	96,825	860	7,307	6.1	5,699.4	5,699.4	5,700.0	0.6
AB	97,375	932	6,020	7.4	5,701.4	5,701.4	5,701.9	0.5
AC	97,925	805	6,938	6.4	5,703.2	5,703.2	5,704.1	0.9
AD	99,525	950	7,361	6.0	5,707.6	5,707.6	5,708.4	0.8
AE	100,325	769	6,775	6.5	5,709.3	5,709.3	5,710.1	0.8

[1]Feet Above Confluence With South Platte River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

CHERRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Coal Creek								
A	77,150	1,900	2,746	7.1	5,497.6	5,497.6	5,497.6	0.0
B	78,270	3,260	1,907	10.2	5,502.5	5,502.5	5,502.5	0.0
C	80,320	3,160	6,460	3.0	5,511.2	5,511.2	5,512.2	1.0
D	83,150	470	1,900	10.3	5,523.9	5,523.9	5,524.4	0.5
E	84,155	350	2,220	8.8	5,529.4	5,529.4	5,530.4	1.0
F	85,900	600	3,177	6.1	5,536.2	5,536.2	5,536.9	0.7
G	86,005	600	2,747	7.1	5,536.2	5,536.2	5,536.9	0.7
H	87,200	280	1,456	13.4	5,543.5	5,543.5	5,543.5	0.0
I	88,195	400	2,880	6.8	5,550.3	5,550.3	5,550.6	0.3
J	89,990	500	3,100	6.3	5,556.9	5,556.9	5,557.9	1.0
K	91,790	610	2,680	7.3	5,564.5	5,564.5	5,565.4	0.9
L	93,425	600	3,200	6.1	5,572.2	5,572.2	5,573.2	1.0
M	95,125	400	2,540	7.4	5,580.5	5,580.5	5,581.5	1.0
N	96,380	585	2,980	6.3	5,584.6	5,584.6	5,585.3	0.7
O	97,495	270	1,113	16.9	5,590.5	5,590.5	5,590.8	0.3
P	98,380	450	2,640	6.9	5,596.3	5,596.3	5,597.3	1.0
Q	100,095	410	3,200	5.7	5,599.5	5,599.5	5,600.3	0.8
R	101,900	400	1,800	10.1	5,609.9	5,609.9	5,610.6	0.7
S	102,550	440	3,300	5.5	5,614.6	5,614.6	5,615.6	1.0
T	102,650	600	2,573	7.0	5,620.2	5,620.2	5,621.2	1.0
U	103,480	685	5,955	3.0	5,621.3	5,621.3	5,622.1	0.8
V	104,100	800	1,136	15.9	5,622.8	5,622.8	5,622.8	0.0
W	105,150	900	3,482	5.2	5,627.0	5,627.0	5,627.0	0.0
X	106,175	570	1,800	10.1	5,631.0	5,631.0	5,631.1	0.1
Y	106,950	560	3,236	5.3	5,636.5	5,636.5	5,637.2	0.7
Z	107,750	780	3,154	5.4	5,639.5	5,639.5	5,640.1	0.6
AA	108,650	590	2,454	7.0	5,643.3	5,643.3	5,643.9	0.6
AB	109,900	440	1,973	9.1	5,649.1	5,649.1	5,649.6	0.5

[1]Feet Above Mouth of Sand Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

COAL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Murphy Creek								
A	3,290	1,000	755	5.6	5,511.9	5,511.9	5,512.1	0.2
B	3,990	770	1,248	3.4	5,514.8	5,514.8	5,515.0	0.2
C	4,440	600	730	5.8	5,516.8	5,516.8	5,516.8	0.0
D	4,940	420	1,101	3.9	5,520.3	5,520.3	5,520.3	0.0
E	5,090	350	702	6.0	5,520.6	5,520.6	5,520.6	0.0
F	5,990	280	670	6.0	5,525.5	5,525.5	5,525.5	0.0
G	6,940	260	605	6.6	5,530.1	5,530.1	5,530.1	0.0
H	7,840	300	786	5.1	5,535.6	5,535.6	5,535.7	0.1
I	8,840	340	909	4.4	5,539.9	5,539.9	5,540.0	0.1
J	9,340	450	736	5.1	5,545.4	5,545.4	5,545.4	0.0
K	9,890	300	576	6.5	5,549.3	5,549.3	5,549.4	0.1
L	11,040	750	759	4.9	5,557.2	5,557.2	5,557.5	0.3
M	12,040	540	514	6.9	5,652.9	5,652.9	5,653.4	0.5
N	12,690	600	565	6.3	5,566.0	5,566.0	5,566.6	0.6
O	13,240	570	316	11.2	5,570.5	5,570.5	5,570.5	0.0
P	13,310	570	681	5.2	5,573.1	5,573.1	5,573.1	0.0
Q	14,160	160	281	12.1	5,575.7	5,575.7	5,575.7	0.0
R	14,910	140	487	7.0	5,581.6	5,581.6	5,581.6	0.0
S	16,060	120	356	9.6	5,585.4	5,585.4	5,585.4	0.0
T	17,010	150	435	7.4	5,591.0	5,591.0	5,591.0	0.0
U	17,360	130	548	5.8	5,592.3	5,592.3	5,592.3	0.0
V	18,010	190	302	10.6	5,595.4	5,595.4	5,595.5	0.1
W	18,710	610	1,203	2.7	5,598.3	5,598.3	5,598.9	0.6
X	19,660	100	285	11.2	5,600.7	5,600.7	5,600.8	0.1
Y	20,160	160	456	7.0	5,604.2	5,604.2	5,604.2	0.0
Z	20,910	60[2]	372	8.2	5,607.4	5,607.4	5,607.5	0.1

[1]Feet Above Confluence With Coal Creek
[2]Floodway Not Shown Due to Scale Limitations

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

MURPHY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Murphy Creek (Cont'd)								
AA	21,020	120	1,029	3.0	5,616.5	5,616.5	5,616.5	0.0
AB	22,900	150	443	6.9	5,623.4	5,623.4	5,623.4	0.0
AC	23,450	80[2]	529	5.8	5,627.0	5,627.0	5,627.1	0.1
AD	25,000	360	453	6.4	5,635.1	5,635.1	5,635.1	0.0
AE	26,250	150	368	7.9	5,642.6	5,642.6	5,642.8	0.2
AF	26,950	240	474	6.1	5,646.2	5,646.2	5,646.8	0.6
AG	27,850	100	421	6.9	5,650.8	5,650.8	5,650.8	0.0
AH	28,350	130	376	7.3	5,652.8	5,652.8	5,652.8	0.0
AI	29,650	180	342	7.9	5,658.0	5,658.0	5,658.1	0.1
AJ	30,350	80[2]	420	6.4	5,662.5	5,662.5	5,662.8	0.3

[1]Feet Above Confluence With Coal Creek
[2]Floodway Not Shown Due to Scale Limitations

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, ARAPAHOE, AND DOUGLAS COUNTIES)

FLOODWAY DATA

MURPHY CREEK

5.0 INSURANCE APPLICATION

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

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations (BFEs) or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone.

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplain, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

Reports detailing the following portions of East Toll Gate Creek and West Toll Gate Creek were incorporated into this study: Analysis of East Toll Gate Creek from Chambers Road to 1,300 feet upstream and from South Buckley Road to 0.8 miles upstream were performed by Merrick and Company Engineers and Architects, and Greiner Engineering Sciences, Inc., respectively (References 1 and 2). The revised hydraulic analyses for West Toll Gate Creek from Mississippi Avenue to approximately 800 feet upstream of Mexico Avenue, and the portion of West Toll Gate Creek from South Buckley Road upstream to East Hampden Avenue were performed by the City of Aurora Engineering Division (Reference 4 and 5). The analysis for the portion of West Toll Gate Creek between East Hampden Avenue and East Quincy Avenue was performed by Merrick and Company Engineers and Architects (Reference 2). The hydrologic analyses for all the revisions were originally performed by the COE and Gingery and Associates.

The official Flood Plain Report on Sand Creek and Toll Gate Creek is the Special Flood Hazard Information Report, Metropolitan Region, Denver, Colorado, Volume II, Sand, Toll Gate, and Lower Cherry Creeks, South Platte River Basin, COE, Omaha, Nebraska, dated July 1971, which was designated by the Colorado Water Conservation Board on March 8, 1972 (Reference 12). The COE, Omaha District, is updating the Sand Creek Study under contract with the Denver Region Urban Drainage and Flood Control District. The Flood Hazard Area Delineation-Sand Creek Report was published in March 1977 (Reference 15). The information contained in this Flood Insurance Study was taken directly from the new data developed by the COE, Omaha district; the studies will be in complete agreement.

With the above-mentioned report for the lower portion of Toll Gate Creek, the Colorado Water Conservation Board also designated the Special Flood Hazard Information Report-Upper Toll Gate Creek and Tributaries, Aurora, Colorado, COE, Omaha, Nebraska, dated June 1973, as the official floodplain report for upper Toll Gate Creek, West Toll Gate Creek, East Toll Gate Creek, Unnamed Creek, and Cherry Creek Spillway Drain (Reference 13). The 100-year flood elevations on East Toll Gate Creek are the same as those shown in the COE report. The 100-year flood elevations on Toll Gate Creek and West Toll Gate Creek have changed due to the new discharges, which reflect the effects of Quincy Dam. Unnamed Creek has changed because of the new development. The Cherry Creek Spillway profile has changed because several of the drop structures shown in the 1973 COE Report have been washed out due to erosion.

The Denver Region Urban Drainage and Flood Control District has published reports on Westerly Creek (Reference 14) and First Creek (Reference 29), which were used in this study; the studies are in complete agreement.

There is a Flood Hazard Area Determination Report for Sable and Granby Ditches, published by the Urban Drainage and Flood Control District in early 1977 (Reference 30). The report was completed in conjunction with this Flood Insurance Study; therefore, the studies are in complete agreement.

No published study information is available for the West Toll Gate Tributary.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Mitigation Division, FEMA, Federal Regional Center, 800 North Loop 288, Denton, Texas, 76201-3698.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Merrick and Company, East Toll Gate Creek 100-Year Floodplain Amendment Report, Denver, Colorado, November 1982

2. Merrick and Company, Hydraulic Analysis of West Toll Gate Creek From East Hampton Avenue to East Quincy Avenue, Denver, Colorado, December 1985

3. Greiner Engineering, Toll Gate Village--Filing No. 14, Denver, Colorado, October 1985

4. City of Aurora Engineering Division, West Toll Gate Creek (Mississippi to Mexico), September 1985

5. City of Aurora Engineering Division, Request For Flood Insurance Rate Map Amendments, Aurora, Colorado, September 1985

6. Holland Corporation, Overlot Grading Improvements Between 500 Feet West and 1,200 Feet East of South Flanders Street, Englewood, Colorado, 1984

7. Colorado Water Conservation Board, Release No. 27, Rainfall-Runoff Data from Small Watersheds in Colorado, June 1968 through September 1971--Colorado Water Resources Basic Data, U.S. Geological Survey, in Cooperation with the Urban Drainage and Flood Control District and the Colorado Department of Highways, Denver, Colorado, 1972

8. Denver Regional Council of Governments, "Area Population Allocations, Denver, Colorado," Council of Governments Notations Publication, September 1976

9. U.S. Department of Commerce, National Oceanic and Atmospheric Administration Environmental Data Service, "Colorado Annual Summary," Volume 80, No. 13, 1975

10. U.S Department of Agriculture, Soil Conservation Service, Soil Survey of Adams County, Colorado, October 1974

11. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Arapahoe County, Colorado, March 1971

12. U.S. Army Corps of Engineers, Omaha District, Special Flood Hazard Report to Revise Flood Plain Information, Metropolitan Region, Denver, Colorado, Volume II, Toll Gate and Lower Cherry Creeks, South Platte River Basin, July 1971

13. U.S. Army Corps of Engineers, Omaha District, Special Flood Hazard Information Report, Upper Toll Gate Creek and Tributaries, Aurora, Colorado, June 1973

14. Denver Region Urban Drainage and Flood Control District, Report on Drainage Master Plan for Westerly Creek, Denver-Aurora Phase A, Camp, Dresser and McKee, Inc., January 1976

15. Cornell, Howland, Hayes and Merryfield-Clair A. Hill and Associates, "Quincy Terminal Raw Water Storage Project, City of Aurora, Colorado," March 1973

16. Urban Drainage and Flood Control District, Major Drainageway Planning--Little Dry Creek, Volumes 1 and 2, McCall, Ellingson and Morrill, Inc., Denver, Colorado, May 1974

17. Denver Region Urban Drainage and Flood Control District, Storm Drainage Criteria Manual, Volumes I and II, Wright-McLaughlin Engineers, Denver, Colorado, March 1974

18. Denver Region Urban Drainage and Flood Control District, Preliminary Flood Hazard Area Delineation Sand Creek, U.S. Army Corps of Engineers, March 1977

19. U.S. Environmental Protection Agency, Storm Water Management Model User's Manual Version II, Department of Environmental Engineering Sciences, University of Florida, Gainesville, Florida, March 1975

20. Bell Mapping Company, Denver, Colorado, Sand Creek Aerial Topographic Maps, Scale 1:1,200 Contour Interval 2 feet, Aurora, Colorado, 1974

21. Parker Aerial Surveys, Denver, Colorado, Aerial Topographic Maps, Scale 1:1,200, Contour Interval 2 feet, (Toll Gate Creek) Aurora, Colorado, 1973

22. Nelson, Haley, Patterson and Quirk, Inc., Greeley, Colorado, Aerial Topographic Mapping, Scale 1:1,200, Contour Interval 2 feet, (R66W-T4S, Sections 8, 15, 16, 17, 20, 22, 29), Aurora, Colorado, 1971

23. Bell Mapping Company, Denver, Colorado, Aerial Topographic Maps, Scale 1:1,200, Contour Interval 2 feet, (Westerly Creek) Aurora, Colorado, 1974

24. Kucera Associates and Gingery Associates, Aerial Topographic Maps, Scale 1:2,400, Contour Interval 2 feet, (Sable Ditch and Granby Ditch) Aurora, Colorado, September 1976

25. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2, Water-Surface Profiles, 723-X6-L202A, Davis, California, Revised September 1990

26. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 feet, Box Elder School, Colorado, 1966; Sable, Colorado, 1965; Fitzsimons, Colorado, 1965, Revised 1971

27. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:2,400, Contour Interval 10 Feet, Coal Creek, Colorado, 1965, Photo revised 1980; Highlands Ranch, Colorado (1965), Photo revised; Piney Creek, Colorado, 1966, Photo revised (1978)

28. City of Aurora Engineering Division, Amended Flood Plain West Toll Gate Creek, West of Chambers Road, Aurora, Colorado, February 1988.

29. Engineering Consultants, Inc., Aurora Water and Drainage at First Creek, Phase A, July 1974

30. Engineering Consultants, Inc., Flood Hazard Area Determination Report, Sable and Granby Ditches, Gingery Associates, Inc., April 1977

31. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 1680, Magnitude and Frequency of Floods in the United States--Part 6B, Lower Mississippi River Basin Below Sioux City, Iowa, H.F. Matthai, 1968

32. Urban Drainage and Flood Control District, Urban Storm Drainage--Criteria Manual, Volumes I and II, prepared by Wright-McLaughlin Engineers, Denver, Colorado, March 1969

33. U.S. Department of the Army, Corps of Engineers, Hydrologic Engineering Center, HEC-1, Flood Hydrograph Package, 723-010 and HEC-II Water-Surface Profiles, 723-X6-L202A, Davis, California

34. Urban Drainage and Flood Control District, Major Drainage Planning--First Creek, Phase B, Volume II, Engineering Consultants, Inc., Aurora, Colorado, March 1977

35. Urban Drainage and Flood Control District, Arapahoe and Douglas Counties, Piney Creek, Flood Hazard Area Delineation, prepared by Gingery Associates, Inc., October 1975

36. Urban Drainage and Flood Control District, Arapahoe and Douglas Counties, Murphy Creek, Flood Hazard Area Delineation, prepared by Gingery Associates, Inc., October 1975

37. Merrick & Company, Denver, Colorado, LOMR for Westerly Creek Through Lowry Air Force Base, February 1996

10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To ensure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Engineering Department for the City of Aurora, 1470 South Havana Street, Aurora, Colorado 80012.

10.1 First Revision

This study was revised on September 30, 1992, to incorporate a revised hydraulic analysis for Unnamed Creek, Letters of Map Revision (LOMRs) issued for Toll Gate Creek, East Toll Gate Creek, West Toll Gate Creek, West Toll Gate Creek Tributary, Cherry Creek Spillway Drain, Westerly Creek, and Sand Creek, and to update the corporate limits.

UNNAMED CREEK

The reach of Unnamed Creek from its confluence with West Toll Gate Creek to the city's corporate limits was revised based on channel improvements. The revised hydraulic analyses presented in a report entitled "Request for Flood Insurance Study Map Revision for Unnamed Creek," dated March 1989, were prepared by Kirkham, Michael and Associates (KMA). The U.S. Army Corps of Engineers (COE) HEC-2 computer model was utilized to develop the revised hydraulic analyses.

This revision included changes to the base flood elevations (BFEs), 100- and 500-year flood boundaries and floodway delineations. Floodway and flood boundaries were delineated using topographic maps prepared by KMA, dated November 16, 1988, at a scale of 1:100 and contour interval of 2 feet.

The Floodway Data Table and Flood Profile Panels 30P and 31P for Unnamed Creek have been revised as a result of this analysis.

WEST TOLL GATE CREEK, WEST TOLL GATE TRIBUTARY, CHERRY CREEK SPILLWAY DRAIN

The LOMR issued on November 22, 1989, reflects a channel modification project for West Toll Gate Creek, West Toll Gate Tributary, and Cherry Creek Spillway Drain, in the vicinity of Horseshoe Park on Flood Insurance Rate Map Panel 0085. The hydraulic analyses were developed by Greenhorne and O'Mara (G&O) utilizing the COE HEC-2 computer model submitted in a report entitled "West Toll Gate Creek (Mexico to Buckley), West Toll Gate Tributary (West Toll Gate Creek to Iliff), Cherry Creek Spillway (West Toll Gate Creek to Iliff), Request for Letter of Map Revisions," dated August 1988, and revised March 1989.

The 100- and 500-year floodplain and 100-year floodway boundary delineations, the Floodway Data Table, and Flood Profile Panels 01P, 02P, and 21P through 26P have been revised for the area bounded by East Mexico Avenue, East Iliff Avenue, Chambers Road and Buckley Road to reflect this modification.

SAND CREEK

The LOMR issued on July 9, 1990, to reflect channel improvements for an area along Sand Creek from its confluence with Toll Gate Creek to approximately 0.5 mile upstream of Chamber Road in the vicinity of Four Star Park, is shown on Flood Insurance Rate Map Panel 0020. The channel improvement project also includes the construction of a floodwall and berm for this reach of Sand Creek. The revised hydraulic analyses were performed by G&O using the COE HEC-2 computer model. Flood boundaries were delineated using topographic maps entitled "Construction Drawings For Sand Creek Channel Improvements Phase I, Flood Plain Data," prepared by G&O, dated February 1989, at a scale of 1:50 and contour interval of 1 foot.

In addition, the Special Flood Hazard Area (SFHA) in the vicinity of Baranmor Parkway downstream to Sand Creek, designated as Zone A, is the result of residual flooding in the area located north of Sand Creek. Residual flooding from the vicinity of Tucson Street downstream to Sand Creek is the result of local drainage in the vicinity of Sable Boulevard, which flows into an open channel along 32nd Avenue and Baranmor Parkway, and drainage in the vicinity of the Union Pacific Railroad, which is collected by a storm sewer system. No new hydrologic and hydraulic analyses were developed as part of this request to revise the SFHA. Therefore, the SFHA boundaries were not modified, but the BFEs have been removed until new analyses can be developed for this area.

The 100- and 500-year floodplain and 100-year floodway boundary delineations, the Floodway Data Table, and Flood Profile Panels 13P and 14P have been revised to reflect this revision.

TOLL GATE CREEK

The LOMRs issued on January 10, 1991, and March 4, 1991, to reflect channel modifications for an area of Toll Gate Creek from its confluence with Sand Creek to a point 3,300 feet upstream of East Sixth Avenue, a reach of approximately 17,000 feet, are shown on Flood Insurance Rate Map Panels 0020 and 0110. The March 4 LOMR was issued to remove a small area from the 100-year floodplain which was inadvertently shown on the attachment for Flood Insurance Rate Map Panel 0020 of the January 10 LOMR. The small area, located south of 28th Avenue and west of Interstate 225, was removed on the attachment for the March 4 LOMR, which superseded the January 10 LOMR.

The following submitted data are the basis for the LOMRs: a report entitled "Tollgate Creek (Sand Creek to 6th Avenue), Request For

Letter of Map Revision for Aurora, Colorado," dated February 1990, prepared by the City of Aurora Engineering Division; Sheets 1 through 7 of 7 work maps entitled "Toll Gate Creek Floodplain Revision," revised October 23, 1990, prepared by the City of Aurora Engineering Division; and Sheets 1 through 3 of 3 work maps entitled "Toll Gate Creek, 500-Year Boundary Map," dated March 1, 1990, prepared by the City of Aurora Engineering Division.

As a result of the modifications to Toll Gate Creek, Flood Profile Panels 17P through 19P and the Floodway Data Table for Toll Gate Creek have been revised.

EAST TOLLGATE CREEK

The basis for this revision is a channelization project including construction of a series of four ponds, which are part of the Center Hills Golf Course, from Buckley Road to approximately 0.5 miles downstream along East Toll Gate Creek. The revised hydraulic analysis was completed in August 1991, by Merrick and Company (MC), using the COE HEC-2 computer model.

The revised hydraulic data resulted in changes to the BFEs. The channel contains the 100-year recurrence interval flood, and the floodway is coincident with the 100-year floodplain throughout the above-mentioned reach. Flood boundaries were delineated using topographic maps prepared by MC, dated January 27, 1987, at a scale of 1" = 50' and a contour interval of 1 foot.

The Floodway Data Table and Flood Profile Panels 27P through 29P for East Toll Gate Creek have been revised as a result of this analysis.

WESTERLY CREEK

The basis for this revision is revised hydrologic and hydraulic analyses for a reach of Westerly Creek from approximately 7,400 feet upstream of mouth to Kelly Road Dam. The revised hydrologic analysis is the result of the construction of Westerly Creek Dam, by the COE and the hydraulic analysis reflect channel improvements. The revised hydraulic analysis was completed by Love and Associates, Inc. (LA), using the COE HEC-2 computer model. Flood boundaries were delineated using topographic maps prepared by LA and Merrick and Company, dated January 1991, at a scale of 1" = 100' and a contour interval of 2 feet.

The Floodway Data Table, Summary of Discharge Table, and Profile Panels 32P through 34P have been revised as a result of this revision.

In addition, this revision includes portions of approximate and detailed flooding previously shown on the effective Flood Insurance Rate Map for Adams County and Arapahoe County. This flooding has been added due to annexations by the City of Aurora. As a result of these new corporate limits, detailed flooding information for

Box Elder Creek, Cherry Creek, Coal Creek, First Creek, Murphy Creek, and Piney Creek, and approximate flooding information for Box Elder Creek and Sampson Gulch are now shown on the Flood Insurance Rate Map for the City of Aurora. The City of Aurora also annexed areas from Douglas County, but no flooding information from this county was added to the Flood Insurance Rate Map.

For portions of Piney Creek, Murphy Creek, and Cherry Creek, the synthetic hydrograph method was used to determine the potential flood magnitudes. The developed hydrographs reflect the effects of precipitation, ground cover, slope, drainage area, and other physical characteristics of the drainage basins. Flood magnitudes for the selected frequencies in the upper reaches of Piney Creek, Coal Creek, and Box Elder Creek were computed using the U.S. Geological Survey regional analysis outlined in Water Supply Paper 1680 (Reference 31).

Rainfall data for the synthetic hydrologic analyses were taken from the Urban Storm Drainage Criteria Manual (Reference 32), prepared by the Urban Drainage and Flood Control District (UDFCD). Synthetic hydrograph procedures used in the study included the Colorado Urban Hydrograph Procedure, outlined in the UDFCD Manual (Reference 32) and COE HEC-1 Flood Hydrograph Package (Reference 33).

Water-surface elevations for floods of the selected recurrence intervals were computed through the use of the COE HEC-2 step-backwater computer program for Piney Creek, Murphy Creek, Coal Creek, and Box Elder Creek. Hydraulic analyses for portions of First Creek, Piney Creek, and Murphy Creek were taken from published UDFCD reports (References 34, 35, and 36). In addition, hydraulic analyses for portions of Sampson Gulch were performed using topographic maps at a scale of 1:24,000 with contour interval of 10 feet (Reference 27). Field-surveyed cross sections were used and normal-depth calculations were performed to obtain topwidths at the selected cross sections.

As a result of extensive updated corporate limits changes, the layout of the Flood Insurance Rate Map was changed. The information shown on previous Flood Insurance Rate Map Panel 0055, 0060, 0065, 0070, 0080, 0085, 0090, and 0100 are now shown on Panels 0080, 0085, 0090, 0095, 0105, 0110, 0115, and 0125, respectively. Only Flood Insurance Rate Map Panel 0020 remained the same, and Flood Insurance Rate Map Panels 0040, 0045, and 0130 are newly created panels.

10.2 Second Revision

The mapping for this revision has been prepared as part of the countywide update for Arapahoe County using digital data. Previously published Flood Insurance Rate Map data produced manually have been converted to vector digital data by a digitizing process. These vector data were fit to raster digital images of the USGS quadrangle maps of the county area to provide horizontal positioning.

Road, highway names, and centerline data have been obtained from the City of Aurora, Department of Public Works, Geographic Information System. The centerlines were modified to the positional accuracy of the USGS quadrangle, and the roads, highways, and street names were modified from the Flood Insurance Rate Map panels. The adjusted centerline data were then computer plotted with the digitized floodplain data to produce the Flood Insurance Rate Map panels.

The Flood Insurance Rate Map panel layout has been adjusted to match that of the USGS quadrangle maps, and numbering has been revised to match that used for the Arapahoe County layout.

This revision also included the results of the LOMR issued on March 21, 1994, for the City of Aurora, to show the effects of channel improvements and the construction of two 9-foot by 6-foot reinforced concrete box culverts under Sable Boulevard, along Sable Ditch. As a result, the BFEs and floodplain and floodway boundaries were revised along Sable Ditch from approximately 570 feet downstream of Sable Boulevard to approximately 360 feet upstream of Sable Boulevard. Flood Profile Panels 09P and 10P and the Floodway Data Table for Sable Ditch were also revised.

10.3 Third Revision

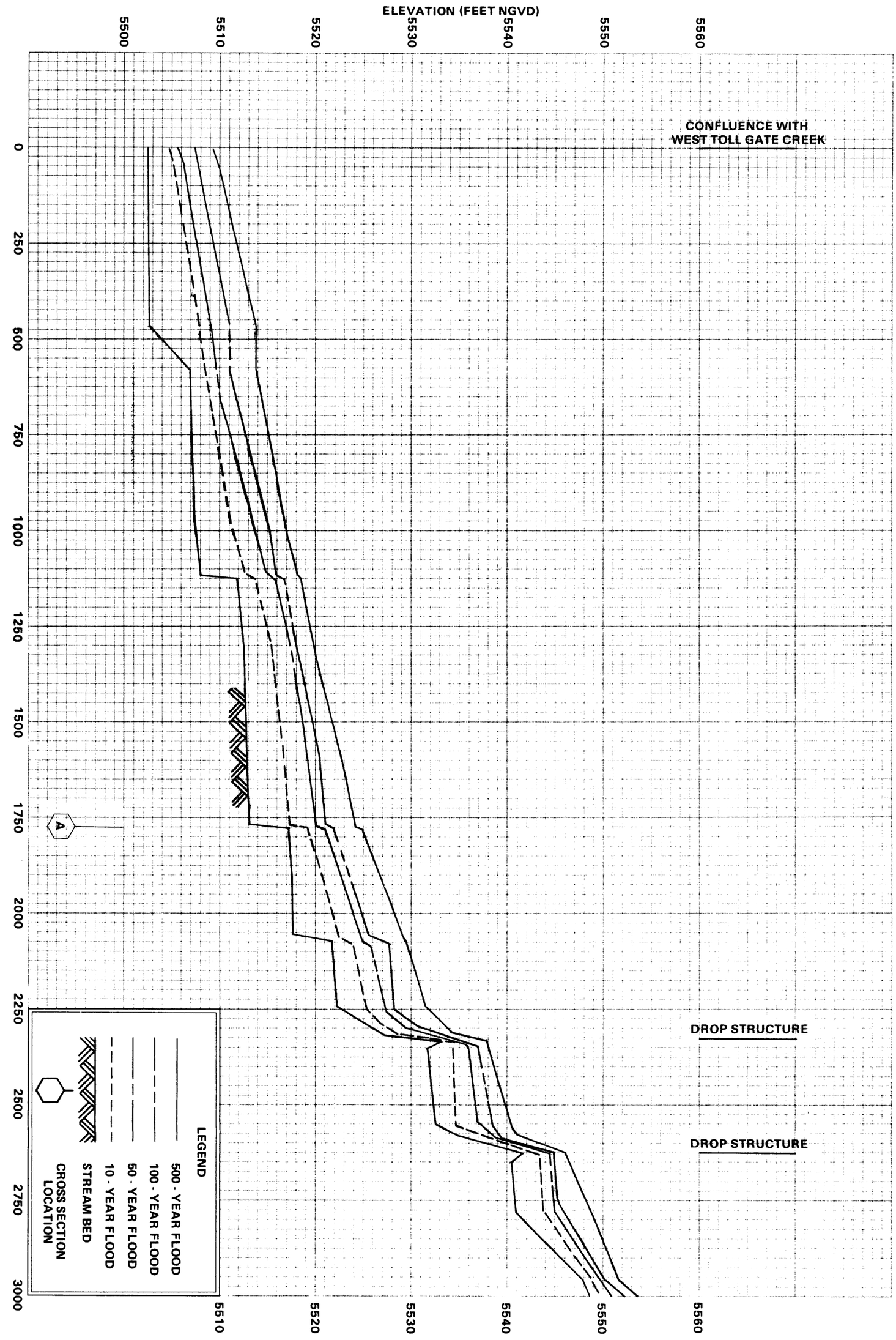
This study was revised on September 7, 1998, to incorporate a LOMR dated April 16, 1996, for Westerly Creek. The LOMR was based on more detailed hydrologic and hydraulic analyses that reflected the effects of the Westerly Creek Dam and channel improvements along Westerly Creek. The revised analyses were performed by Merrick & Company and affect the reach of Westerly Creek from just upstream of the Kelly Road Dam to Havana Street, which is in the area that was formerly Lowry Air Force Base. This reach was previously studied by approximate methods and designated Zone A on the Flood Insurance Rate Map. The reach of Westerly Creek from just upstream of the Kelly Road Dam to approximately 1,350 feet downstream of Havana Street lies outside the corporate limits of the City of Aurora, within the City and County of Denver, Colorado.

The revised hydrologic analysis was performed using the Colorado Urban Hydrograph Procedure (Reference 32). The Environmental Protection Agency Storm Water Management Model (Reference 19) was used for hydrograph routing.

The revised hydraulic analyses were performed using the U.S. Army Corps of Engineers HEC-2 computer program (Reference 25). Revised cross-section data and the effects of the Westerly Creek Dam were incorporated into the hydraulic model. The results of the hydraulic model indicate that flow splits from the main channel of Westerly Creek downstream of Havana Street. This split flow, designated as Westerly Creek Overflow, rejoins Westerly Creek just upstream of the Westerly Creek Dam.

Floodplain boundaries were delineated using topographic maps at a scale of 1:3,600, with a contour interval of 2 feet (Reference 37).

This revision is shown on Flood Insurance Rate Map Panel 0180. Table 1, "Summary of Discharges," Table 2, "Floodway Data," and Profile Panel 35P have been revised and Profile Panels 35P(a) and 68P have been added to reflect the results of the revised hydrologic and hydraulic analyses.



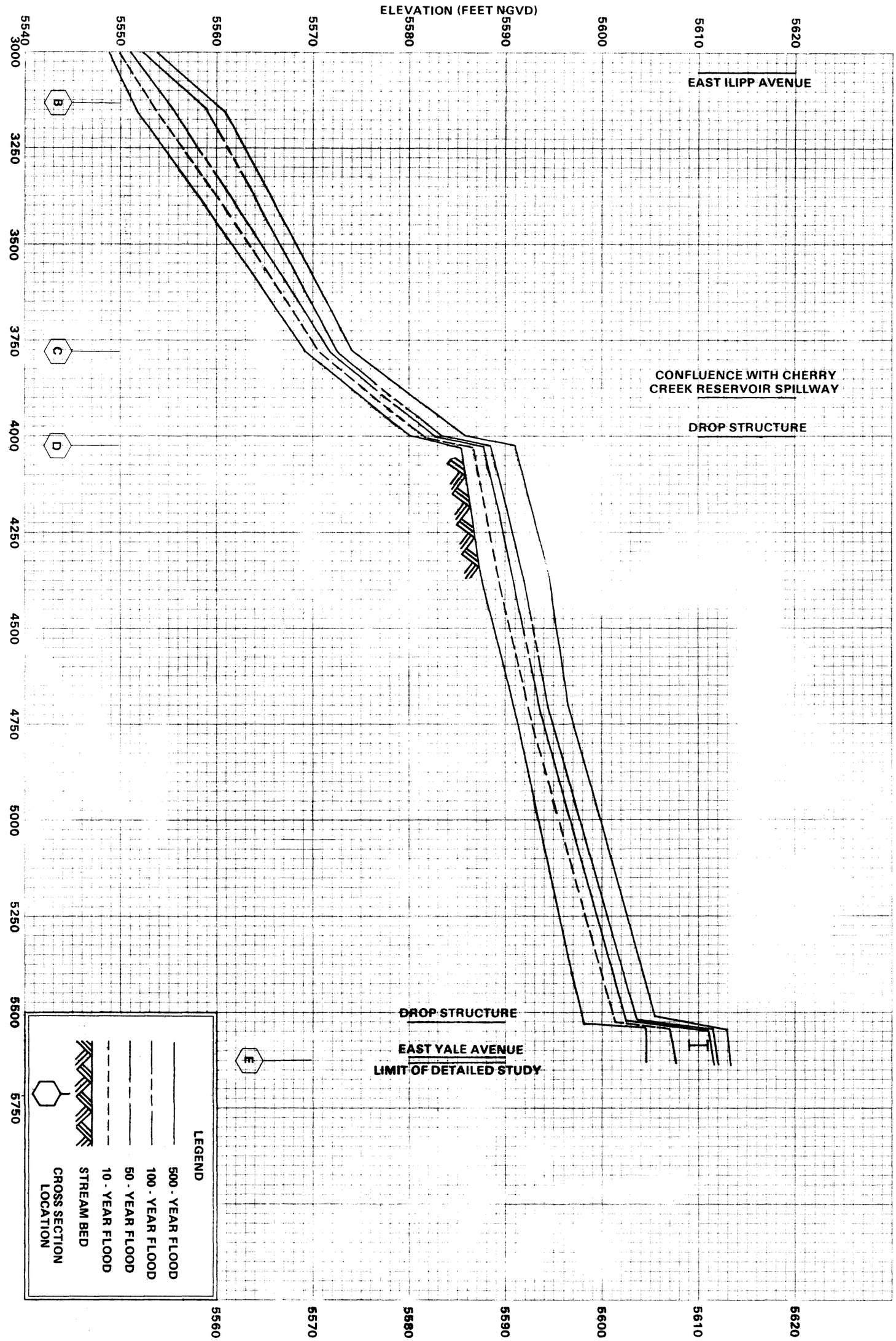
01P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

CHERRY CREEK SPILLWAY DRAIN



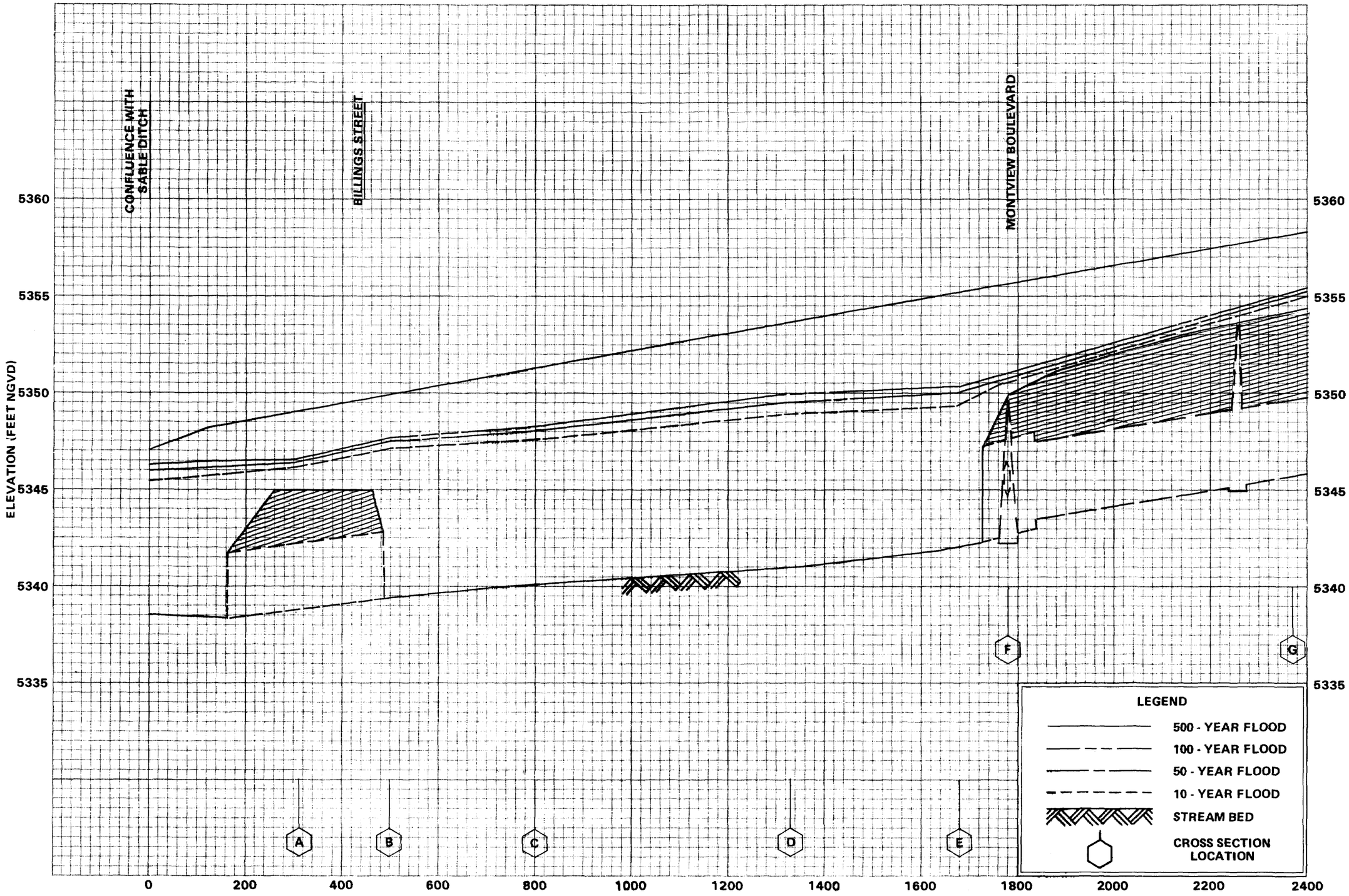
02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

CHERRY CREEK SPILLWAY DRAIN



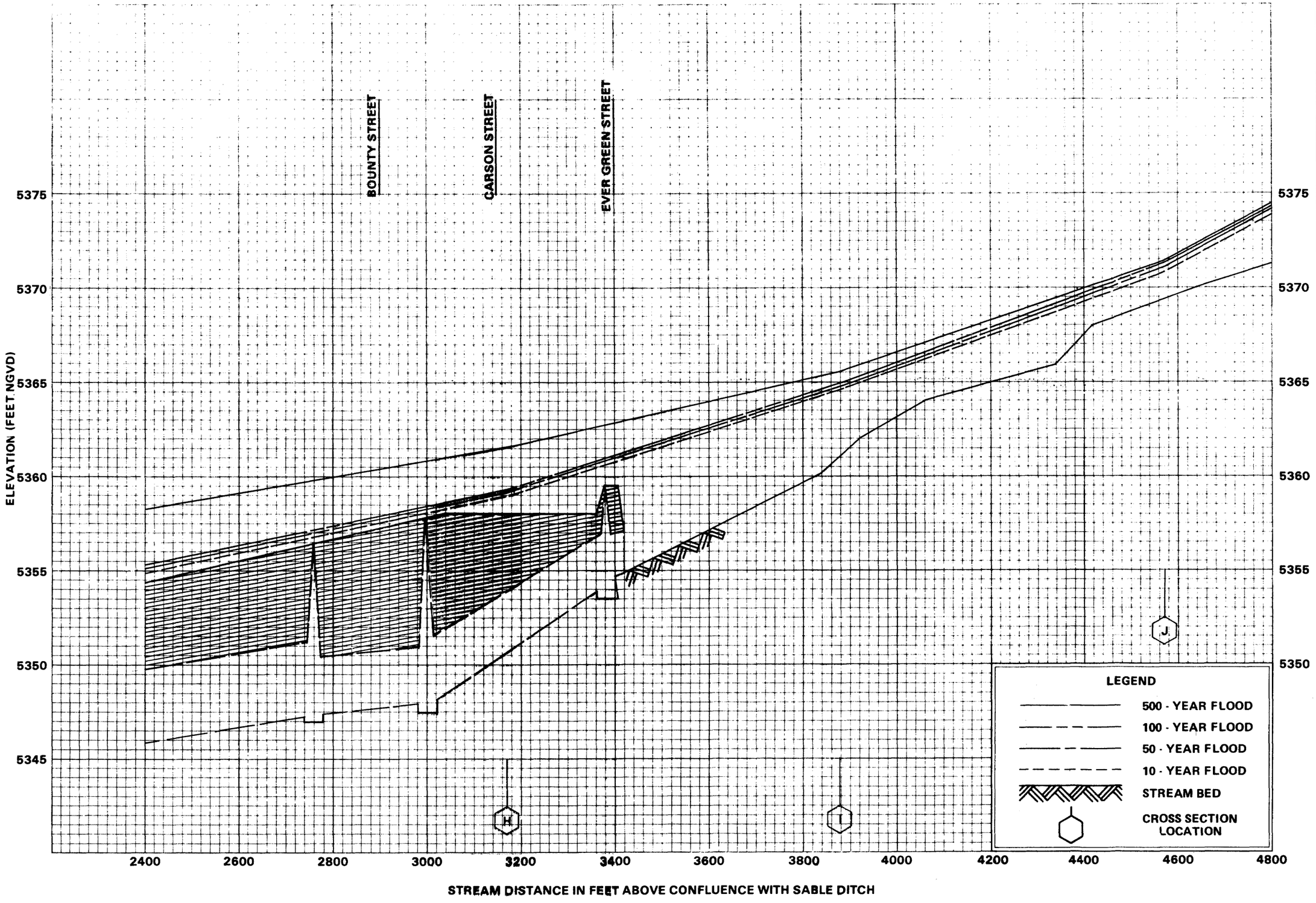
FLOOD PROFILES

GRANBY DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

03P



FLOOD PROFILES

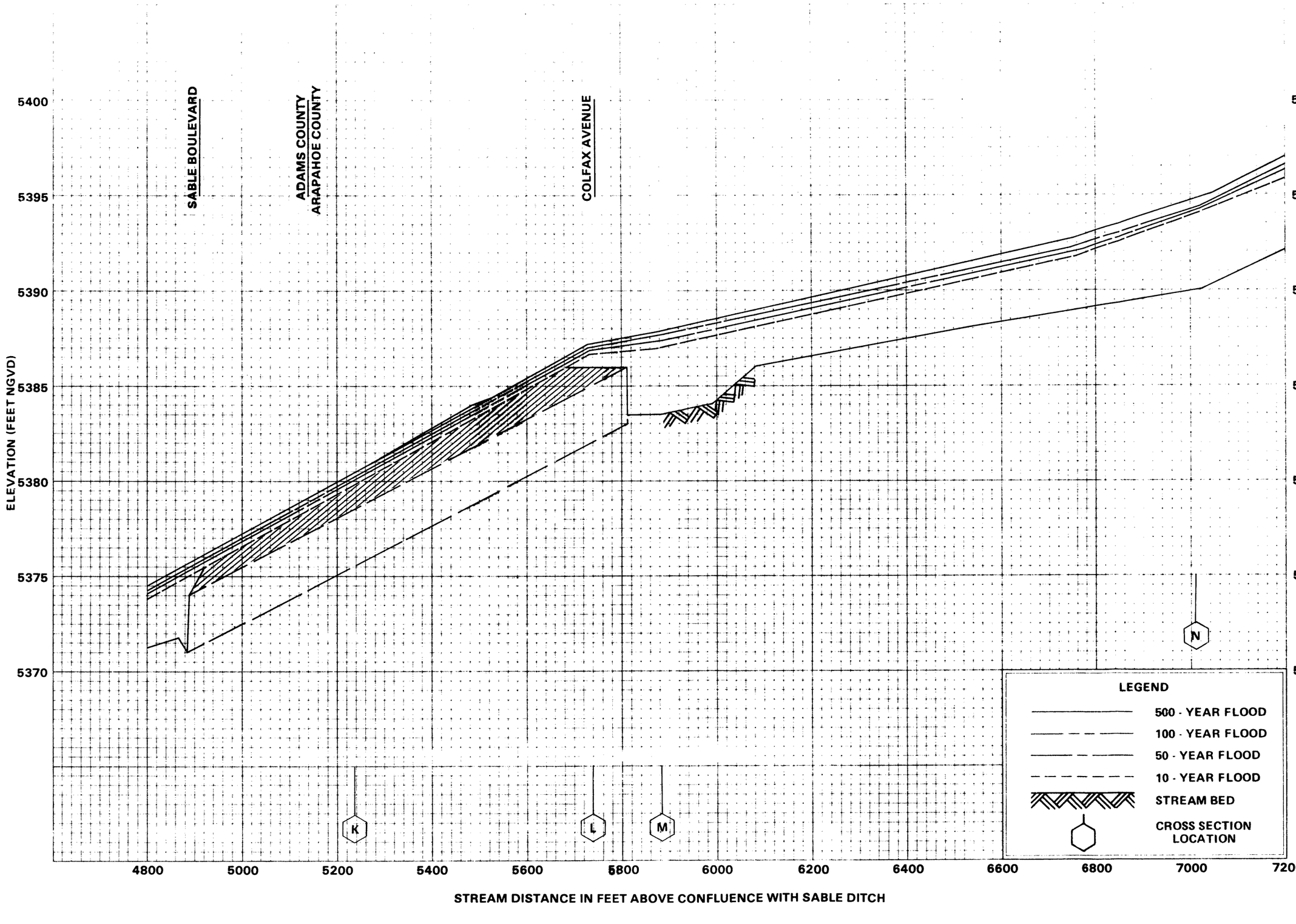
GRANBY DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

04P



FLOOD PROFILES

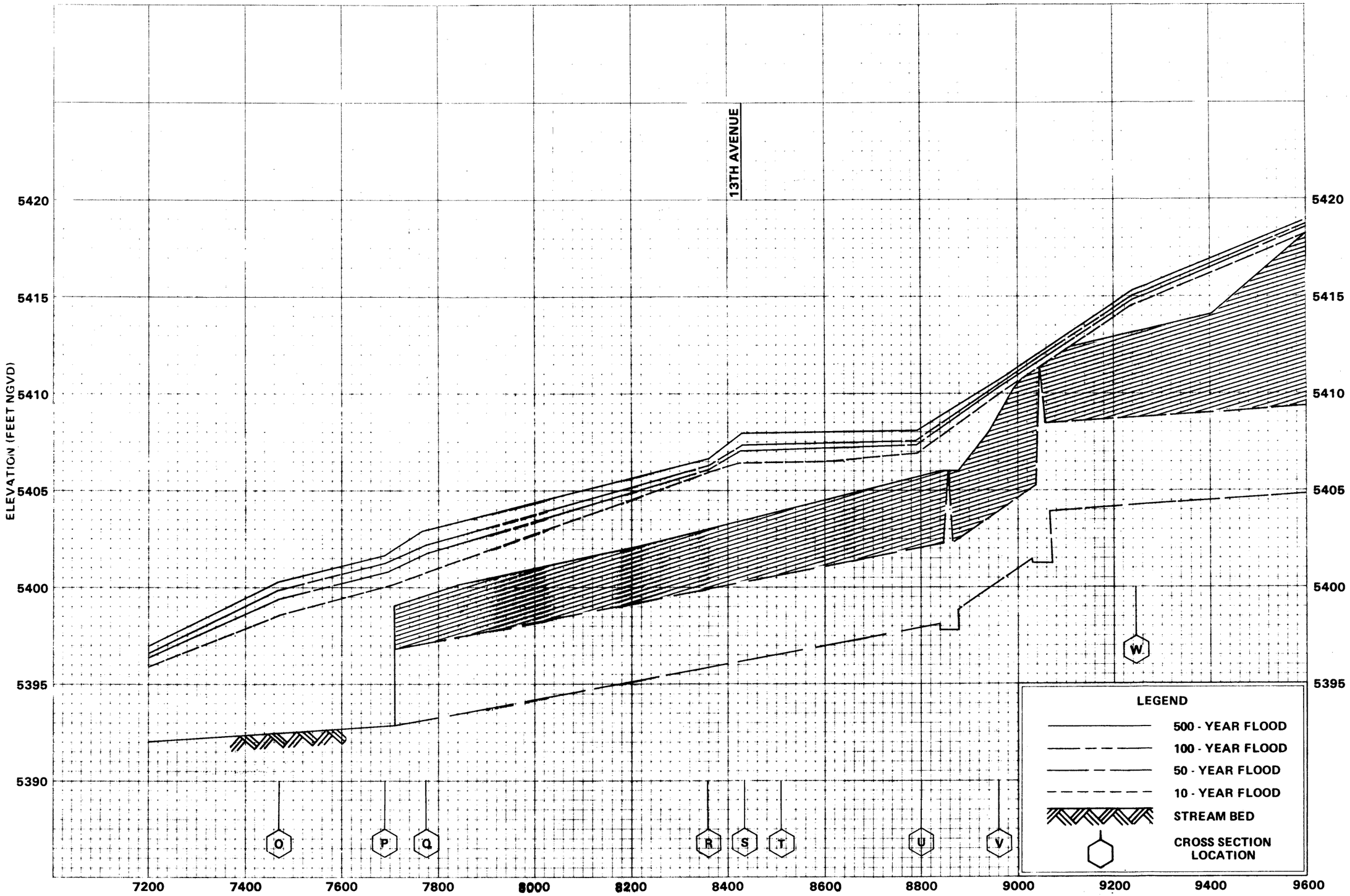
GRANBY DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

05P



FLOOD PROFILES

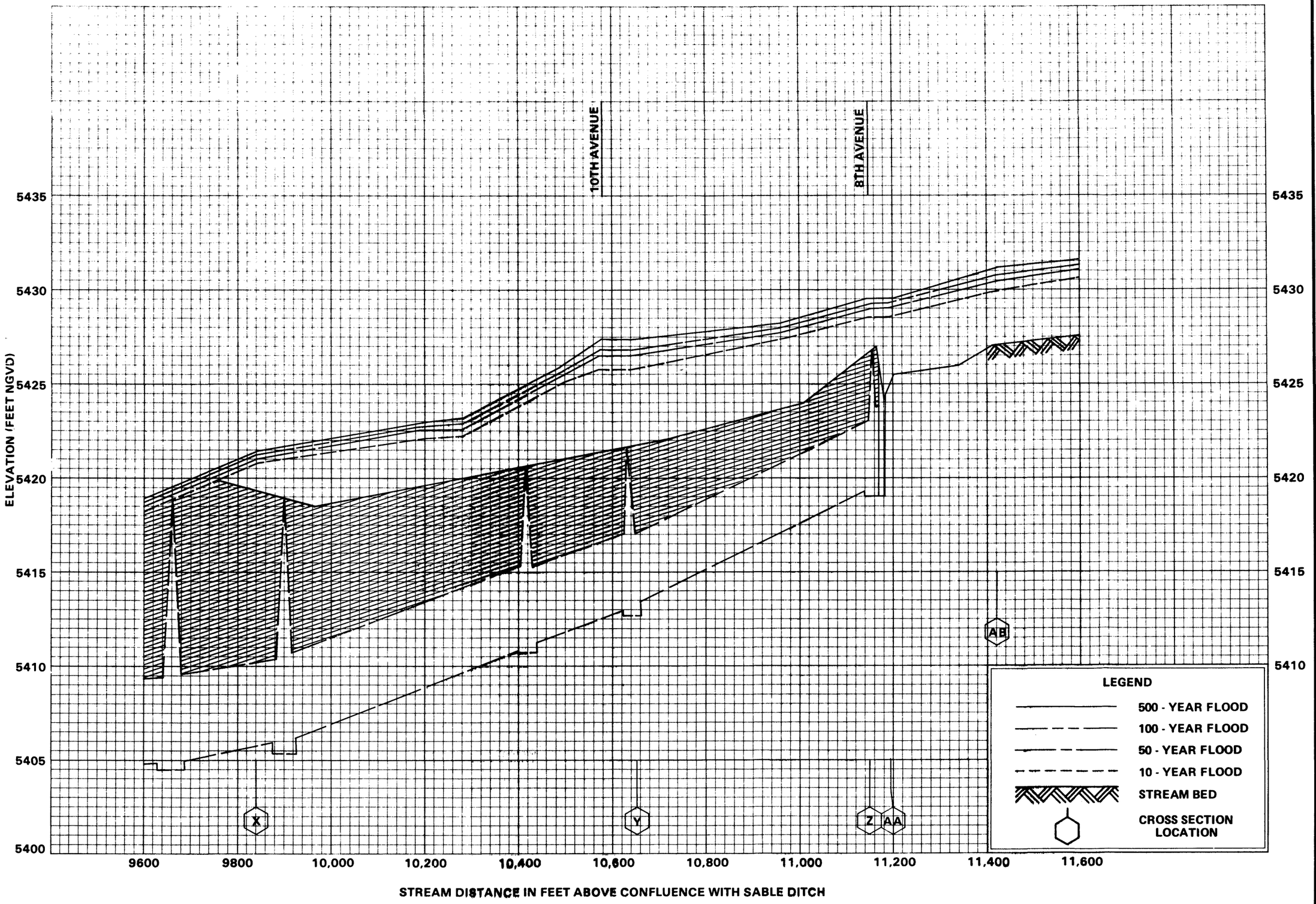
GRANBY DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

06P



FLOOD PROFILES

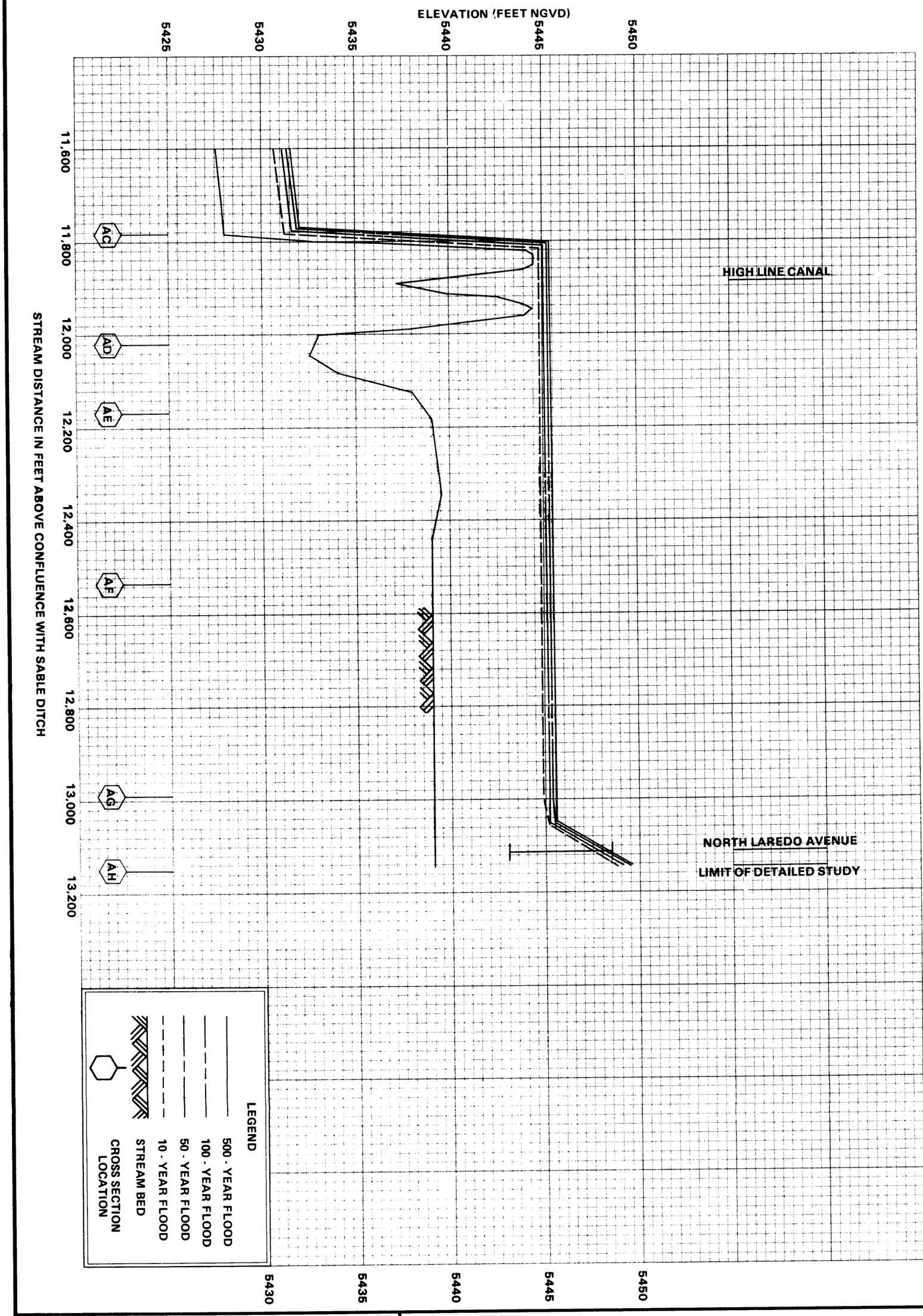
GRANBY DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

07P



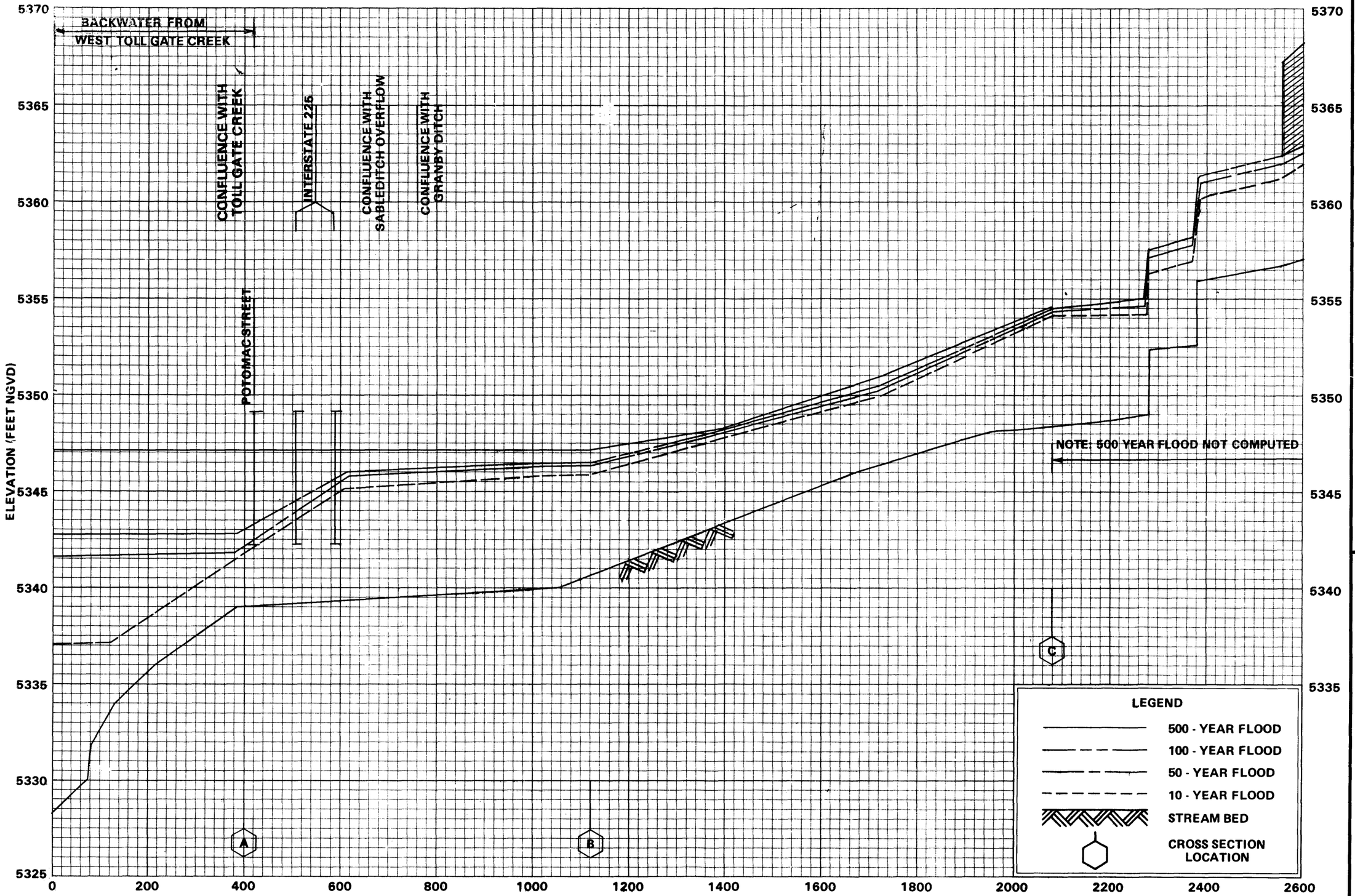
08P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

GRANBY DITCH



FLOOD PROFILES

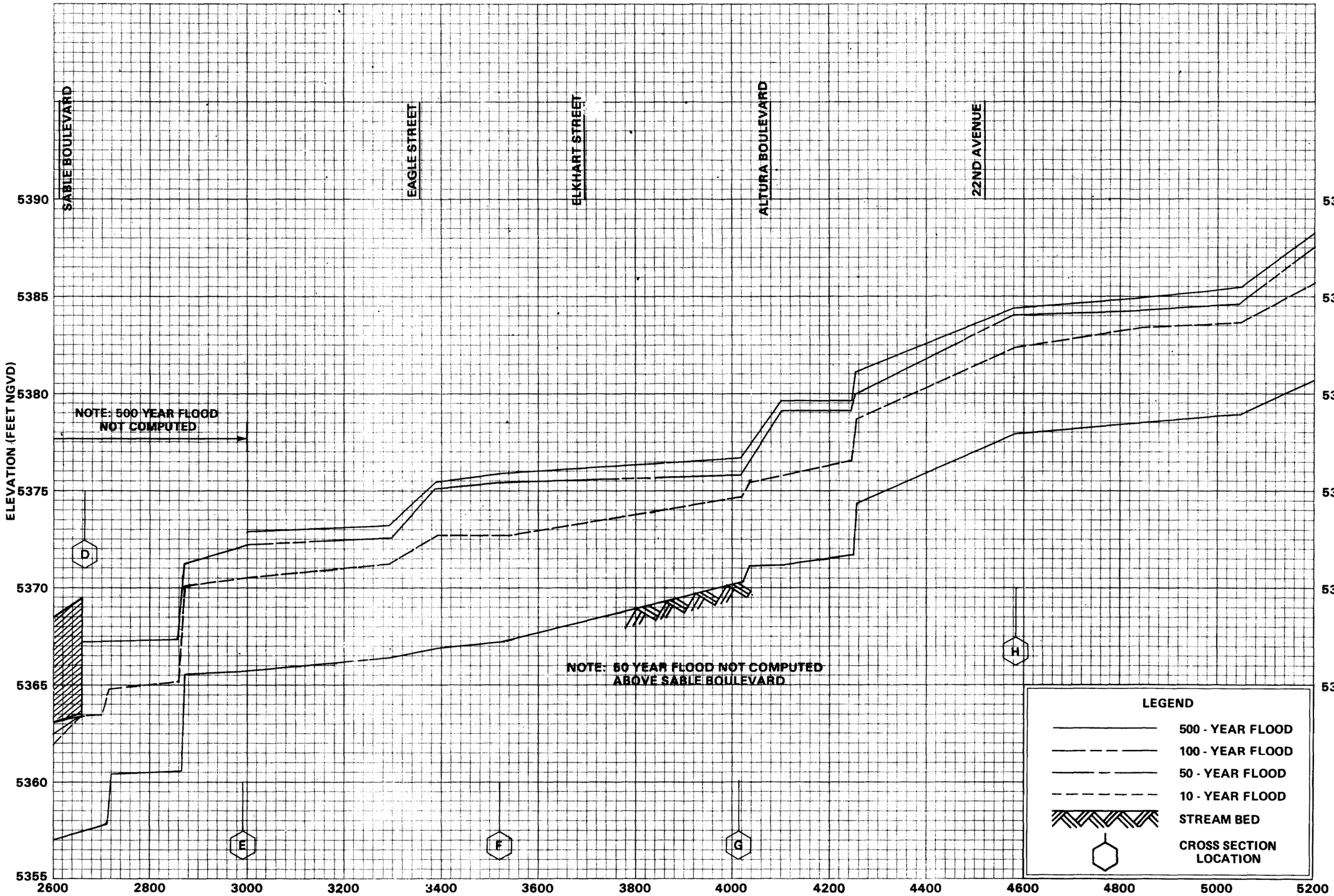
SABLE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA,CO

(ADAMS,DOUGLAS,AND ARAPAHOE COS.)

09P



FLOOD PROFILES

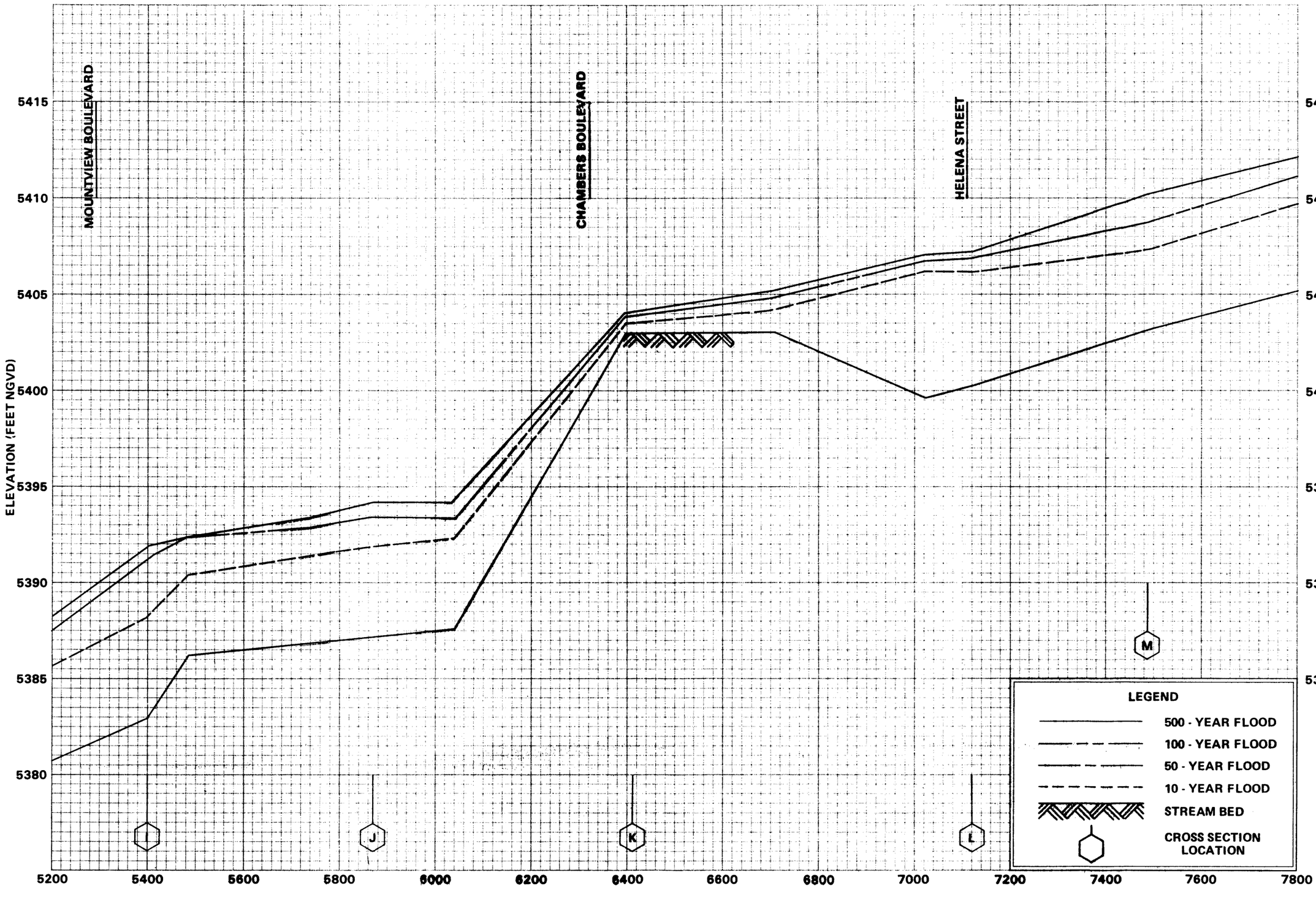
SABLE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA,CO

(ADAMS,DOUGLAS,AND ARAPAHOE COS.)

10P



FLOOD PROFILES

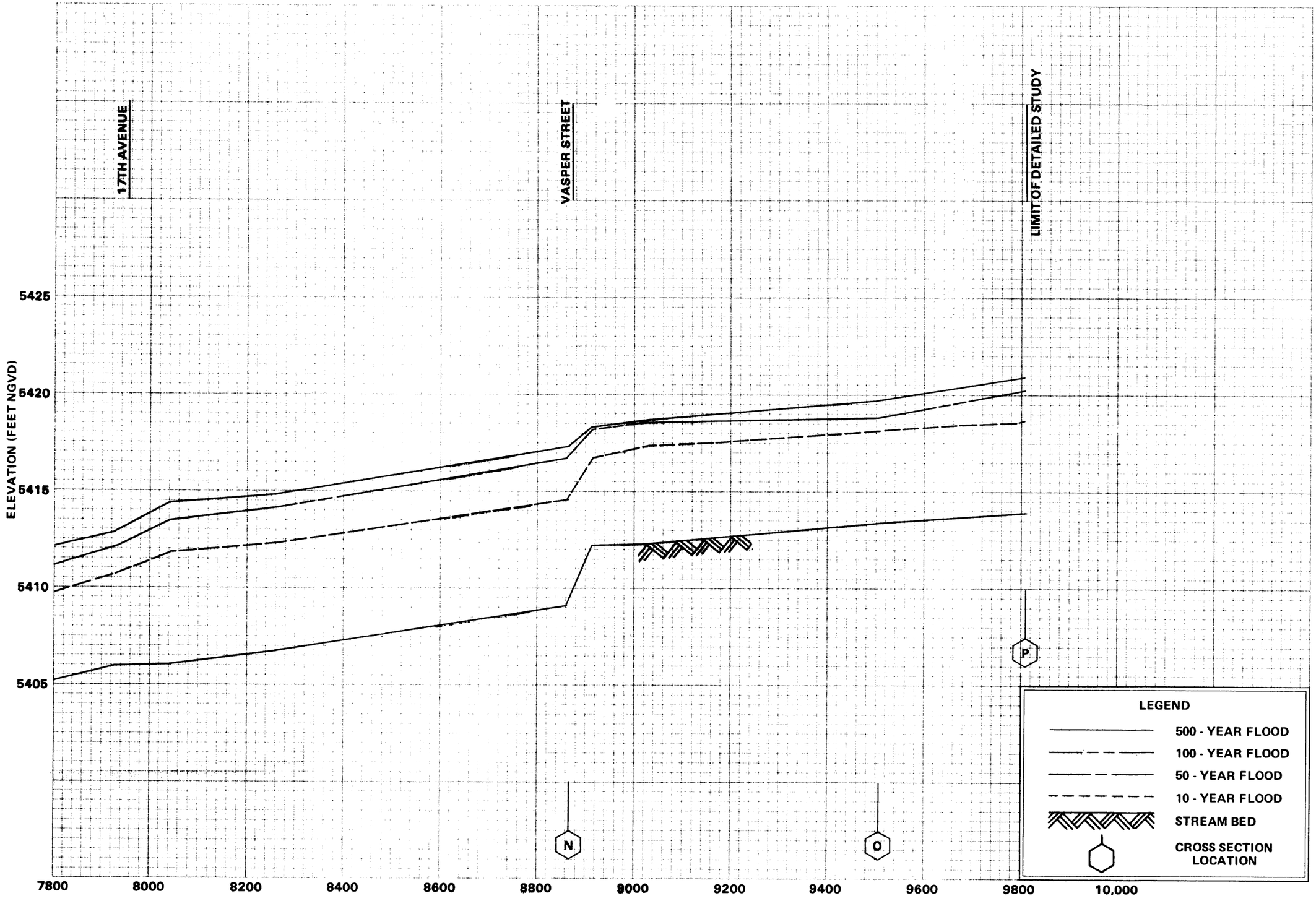
SABLE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

11P



FLOOD PROFILES

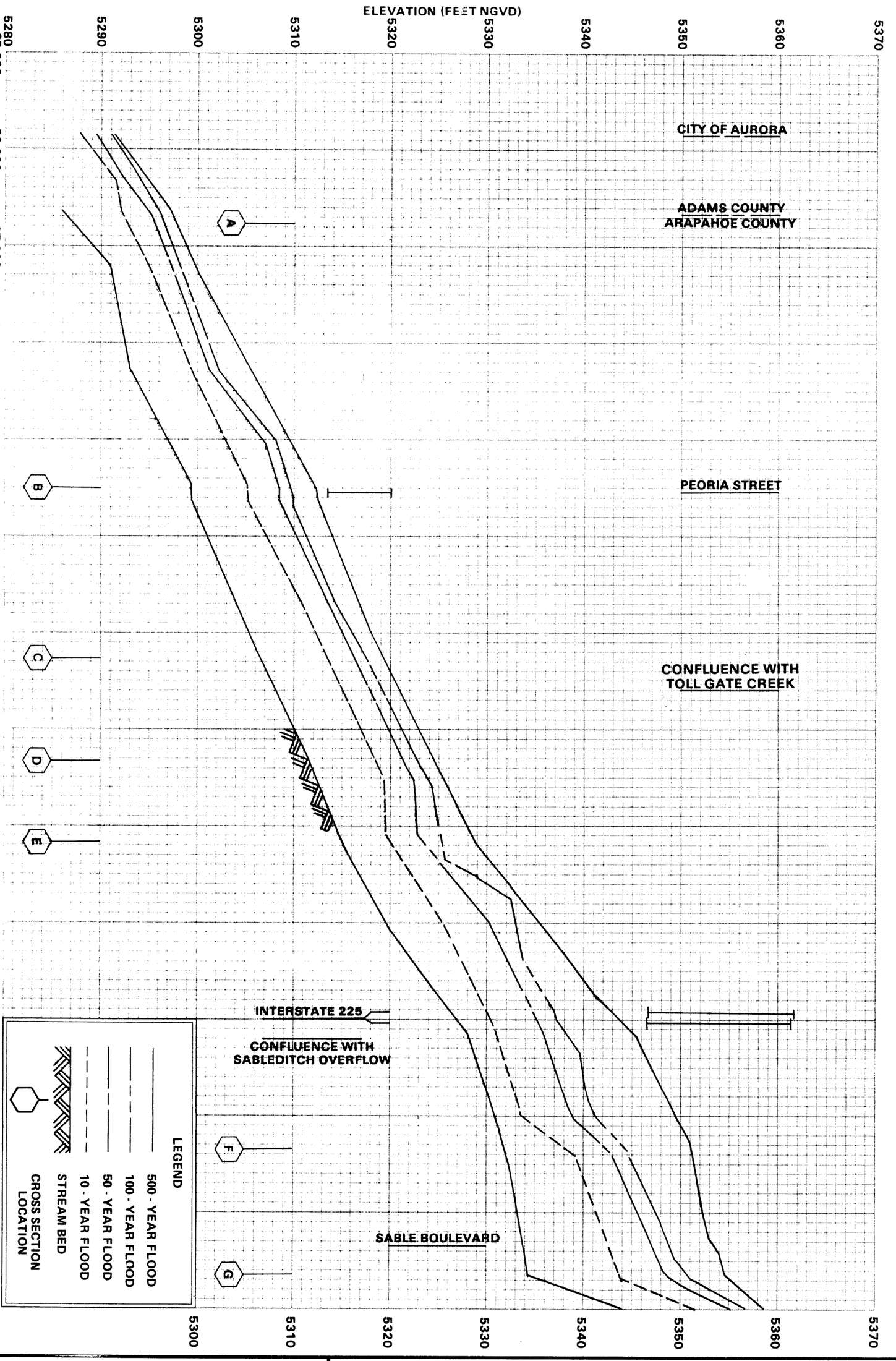
SABLE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

12P



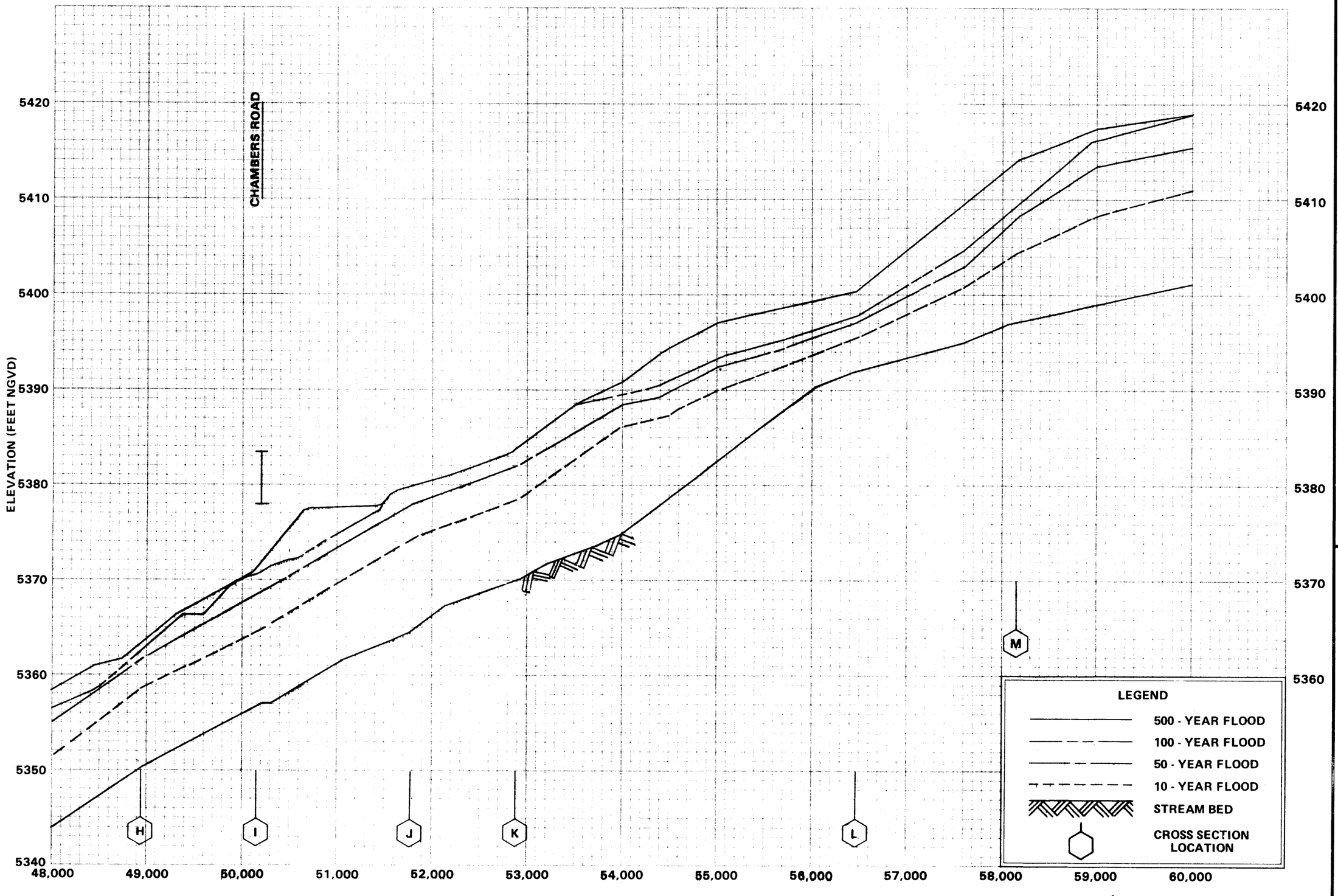
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

SAND CREEK

13P



FLOOD PROFILES

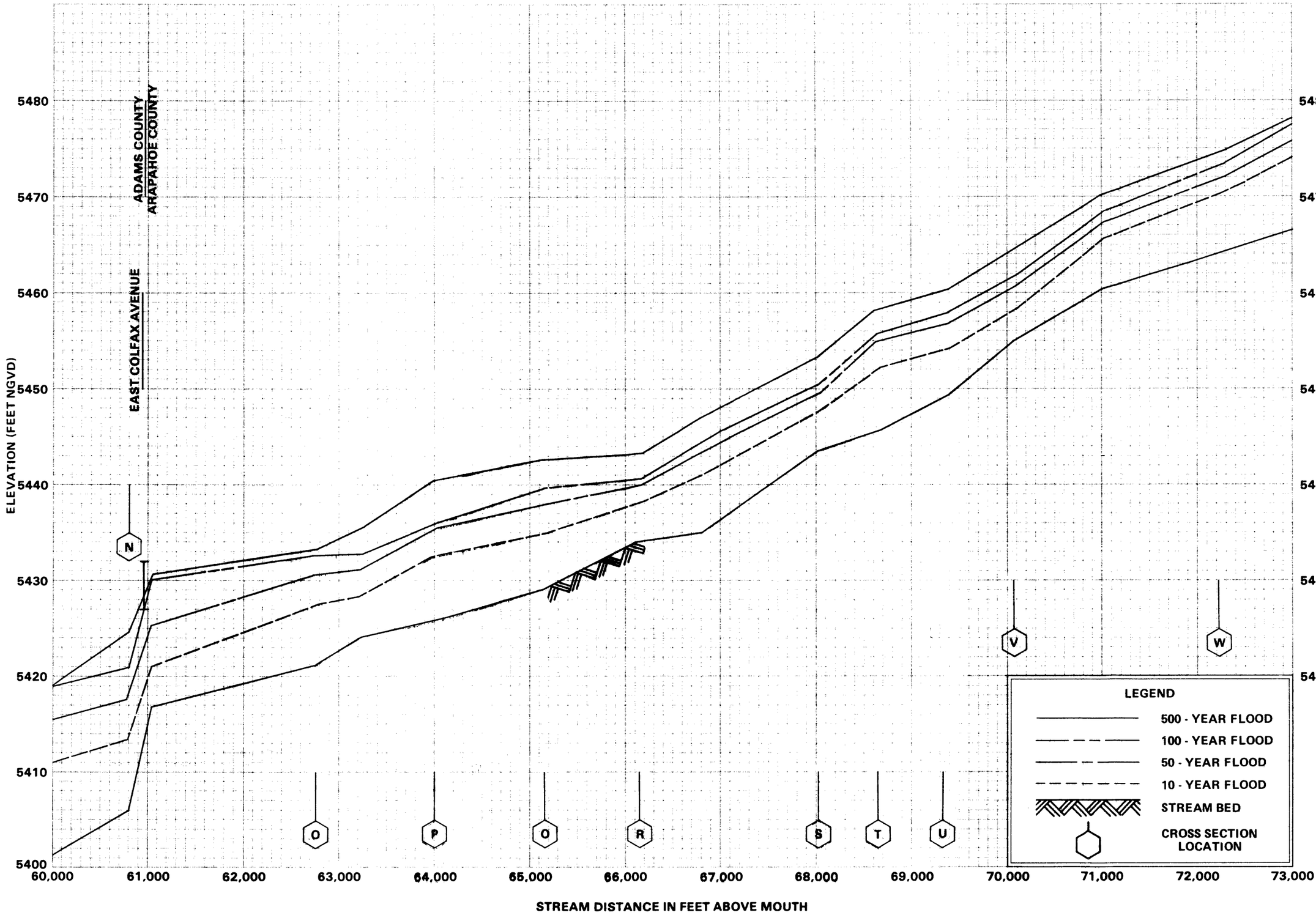
SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

14P

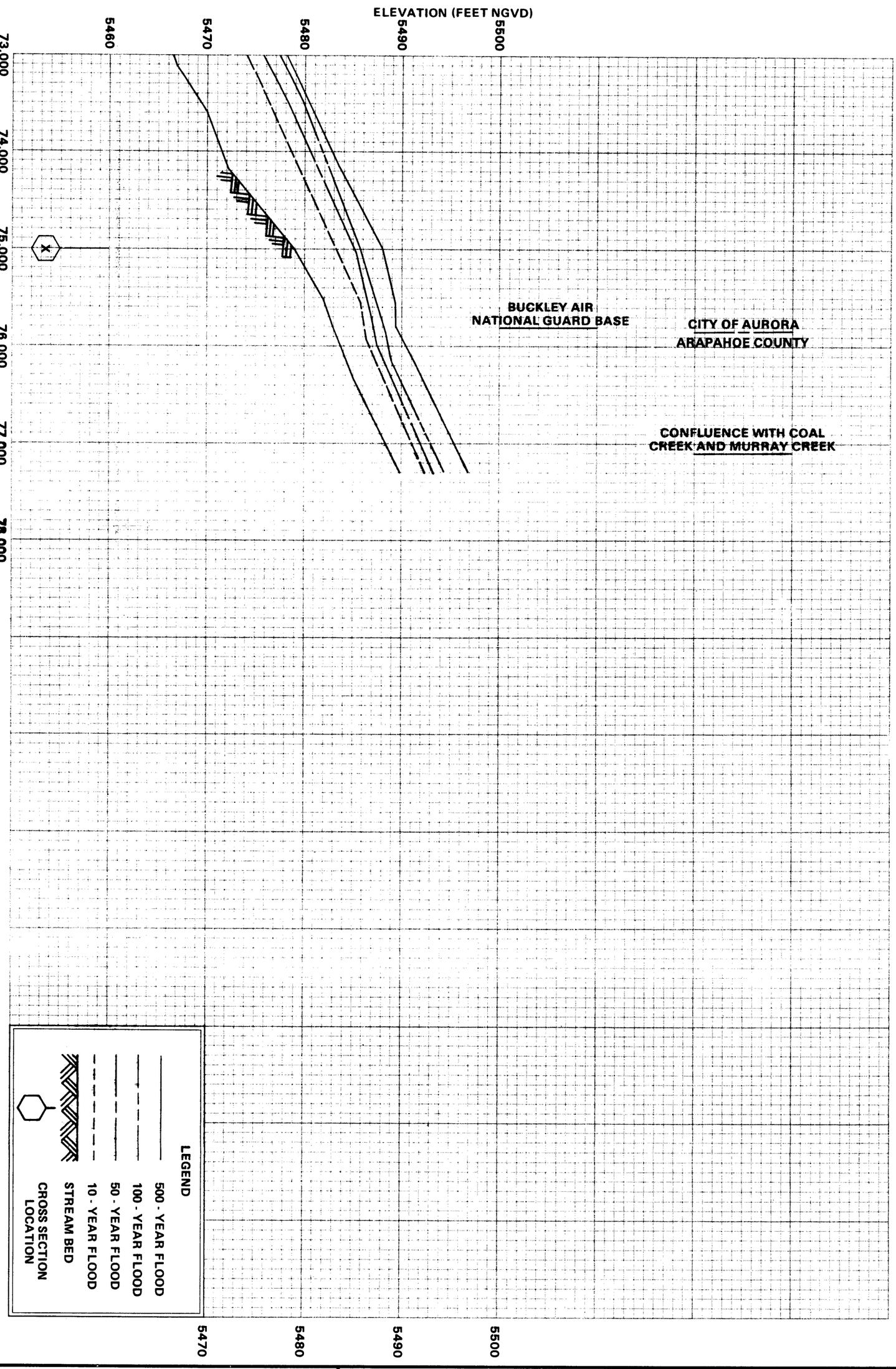


FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



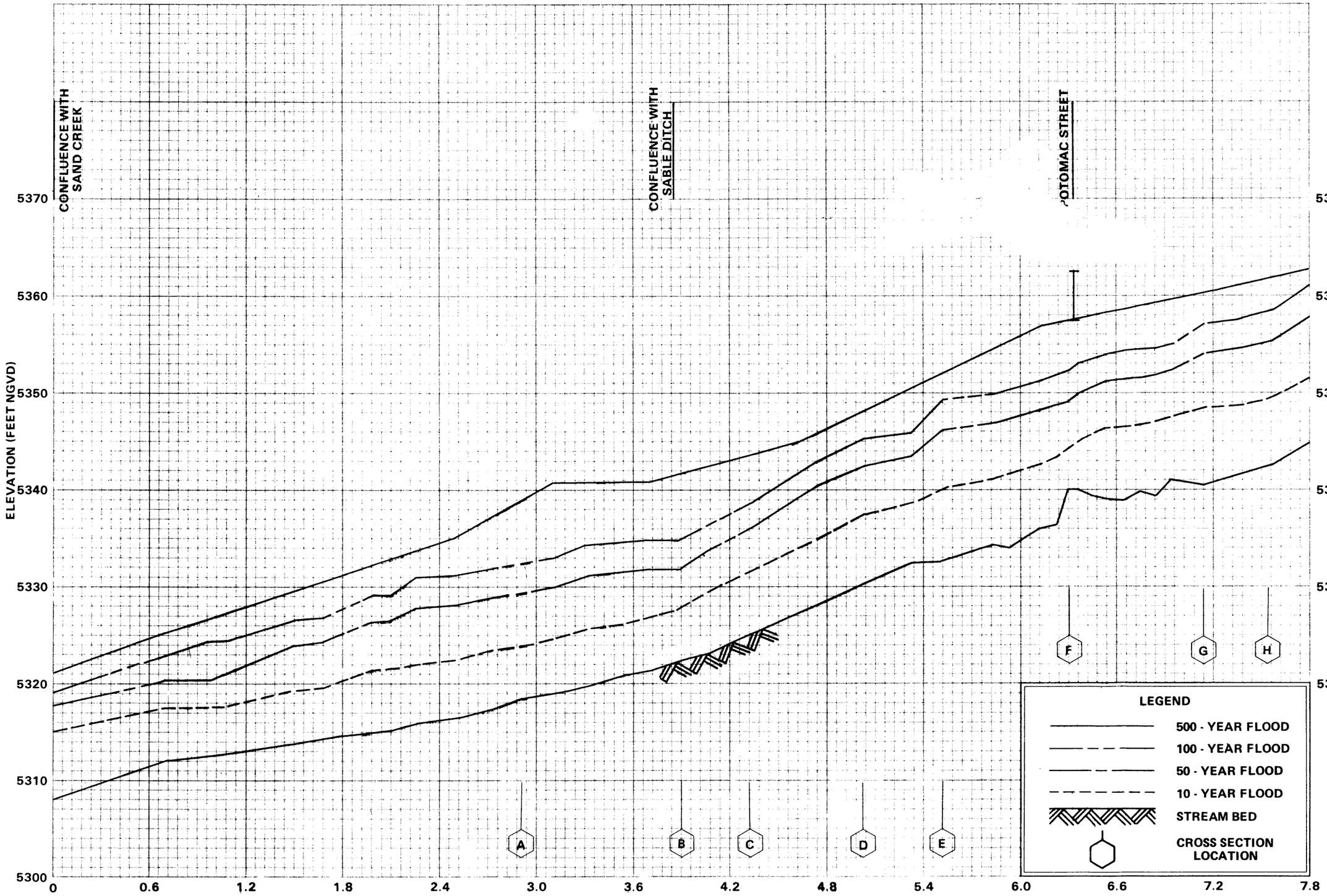
16P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

SAND CREEK

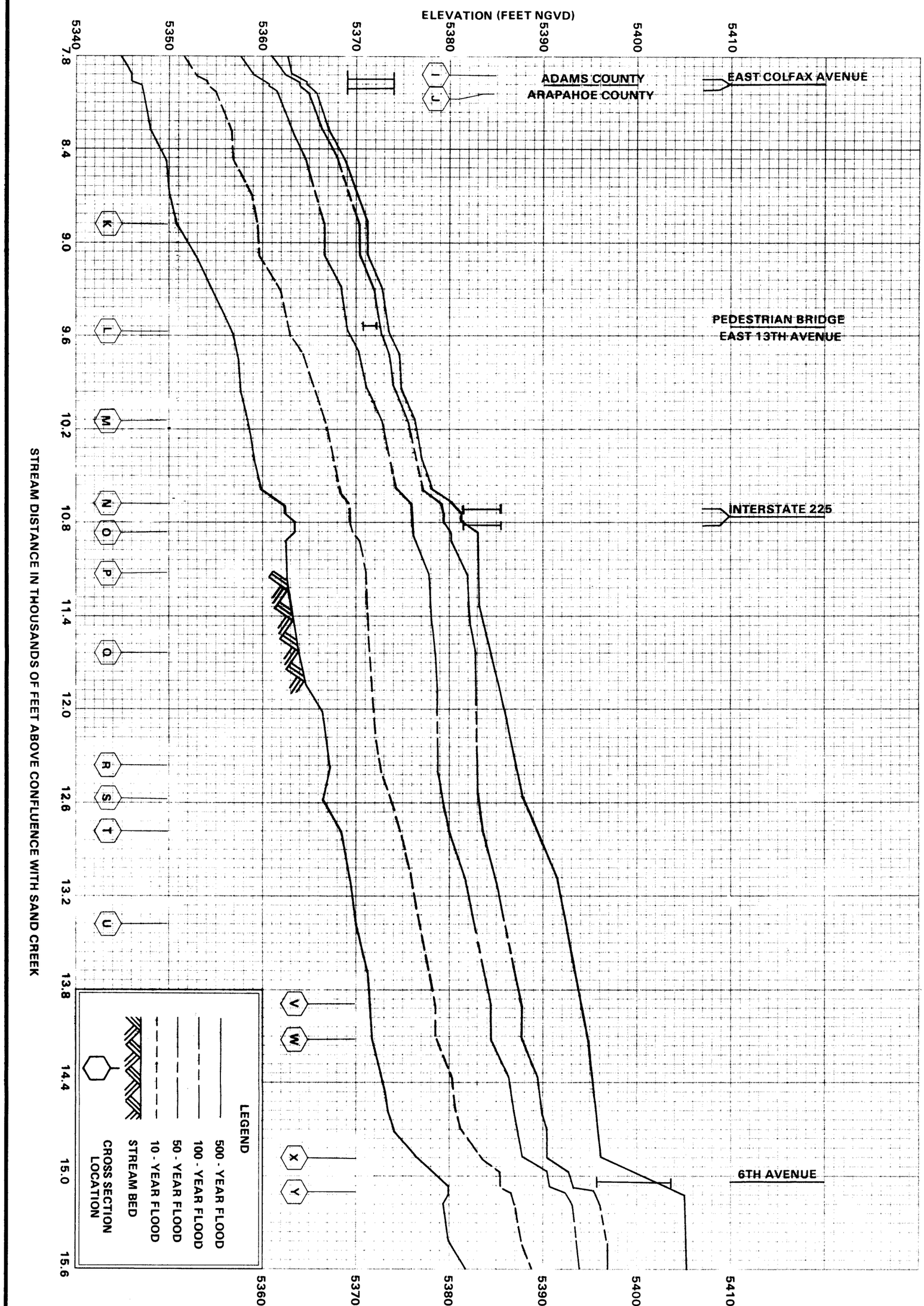


FLOOD PROFILES

TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



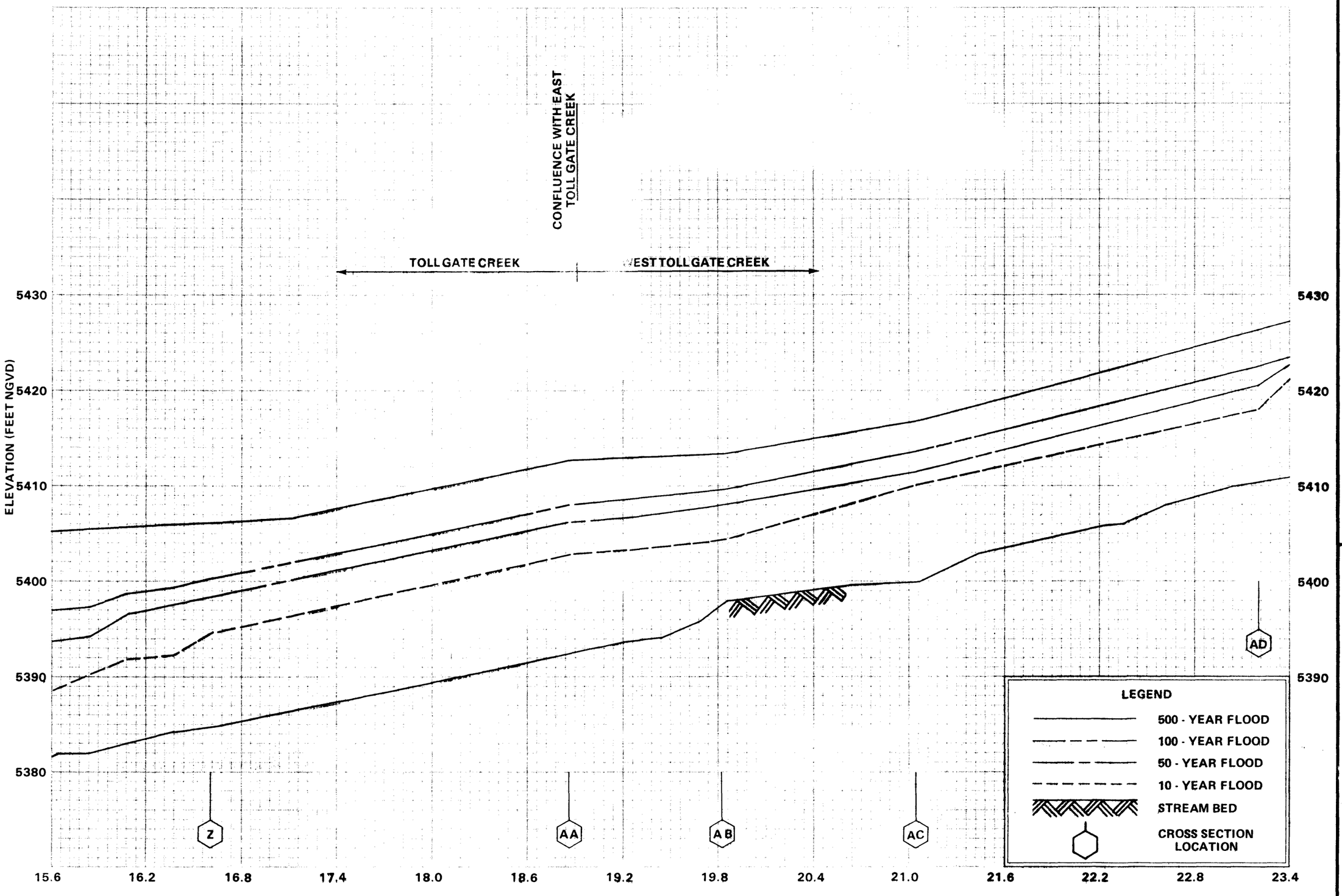
18P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

TOLL GATE CREEK



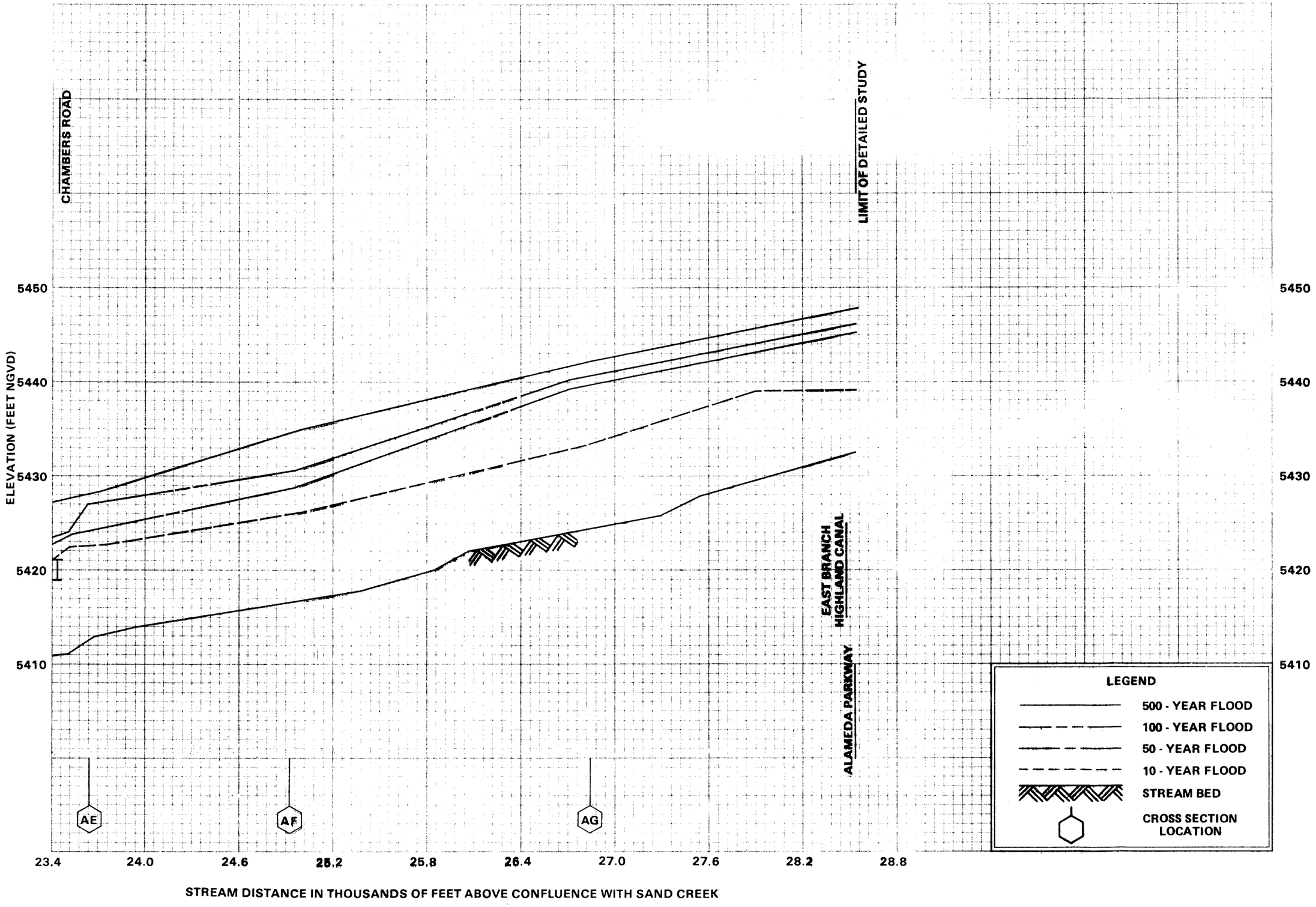
FLOOD PROFILES

WEST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



FLOOD PROFILES

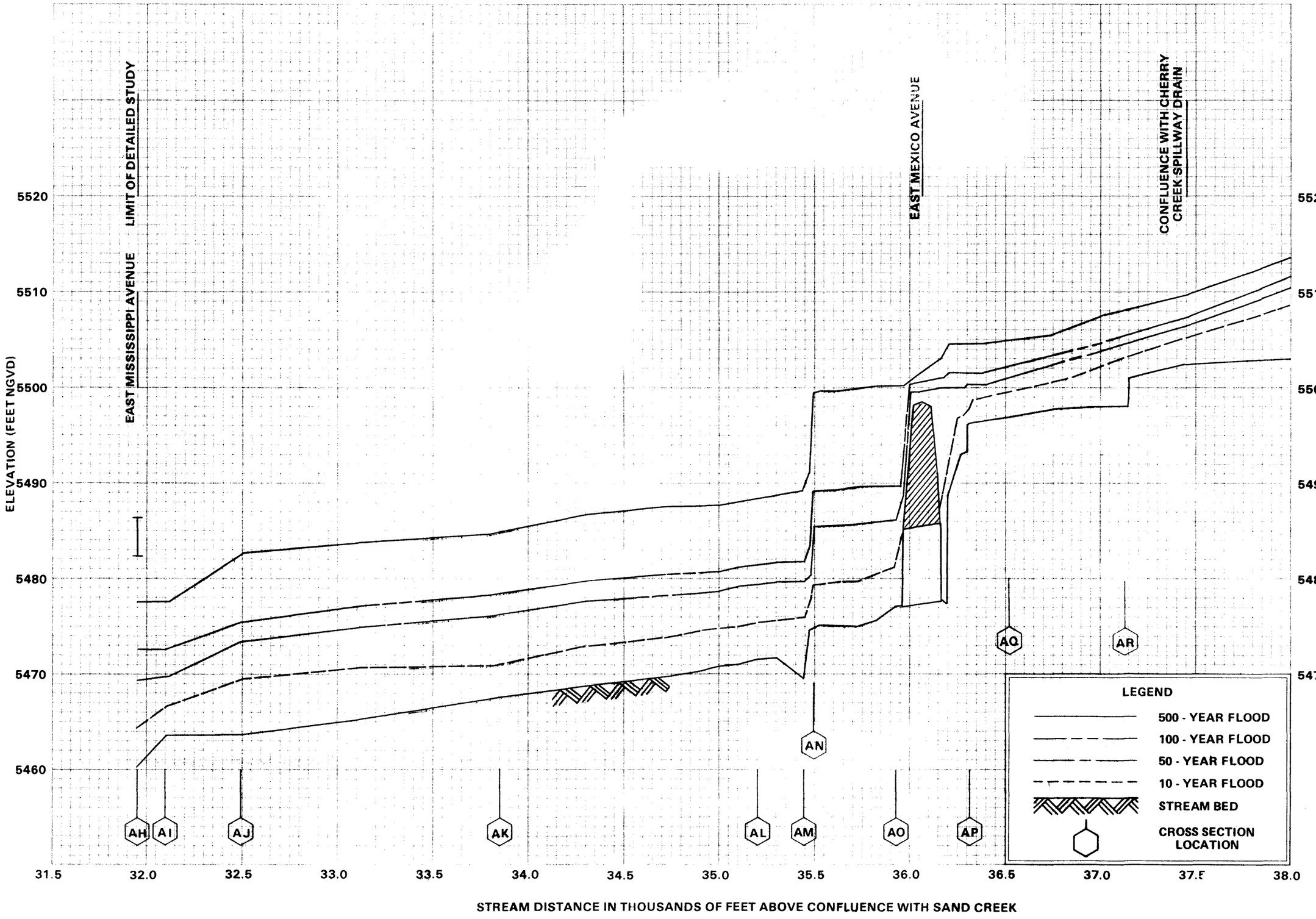
WEST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

20P



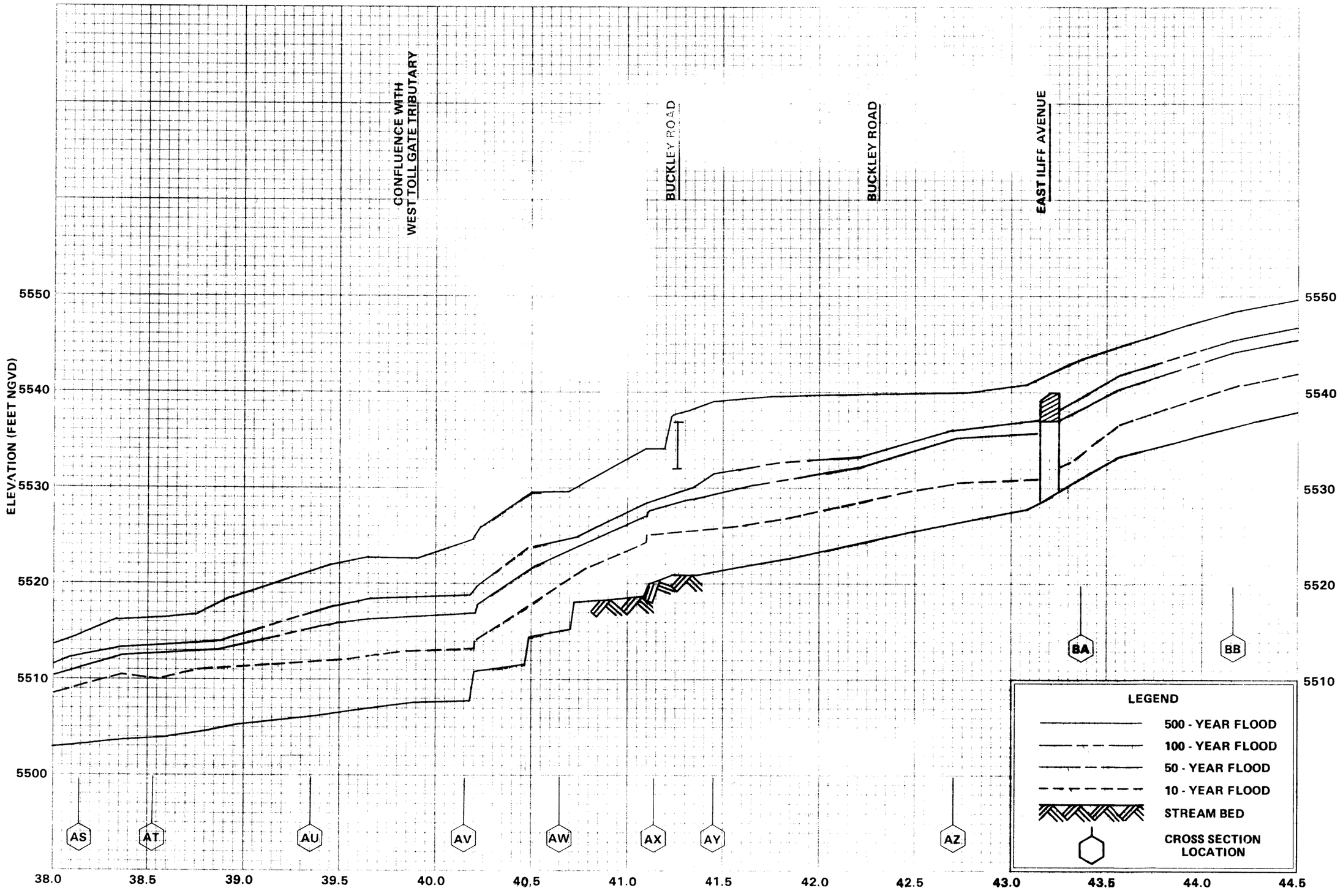
FLOOD PROFILES

WEST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



FLOOD PROFILES

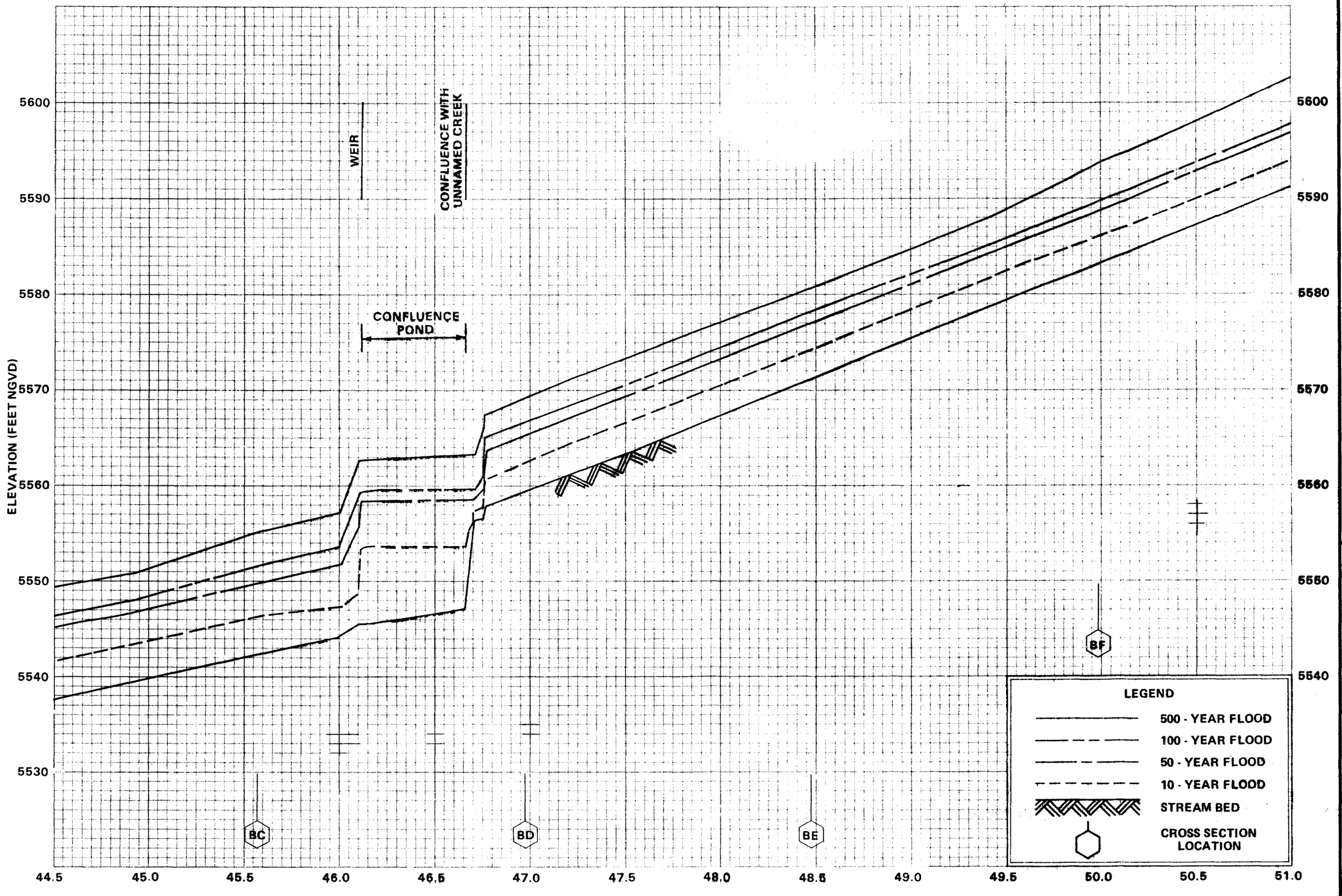
WEST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

22P



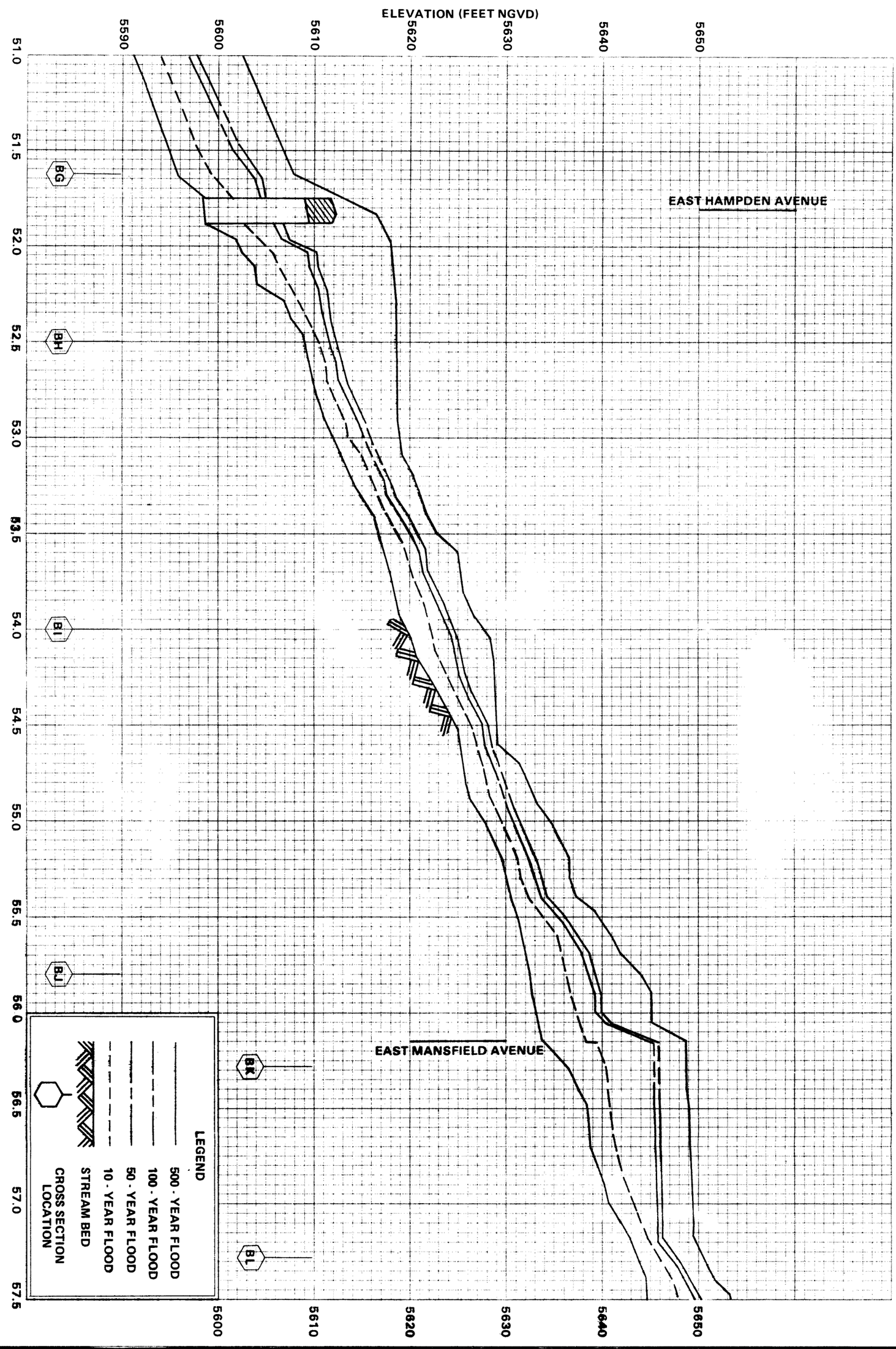
FLOOD PROFILES

WEST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



24P

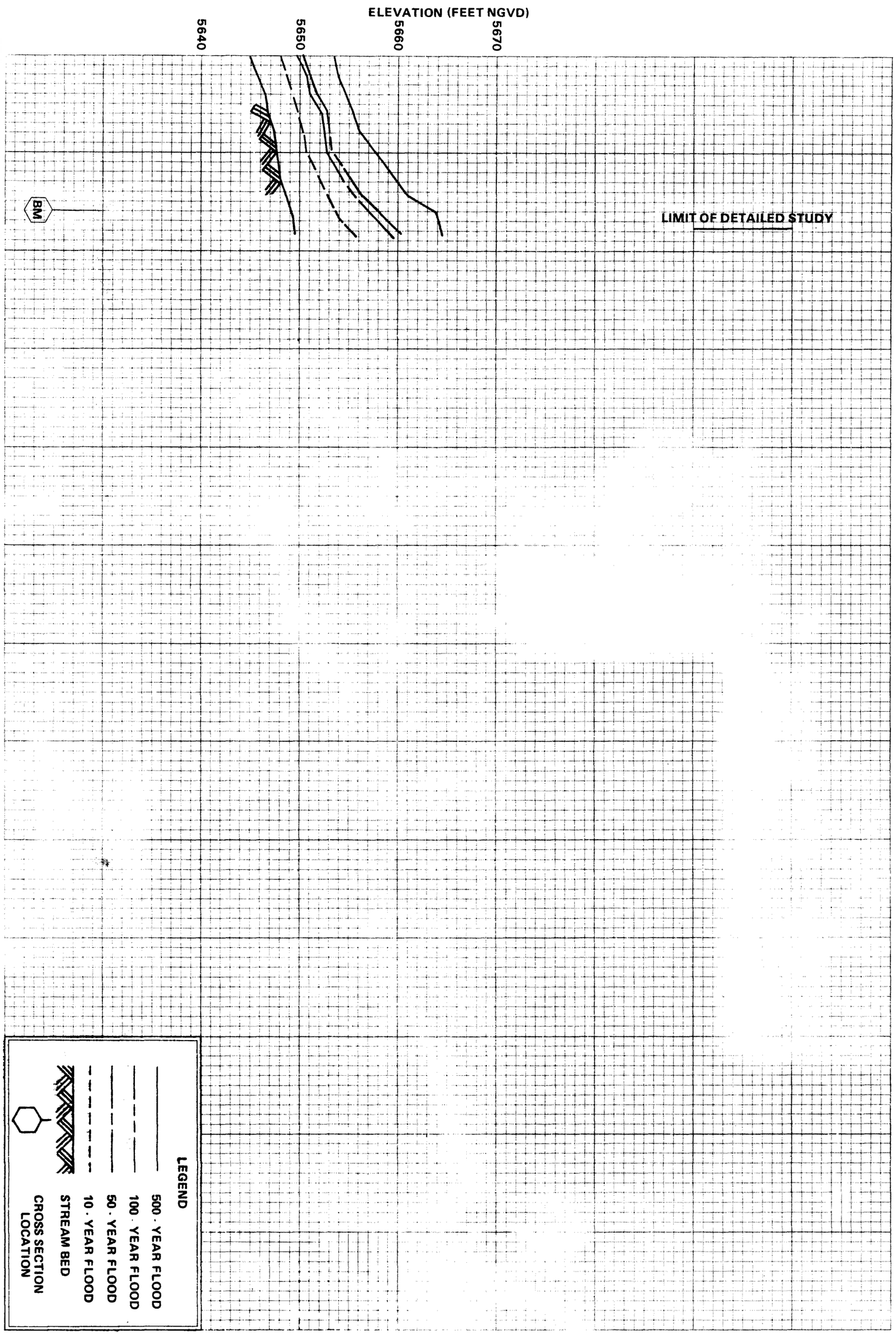
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

WEST TOLL GATE CREEK



STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH SAND CREEK

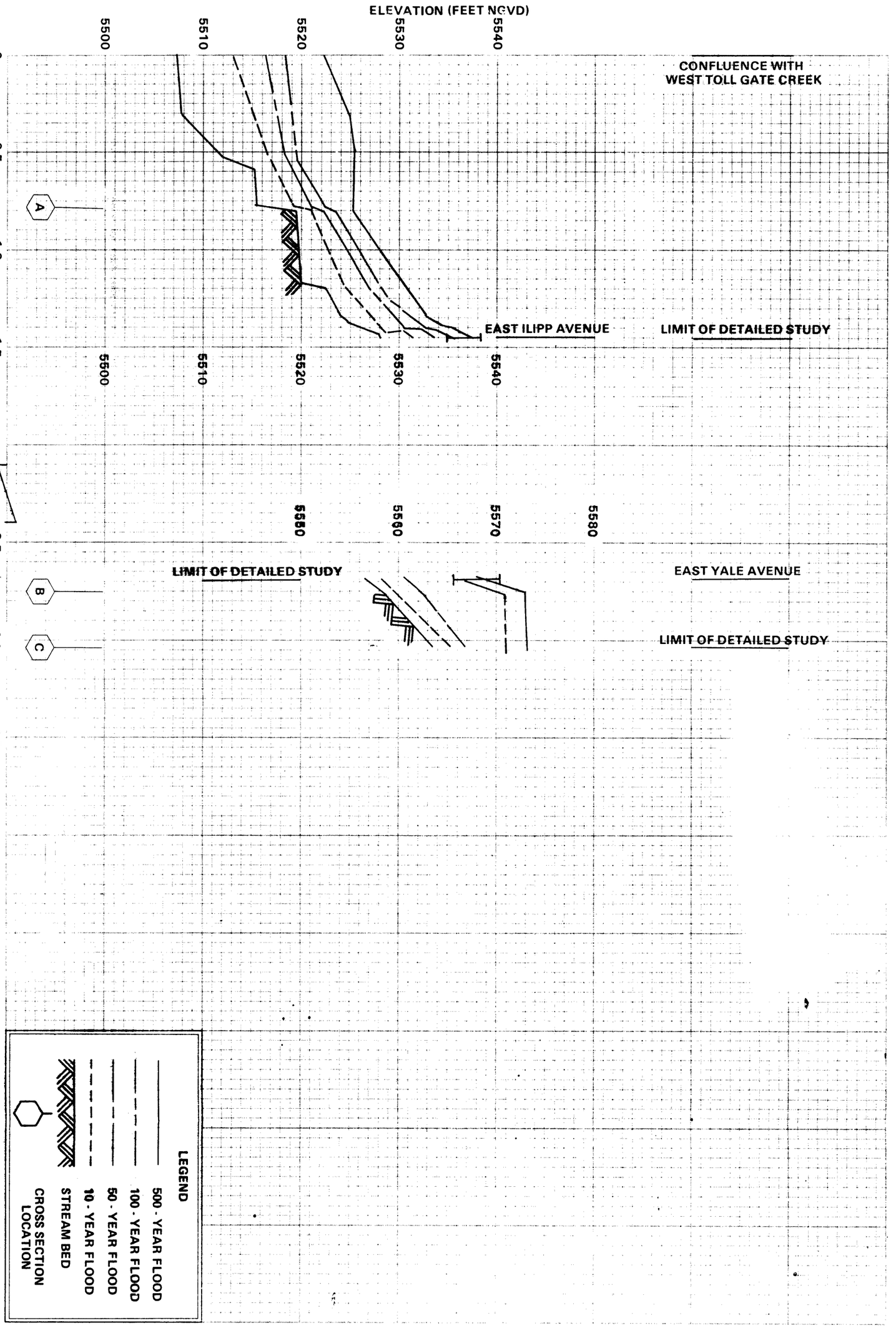
25P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

WEST TOLL GATE CREEK



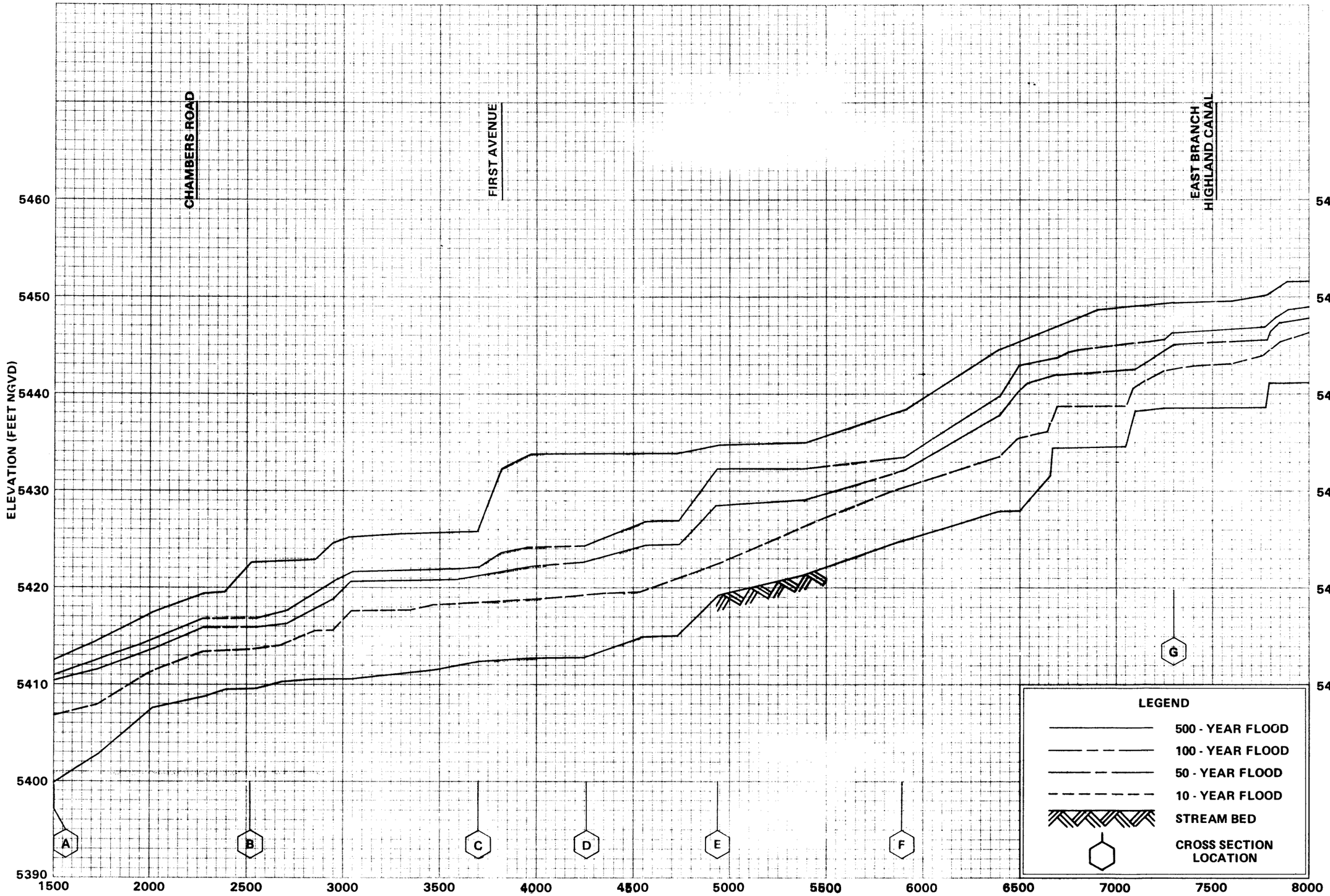
26P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

WEST TOLL GATE CREEK TRIBUTARY



FLOOD PROFILES

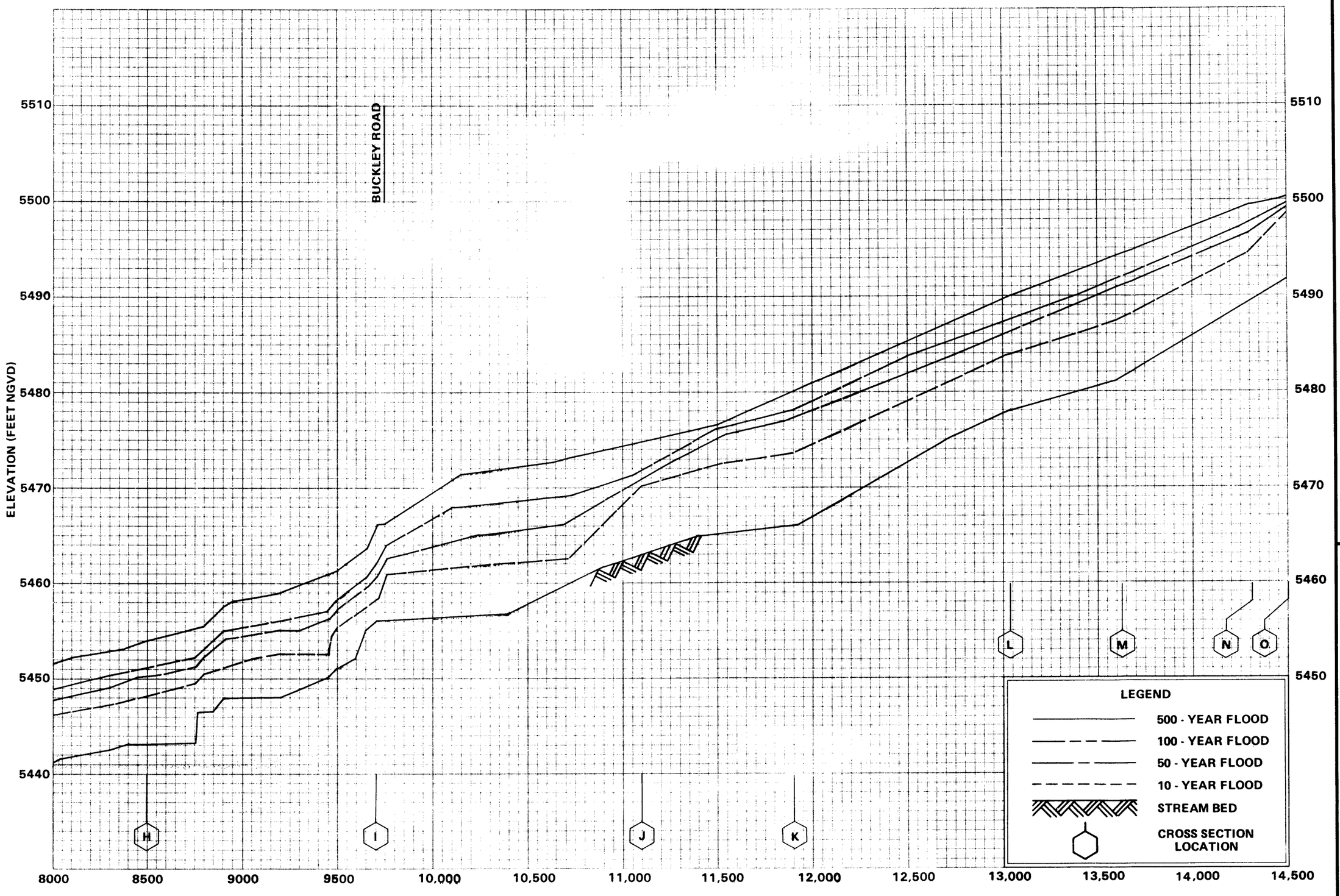
EAST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

27P



FLOOD PROFILES

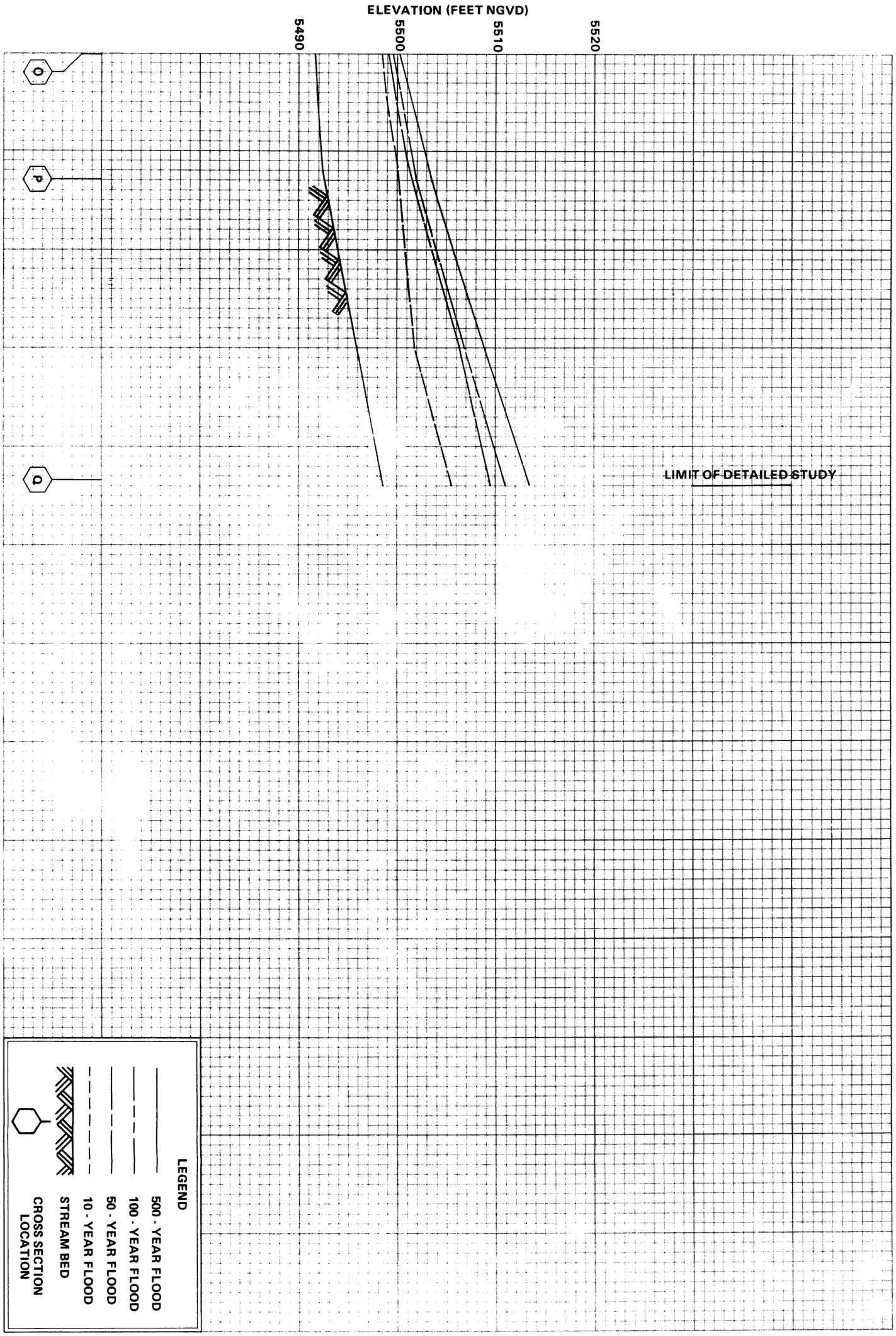
EAST TOLL GATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

28P



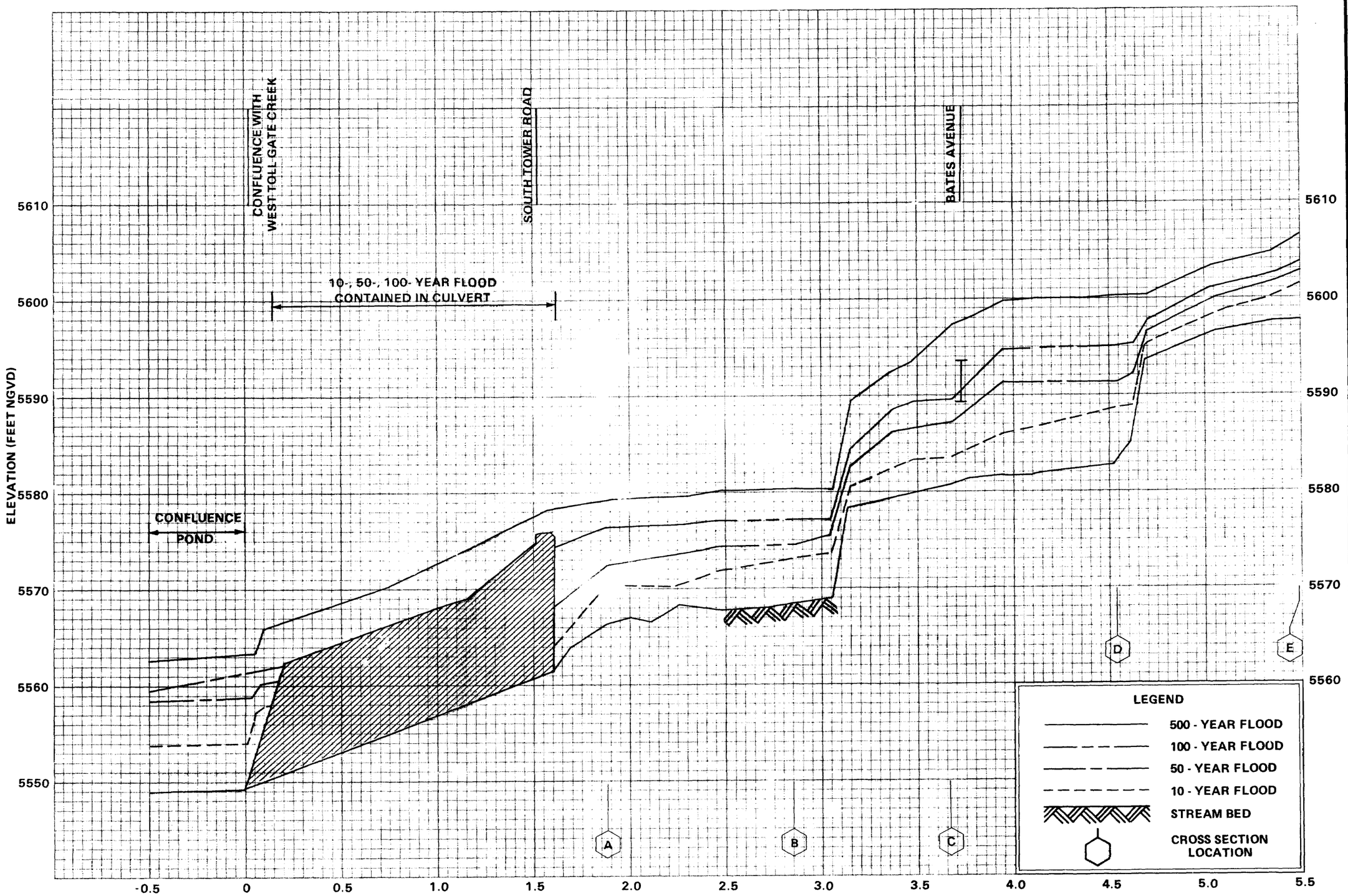
29P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

EAST TOLL GATE CREEK



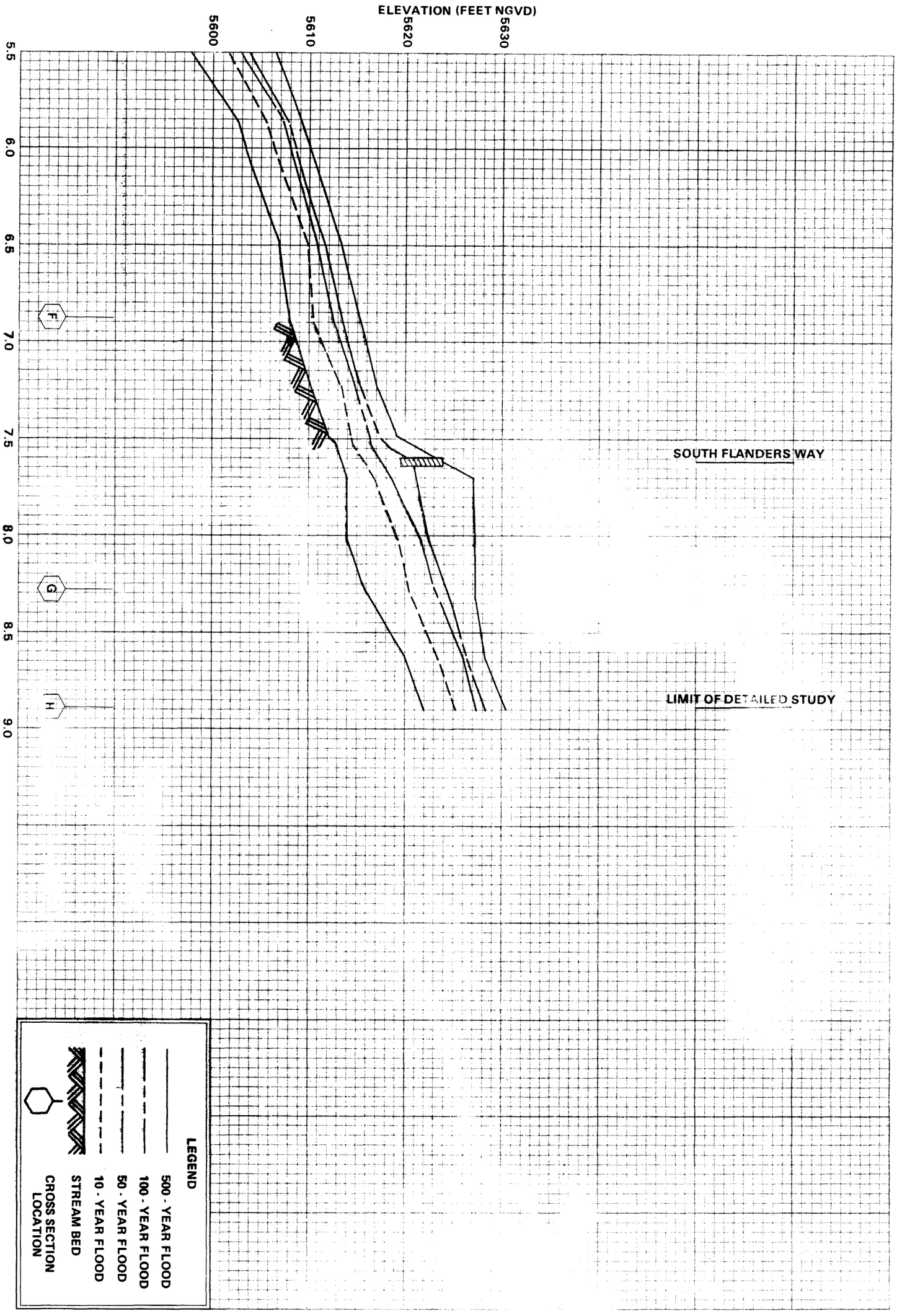
FLOOD PROFILES

UNNAMED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



31P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

UNNAMED CREEK

CITY AND COUNTY OF DENVER
ADAMS COUNTY
CITY OF AURORA

ELEVATION (FEET NGVD)

5310
5305
5300
5295
5290
5285
5280

6600 6800 7000 7200 7400 7600 7800 8000 8200 8400 8600 8800 9000 9200

STREAM DISTANCE IN FEET ABOVE MOUTH

A
B

LEGEND

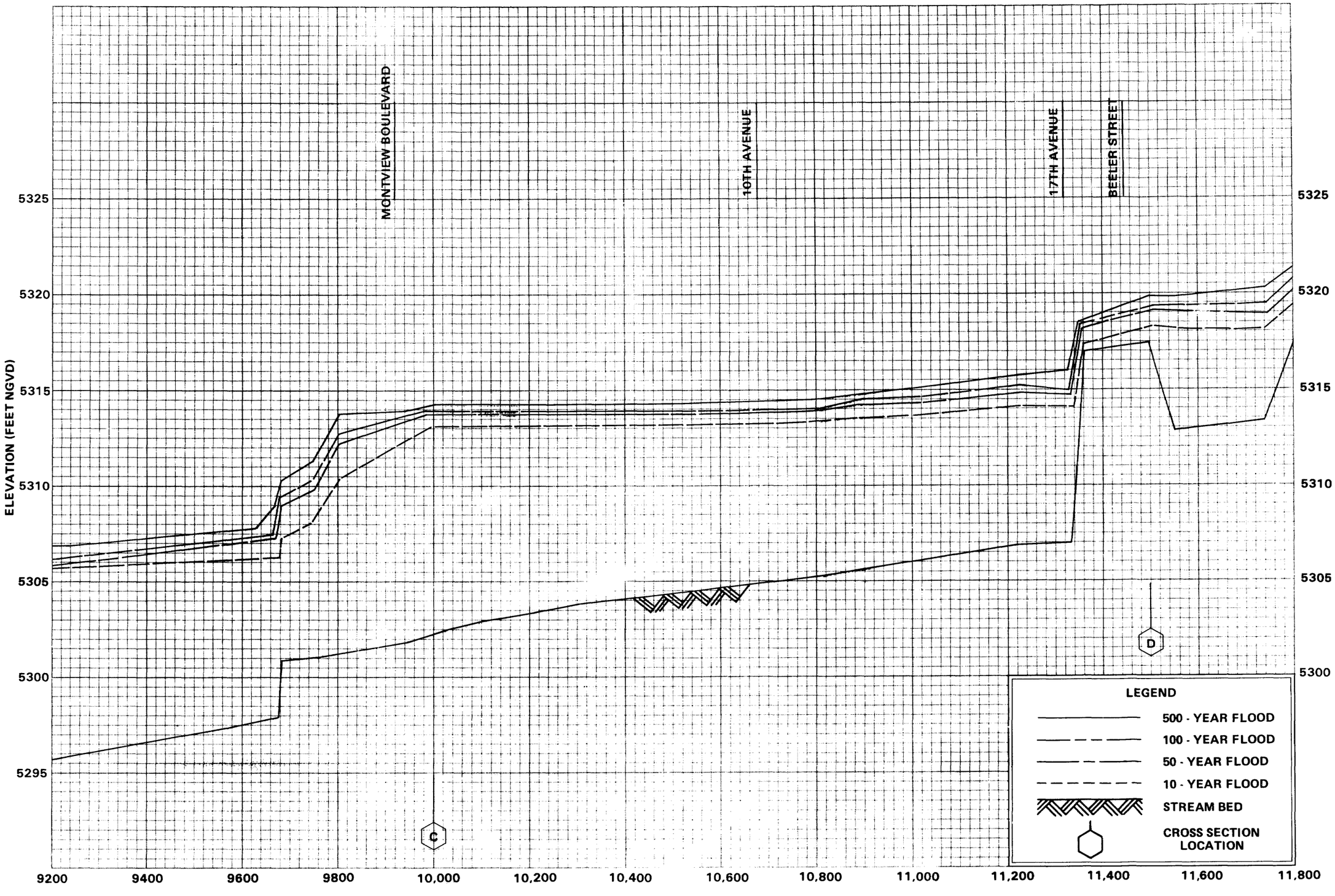
- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



FLOOD PROFILES

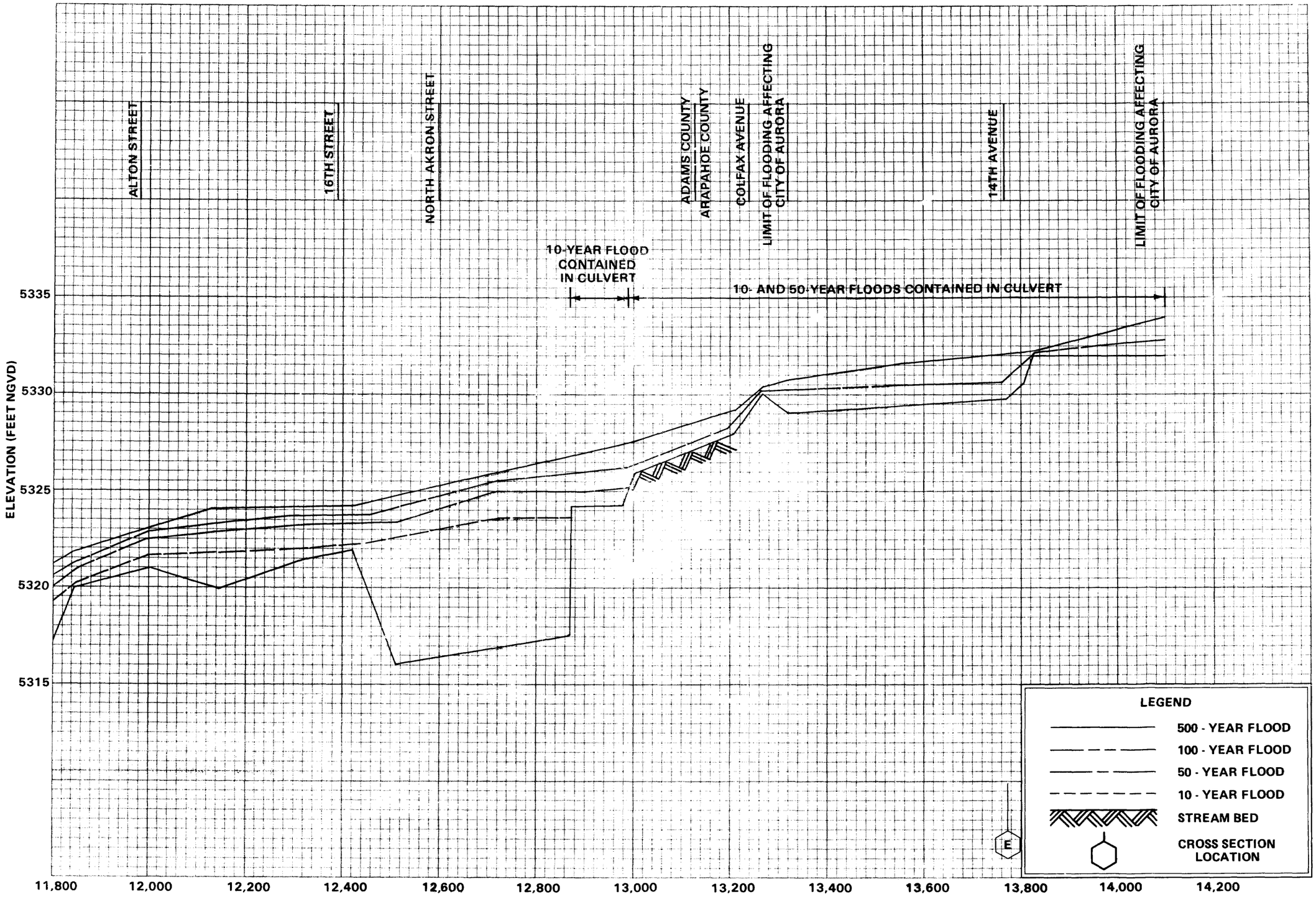
WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

33P



FLOOD PROFILES

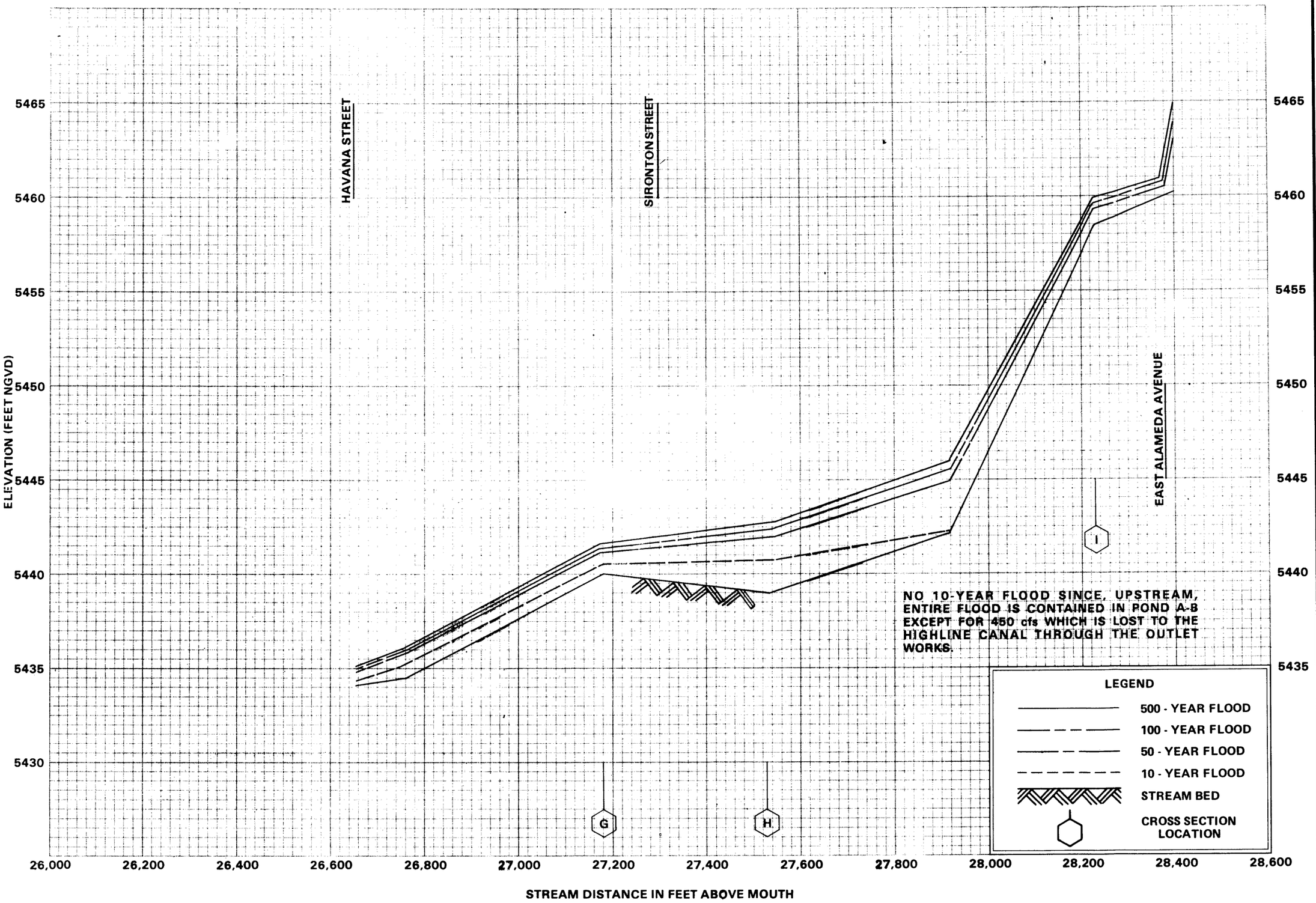
WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

34P



FLOOD PROFILES

WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

35P

CITY & COUNTY OF DENVER
CITY OF AURORA

WESTERLY CREEK OVERFLOW

HAVANA STREET

ELEVATION IN FEET (NGVD)

5435
5430
5425
5420
5415

5435
5430
5415
5410

100- YEAR FLOOD
CONTAINED IN CHANNEL

UNNAMED ROAD

F

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

28400 28600 28800 29000 29200 29400 29600 29800 3000

STREAM DISTANCE IN FEET ABOVE MOUTH

FLOOD PROFILES

WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF AURORA, CO
(ADAMS, ARAPAHOE, AND DOUGLAS COS.)

35P(a)

POND A-B SPILLWAY

ELEVATION (FEET NGVD)

5475
5470
5465
5460
5455

NO 10-YEAR FLOOD SINCE, UPSTREAM, ENTIRE FLOOD IS CONTAINED IN POND A-B EXCEPT FOR 450 cfs WHICH IS LOST TO THE HIGHLINE CANAL THROUGH THE OUTLET WORKS.

J

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

28,400 28,600 28,800 29,000 29,200 29,400 29,600 29,800 30,000 30,200 30,400 30,600

STREAM DISTANCE IN FEET ABOVE MOUTH

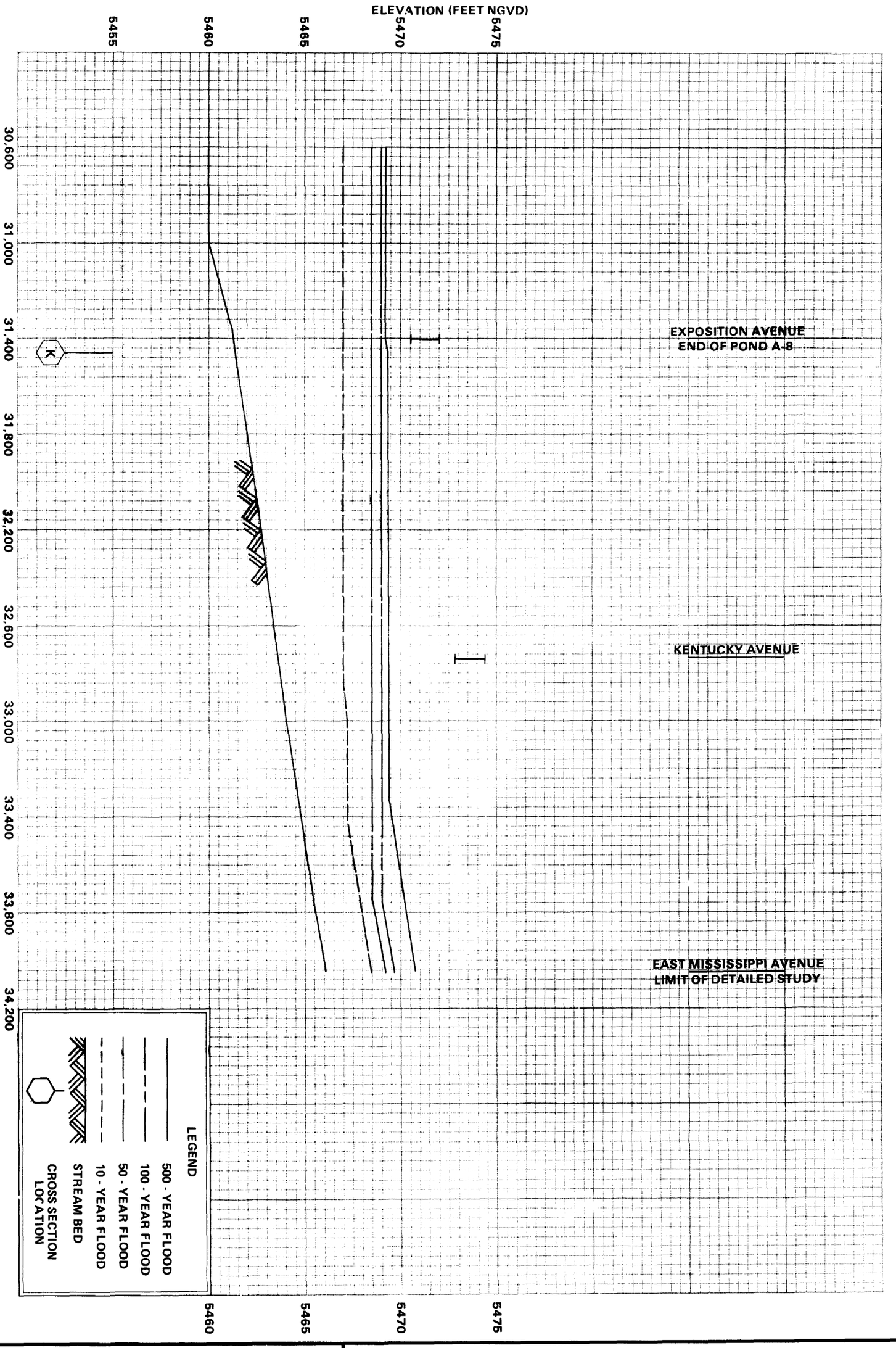
FLOOD PROFILES

WESTERLY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



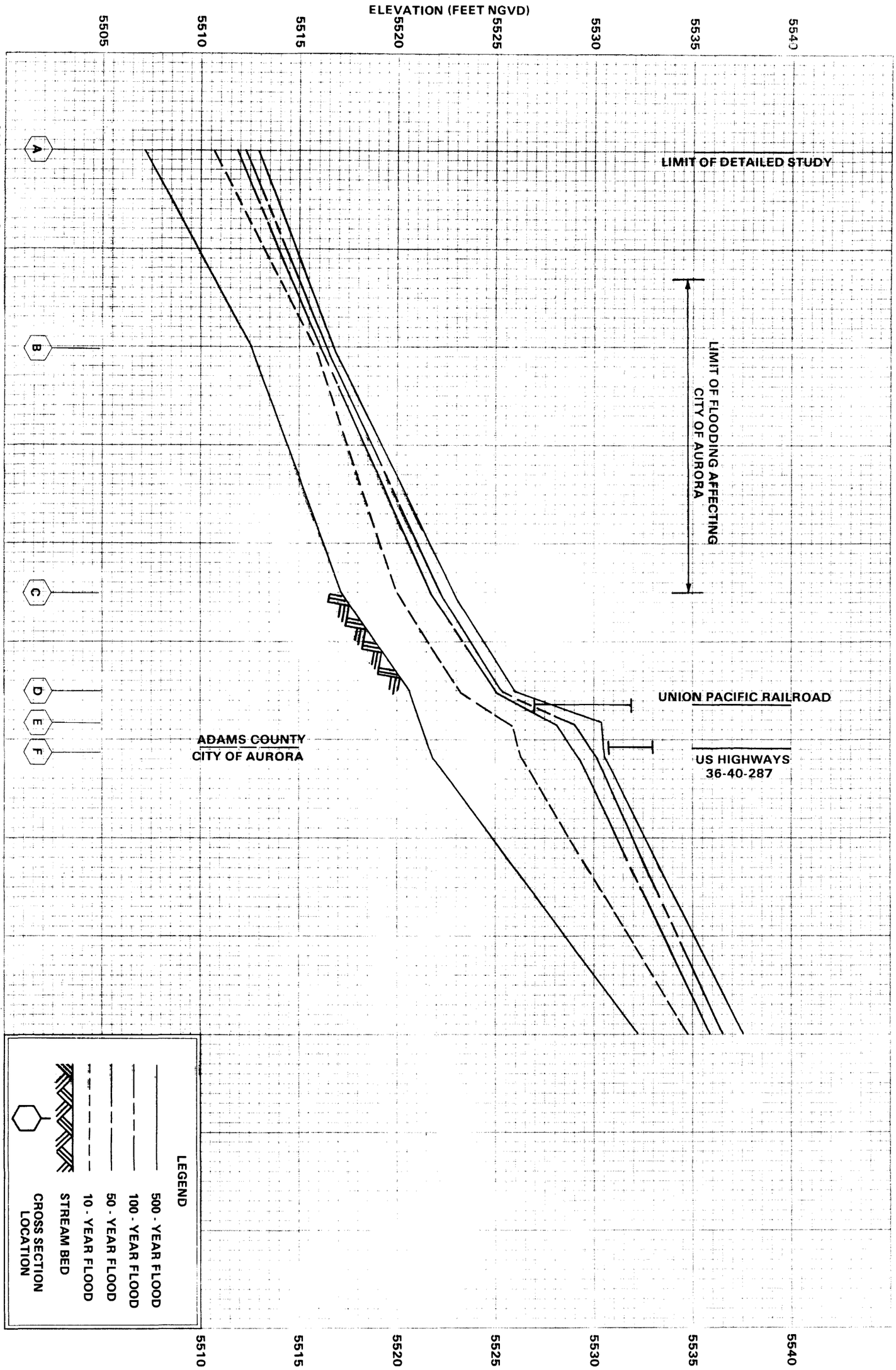
37P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

WESTERLY CREEK



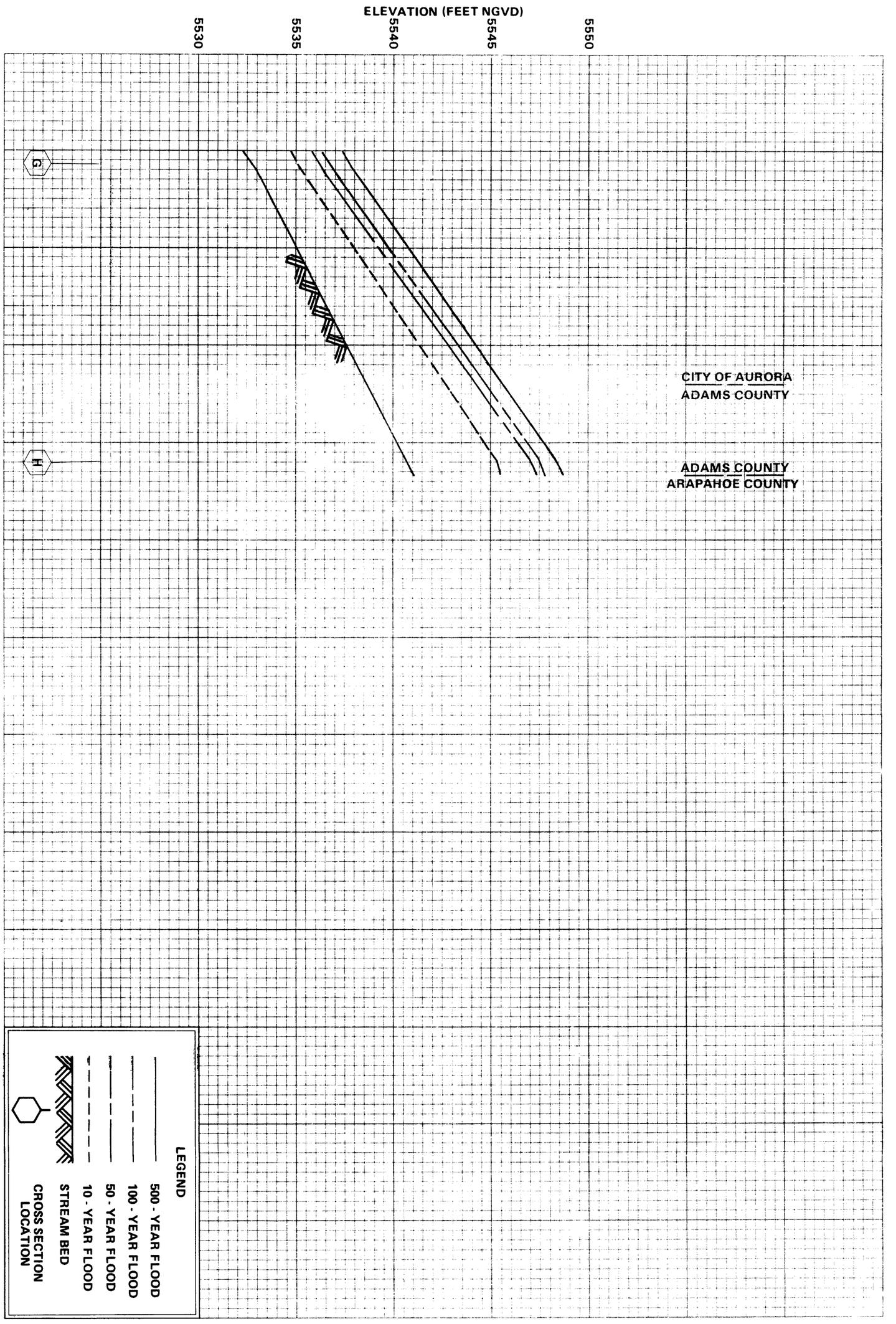
38P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

BOX ELDER CREEK



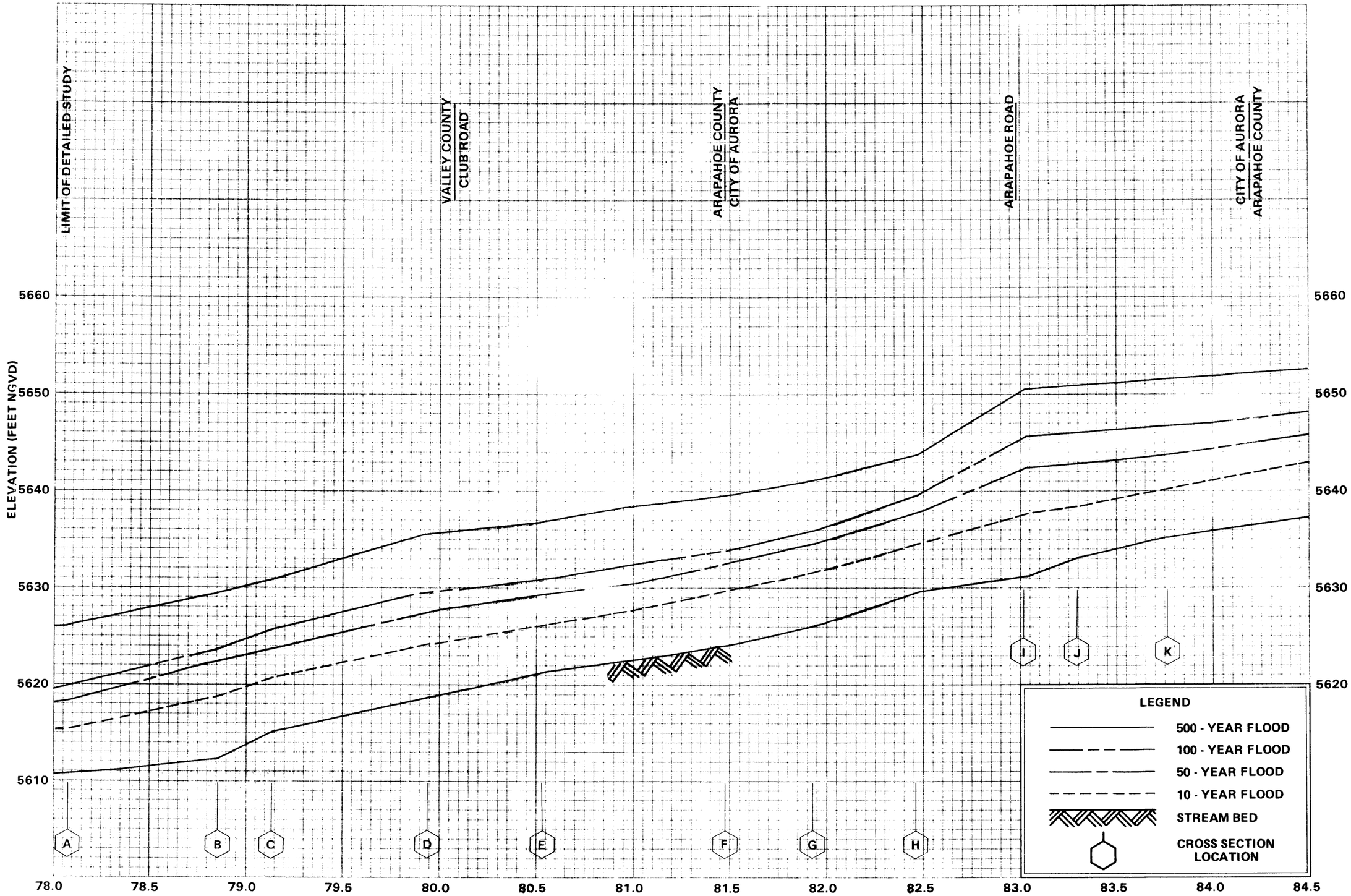
39P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

BOX ELDER CREEK

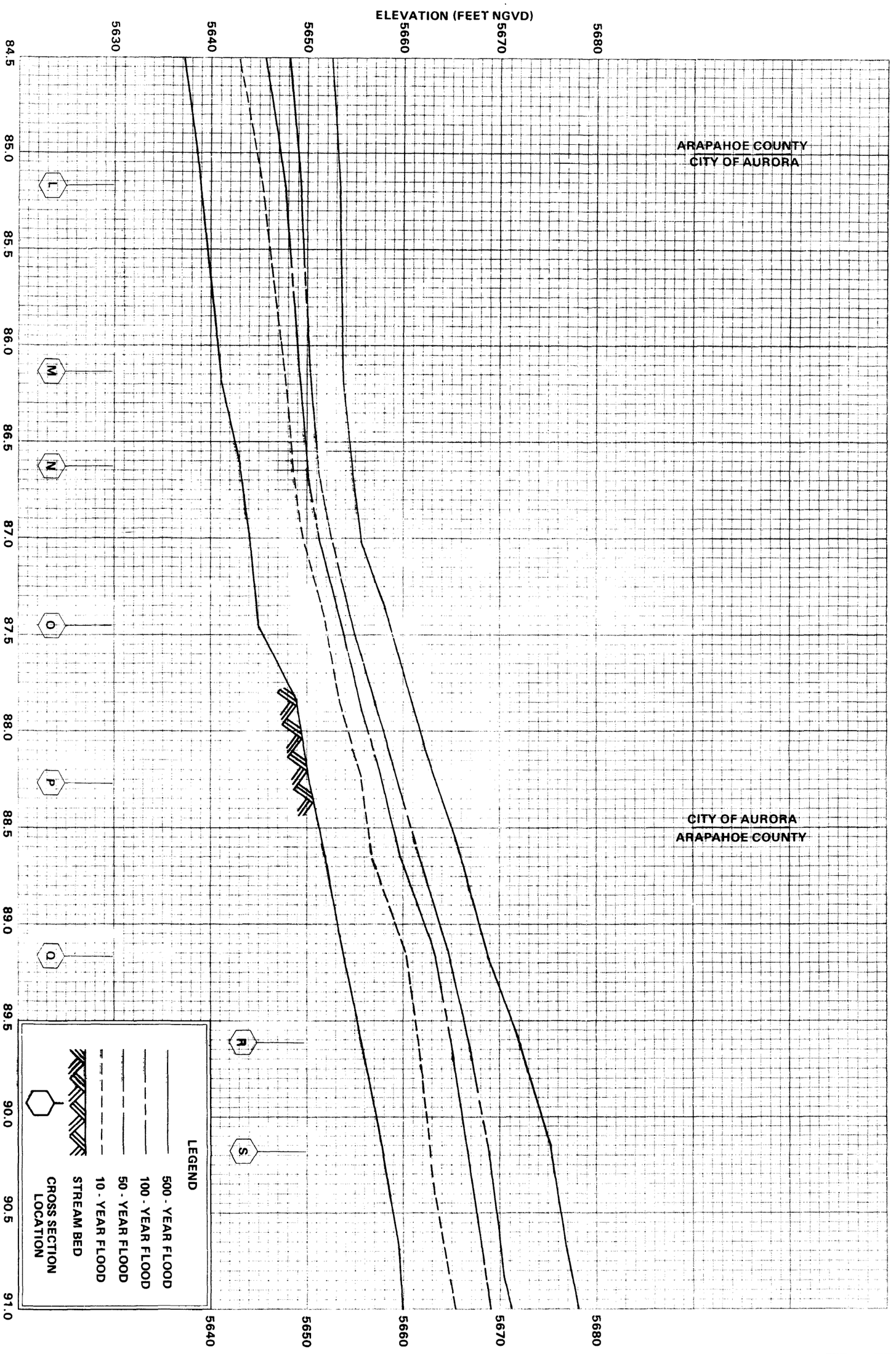


FLOOD PROFILES

CHERRY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



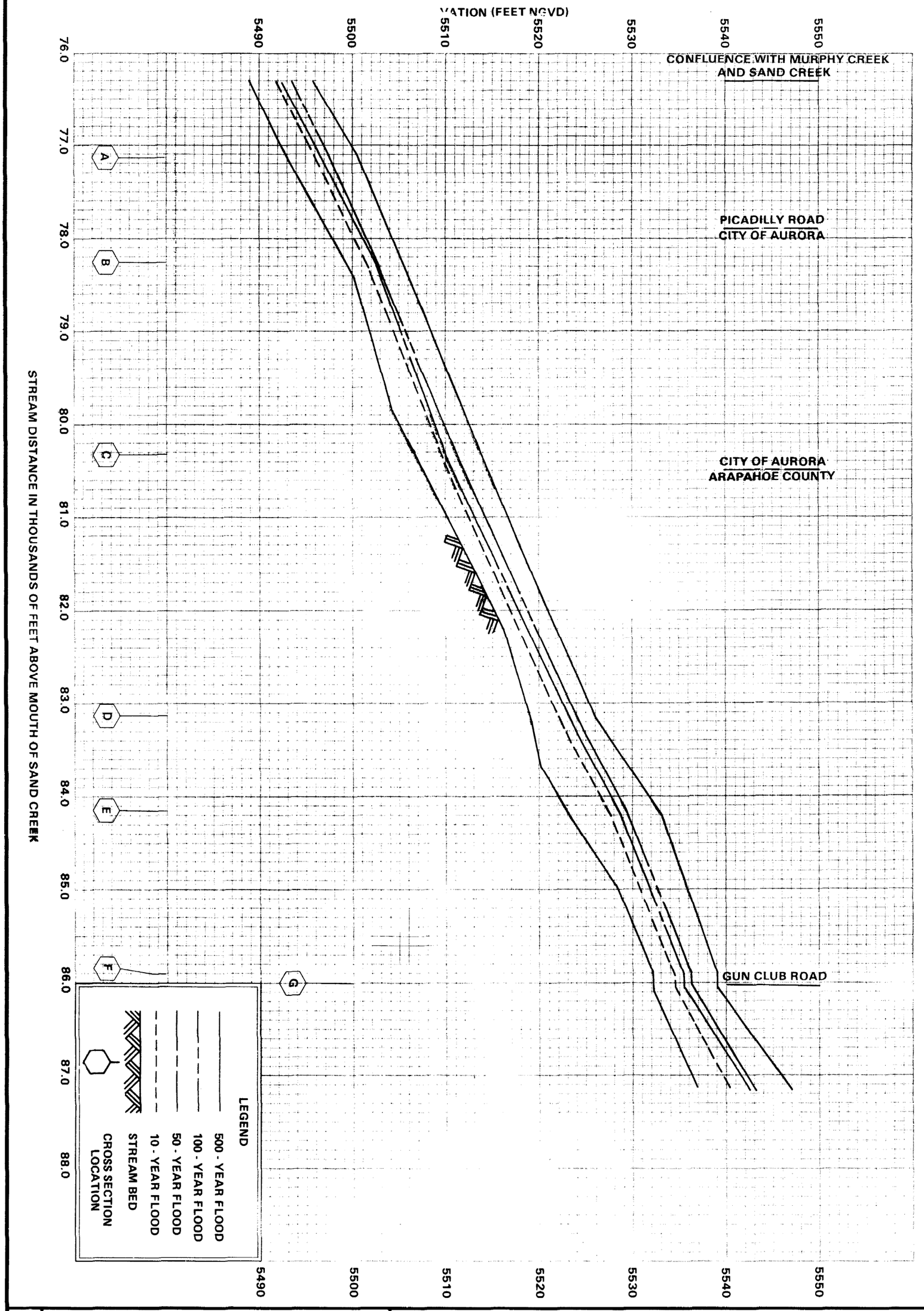
41P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

CHERRY CREEK



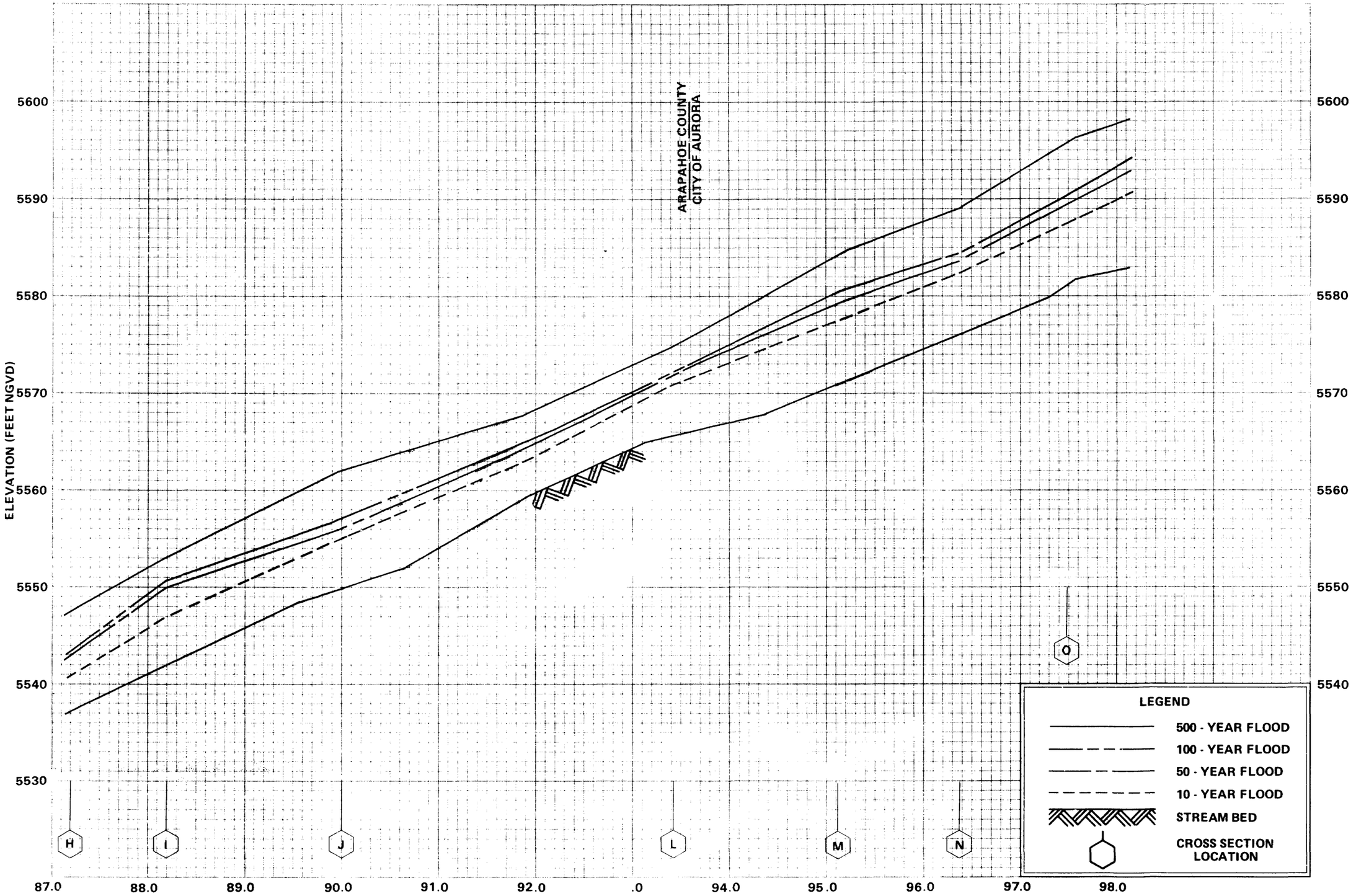
42P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

COAL CREEK

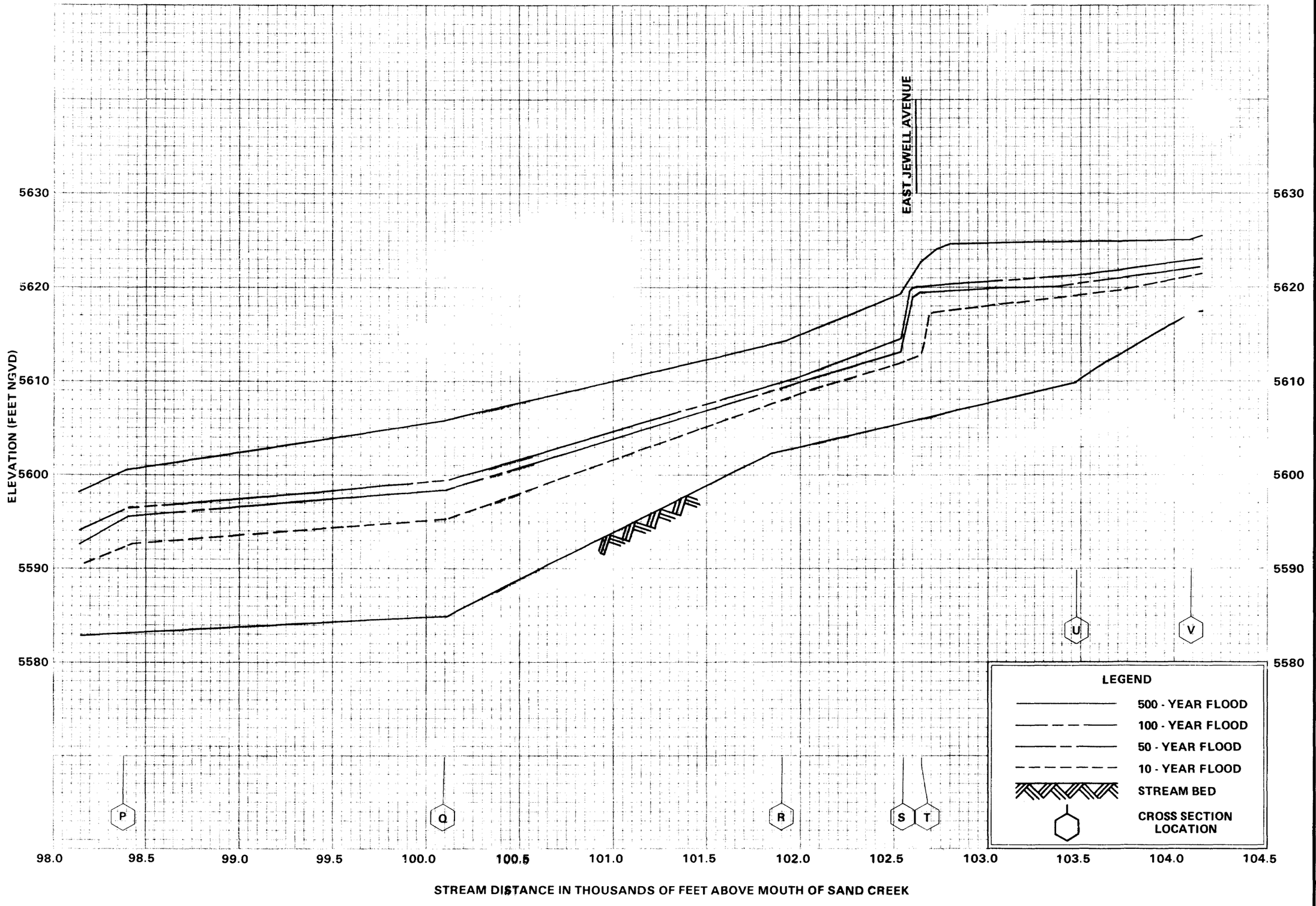


FLOOD PROFILES

COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



FLOOD PROFILES

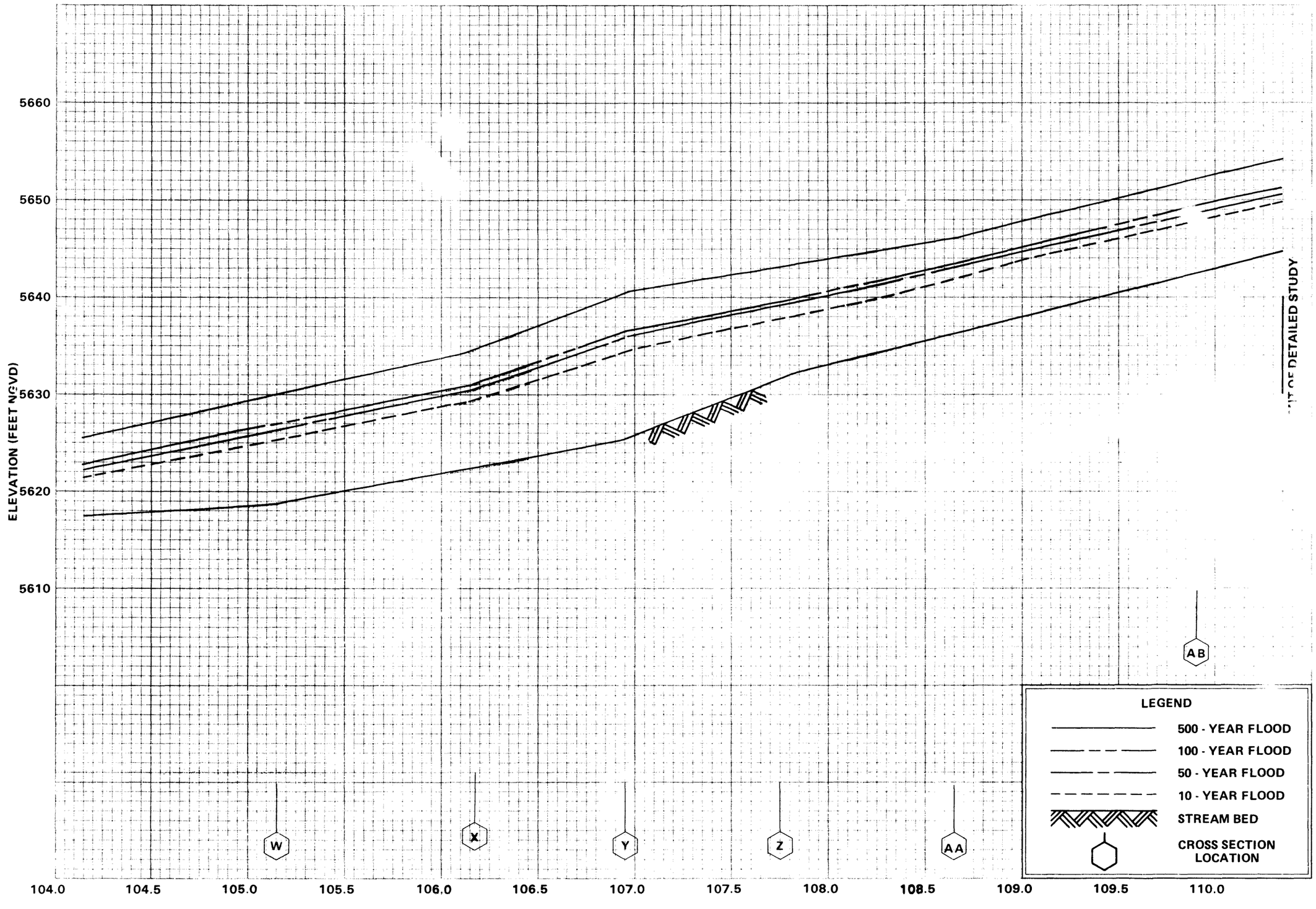
COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

44P



FLOOD PROFILES

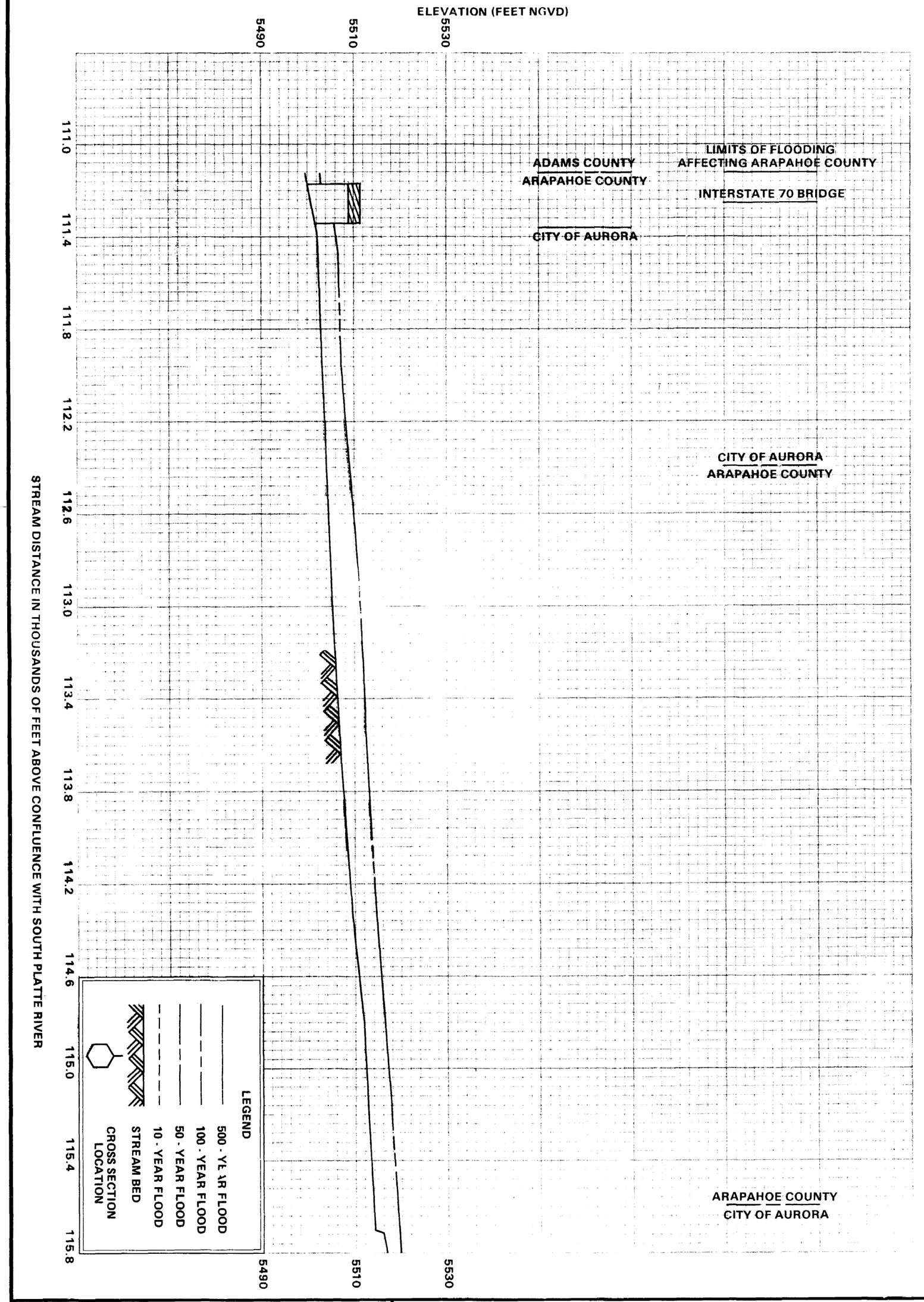
COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

45P



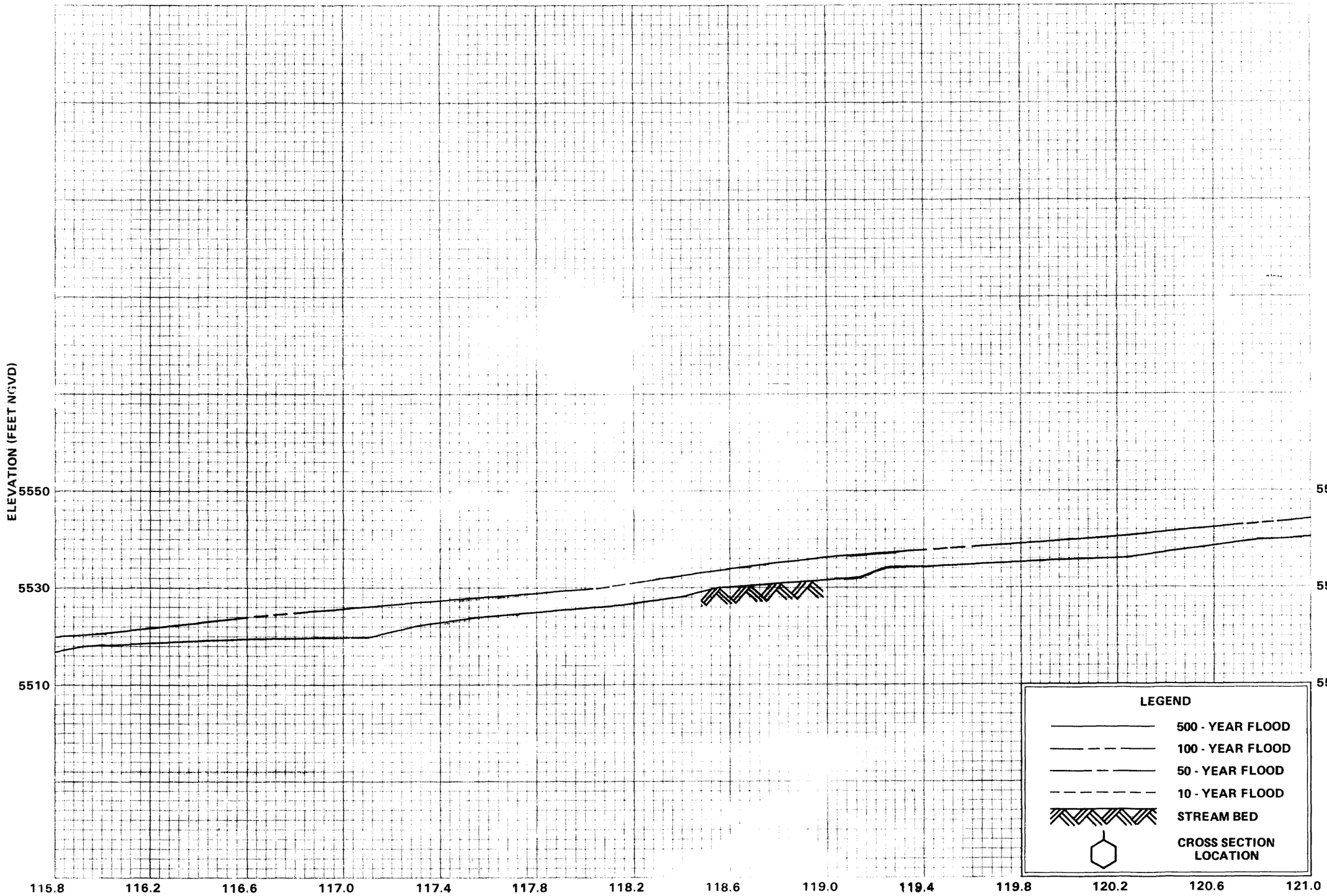
46P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

FIRST CREEK



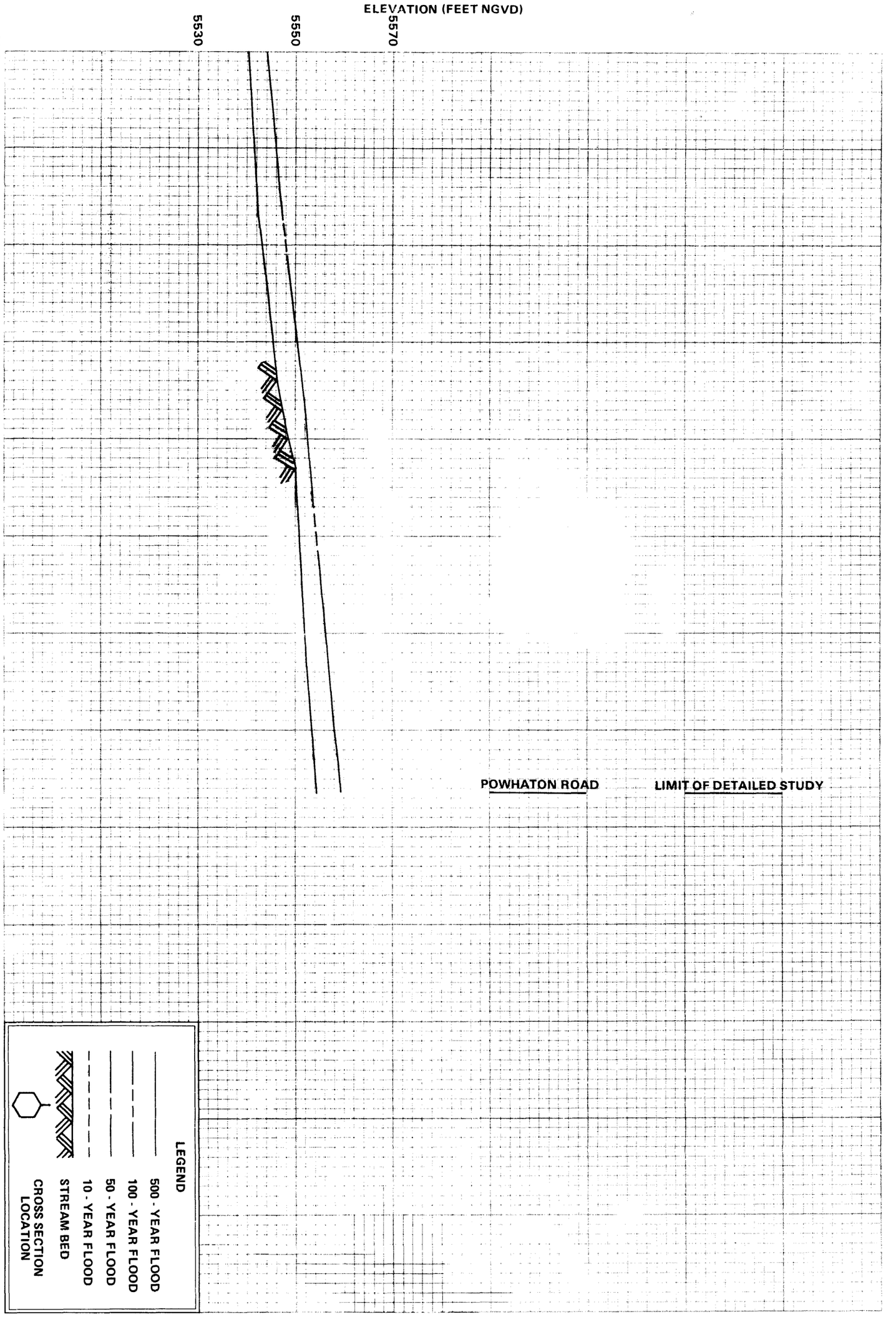
FLOOD PROFILES

FIRST CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



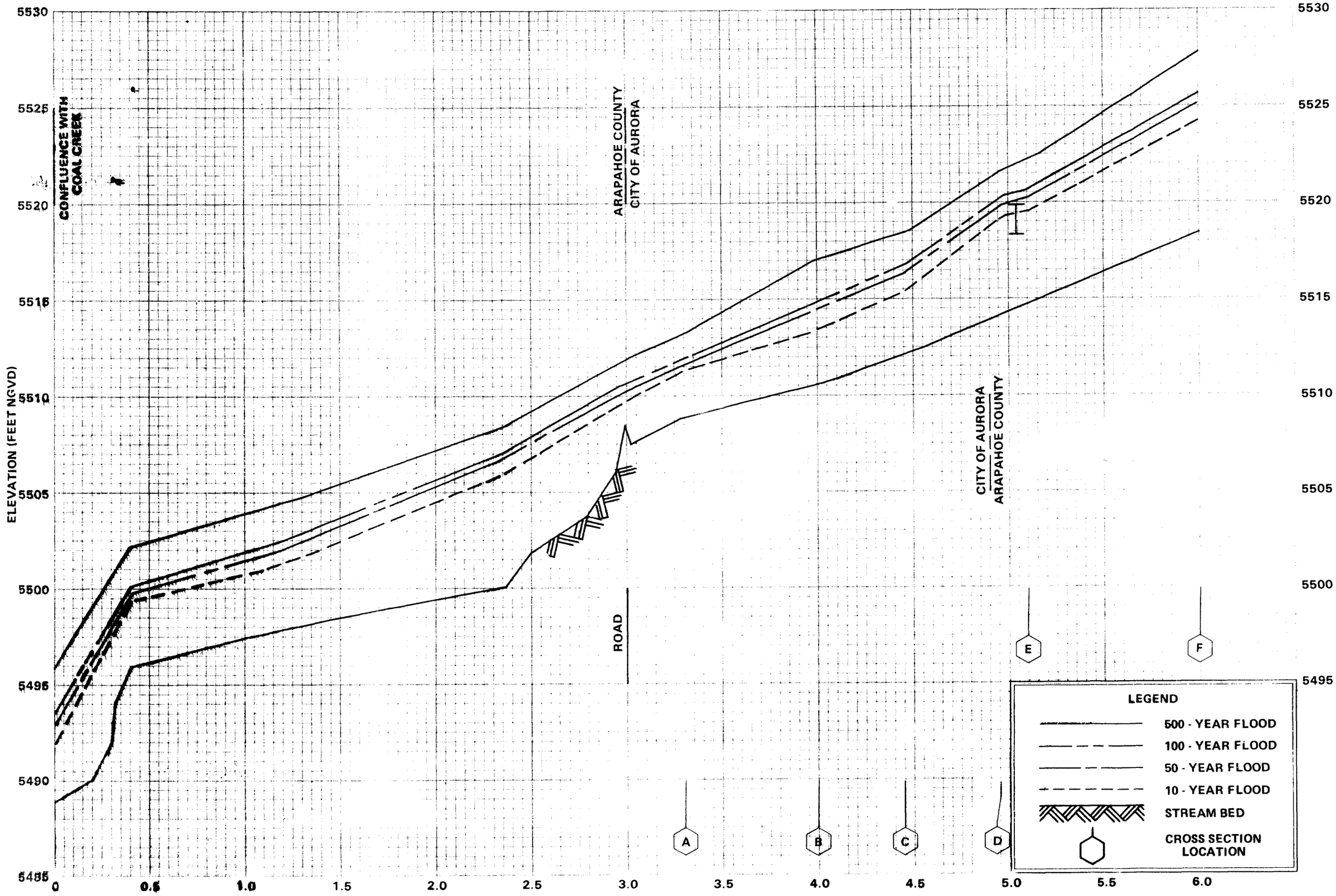
48P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

FIRST CREEK

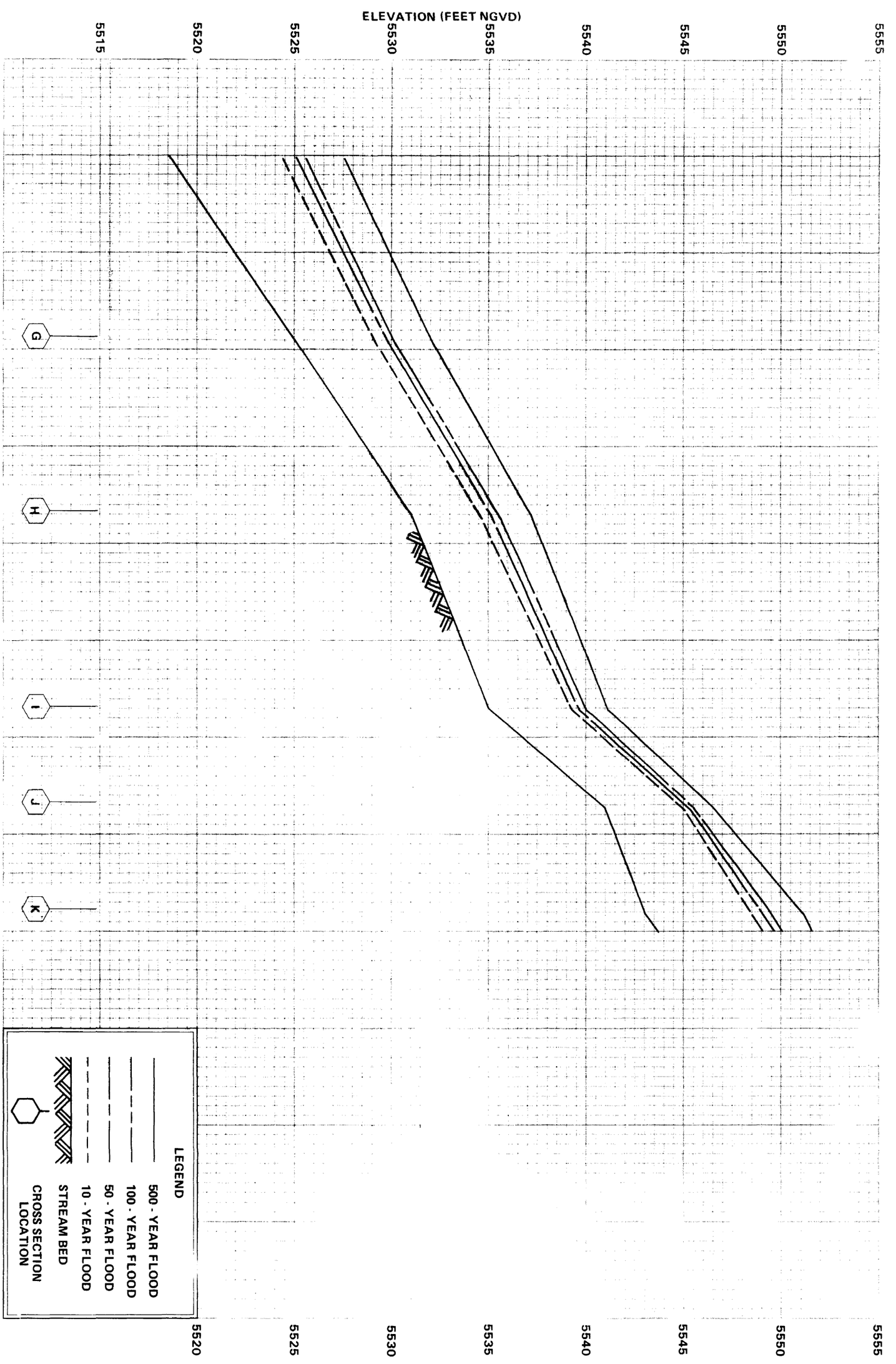


FLOOD PROFILES

MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



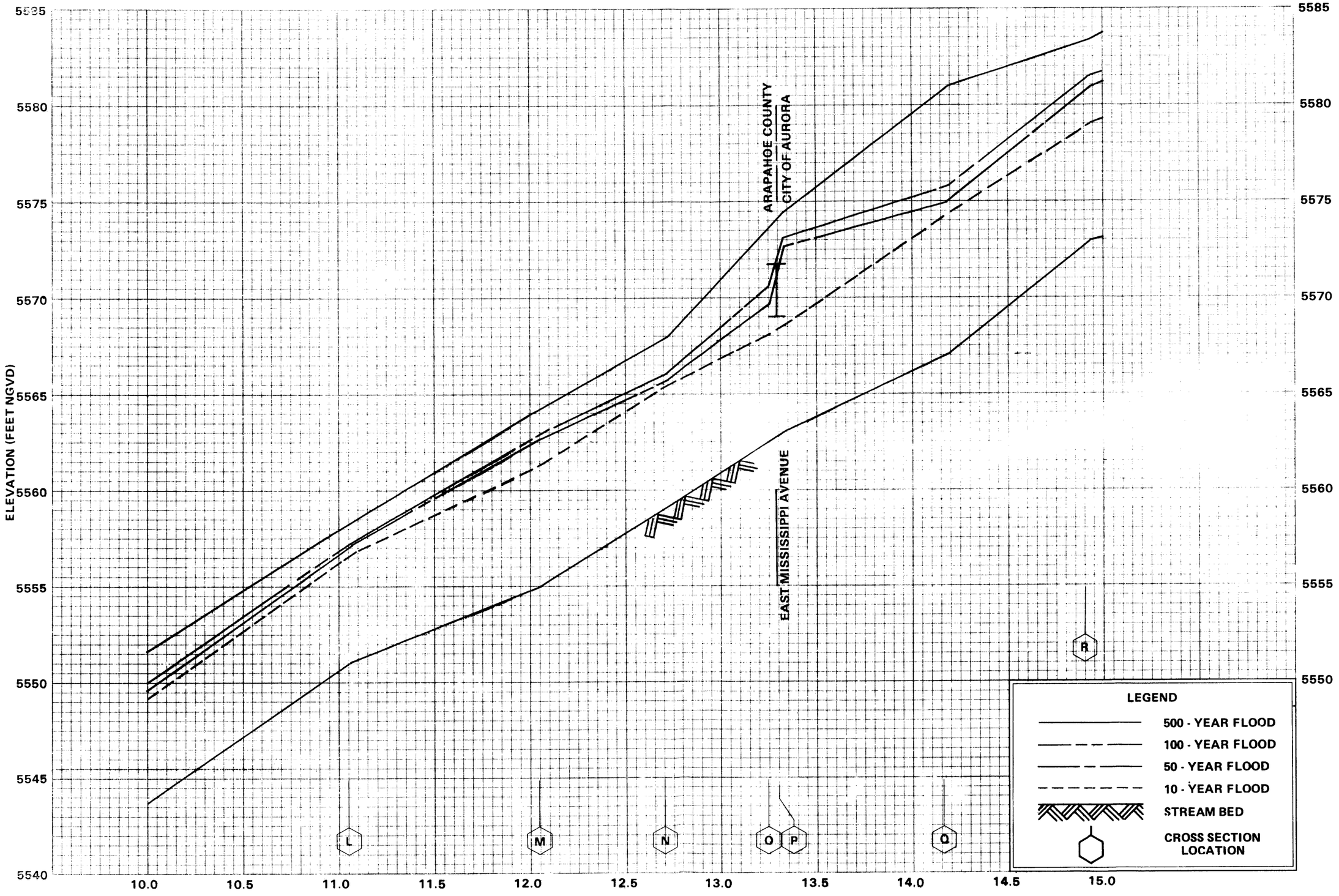
50P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK



FLOOD PROFILES

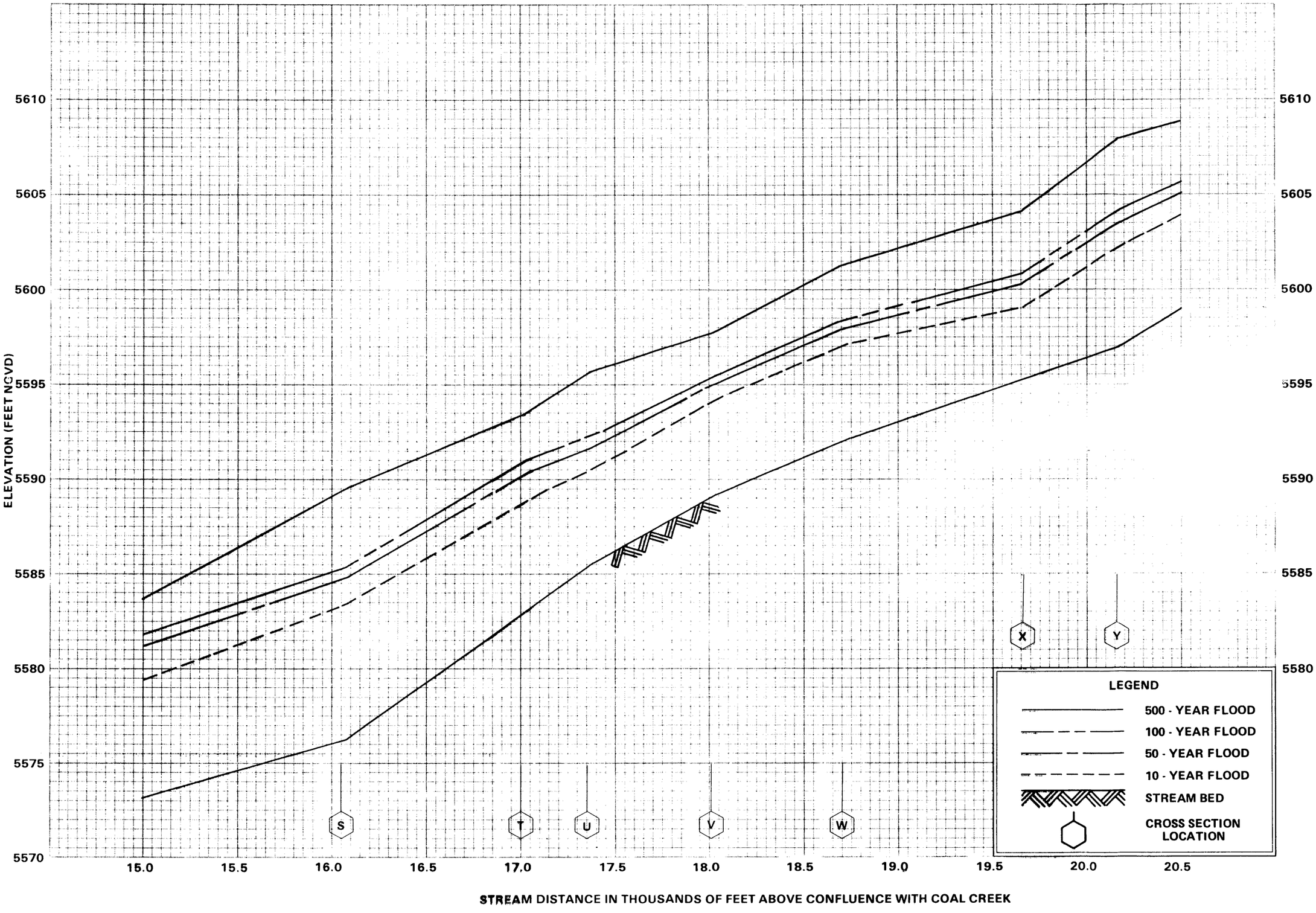
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

51P



FLOOD PROFILES

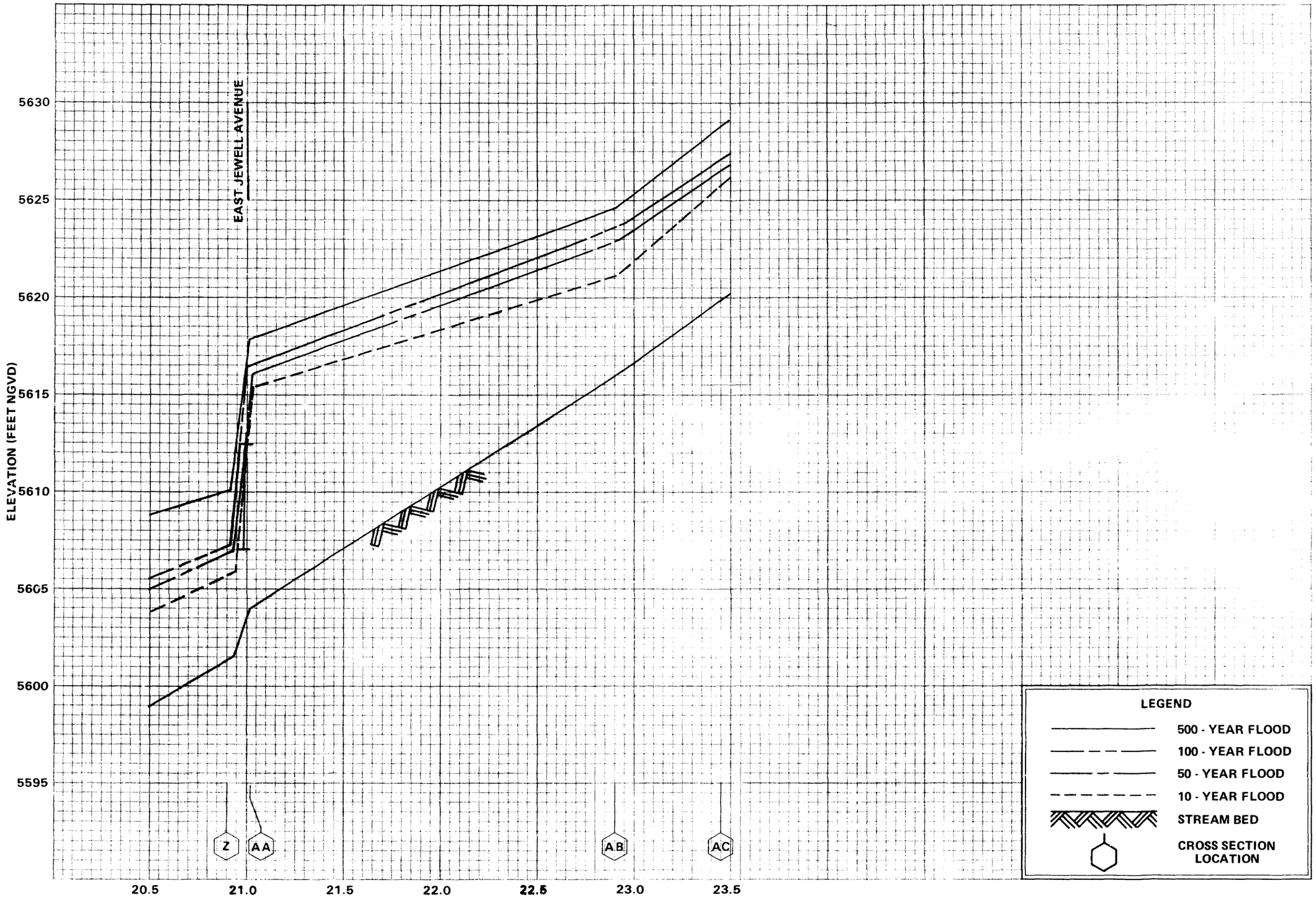
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

52P



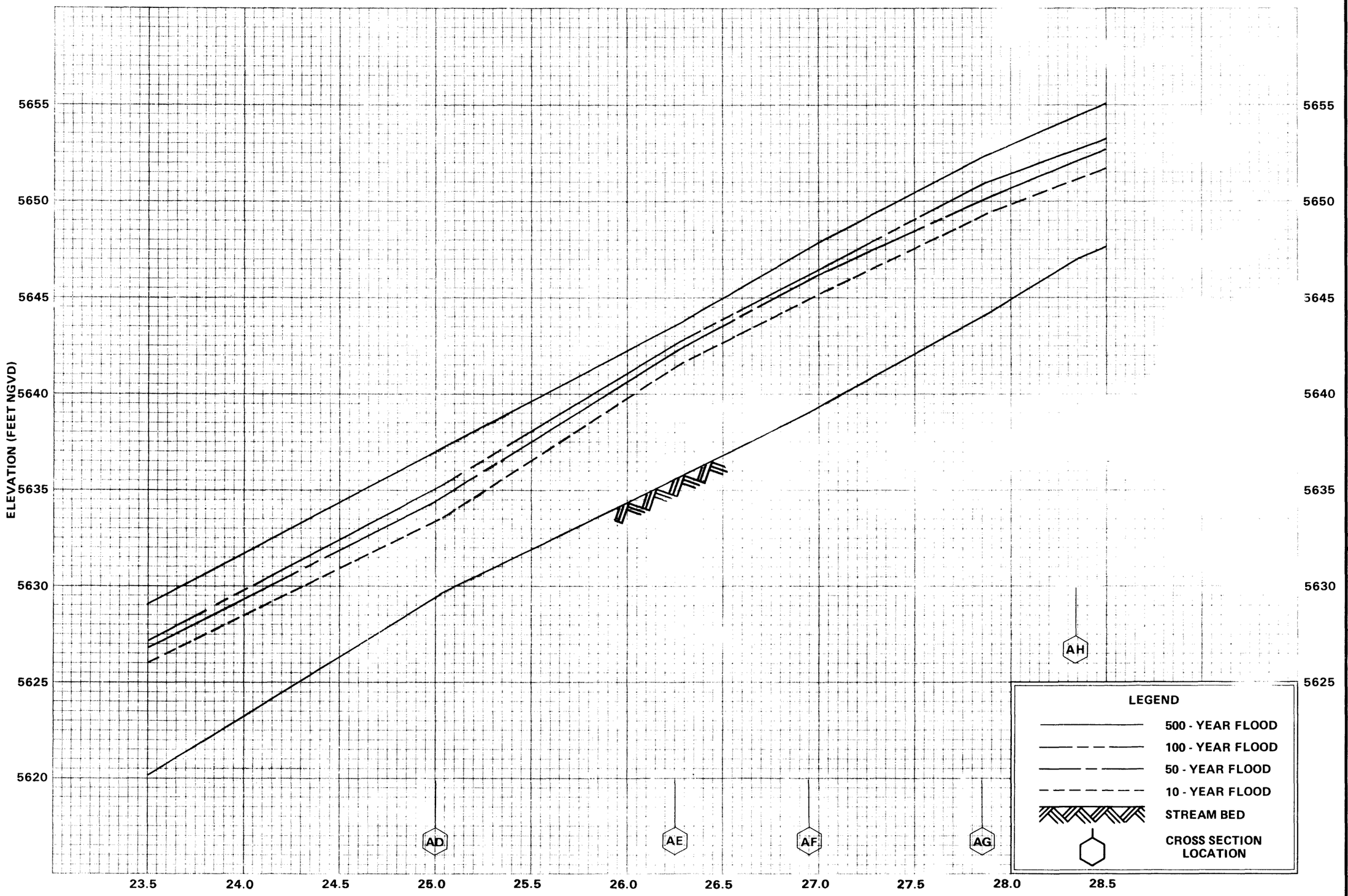
FLOOD PROFILES

MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

53P



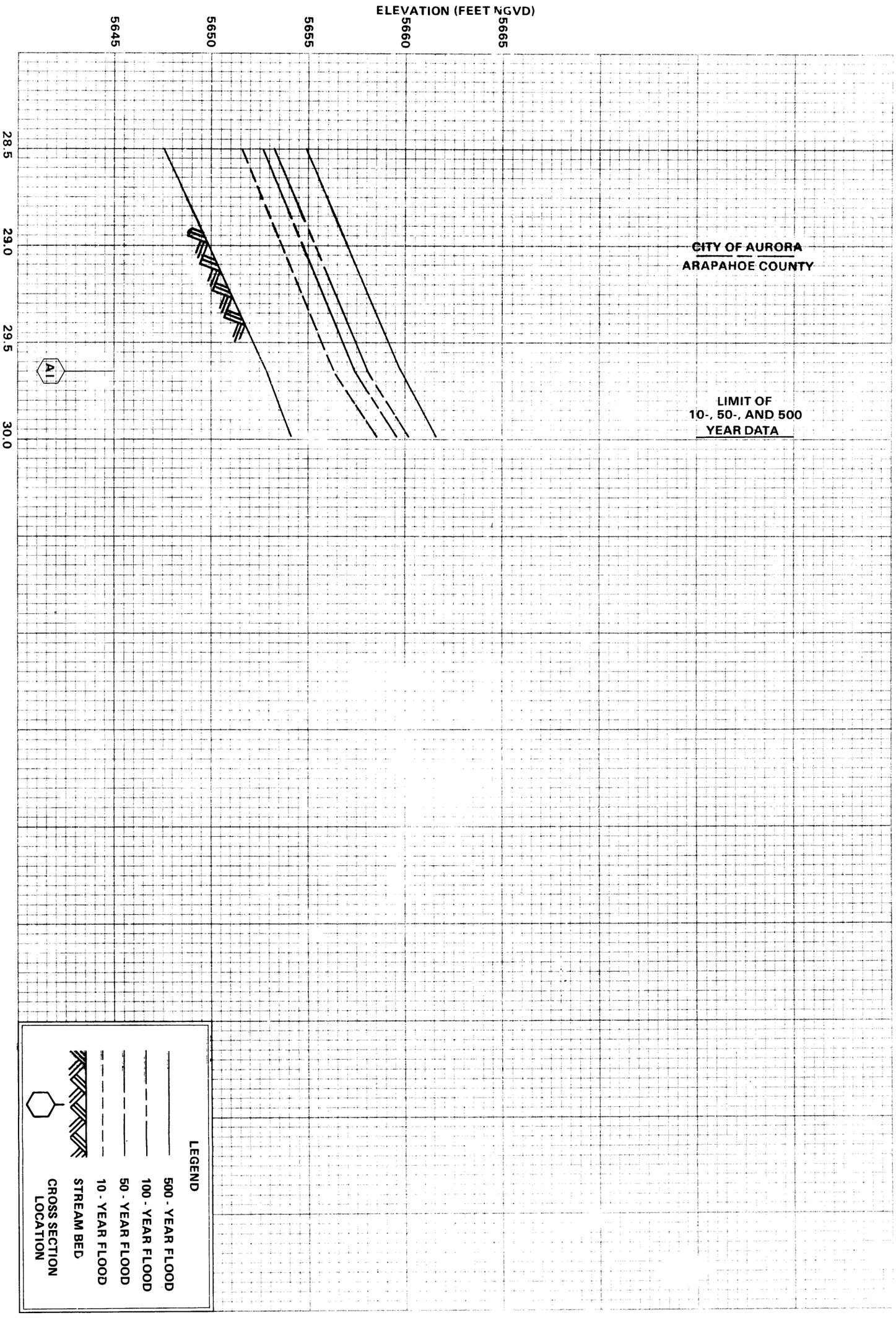
FLOOD PROFILES

MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



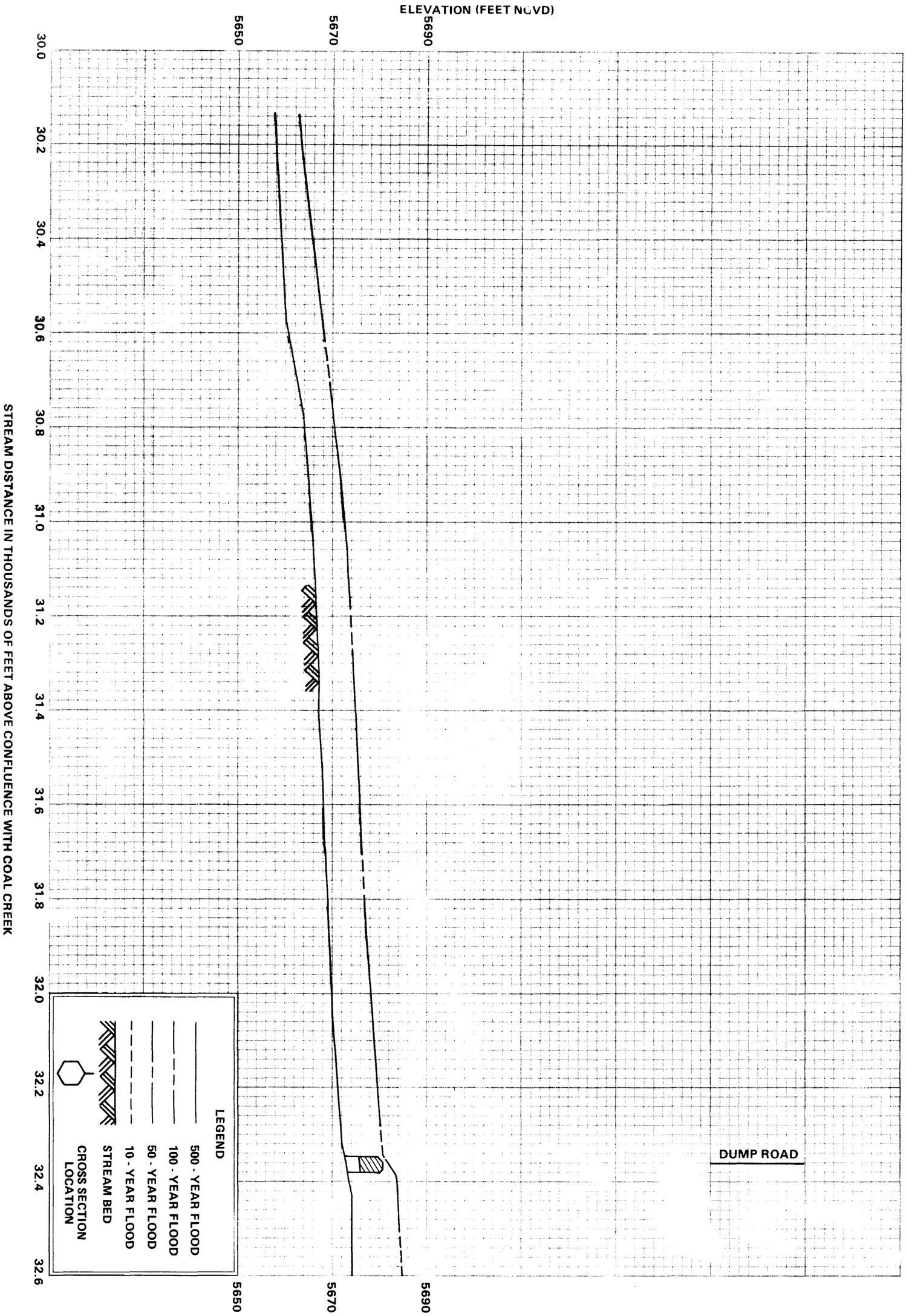
55P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK



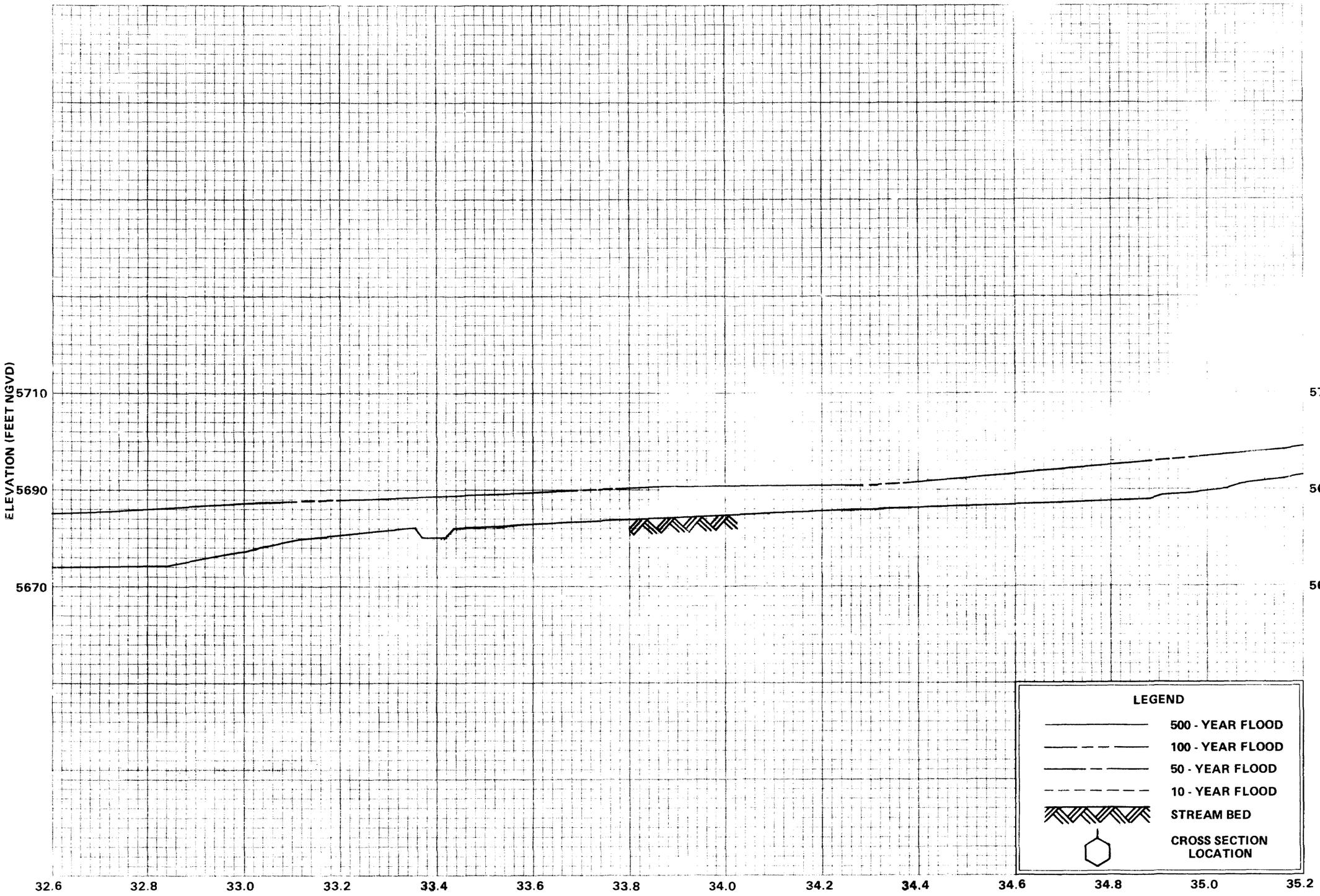
56P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK



FLOOD PROFILES

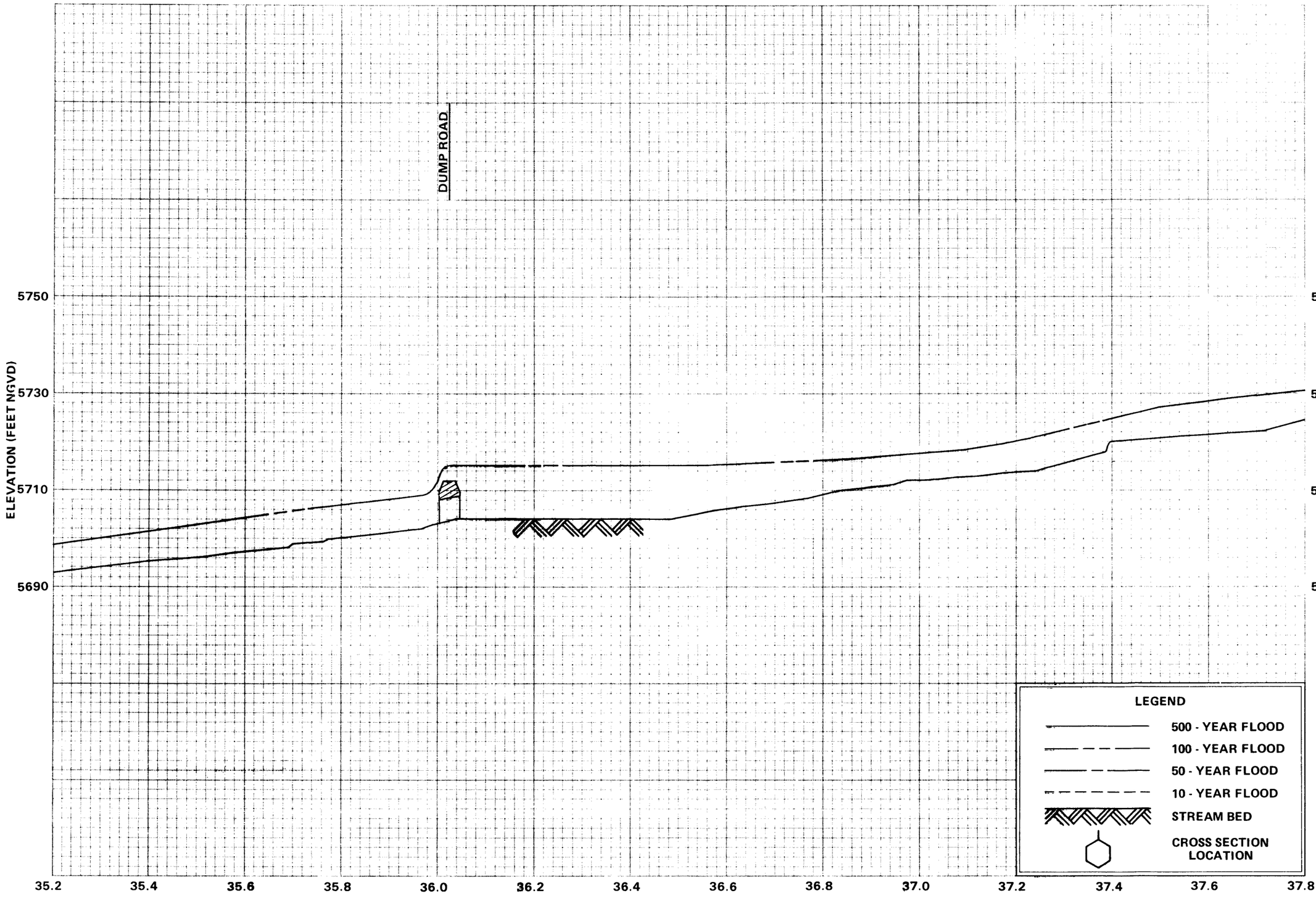
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

57P



FLOOD PROFILES

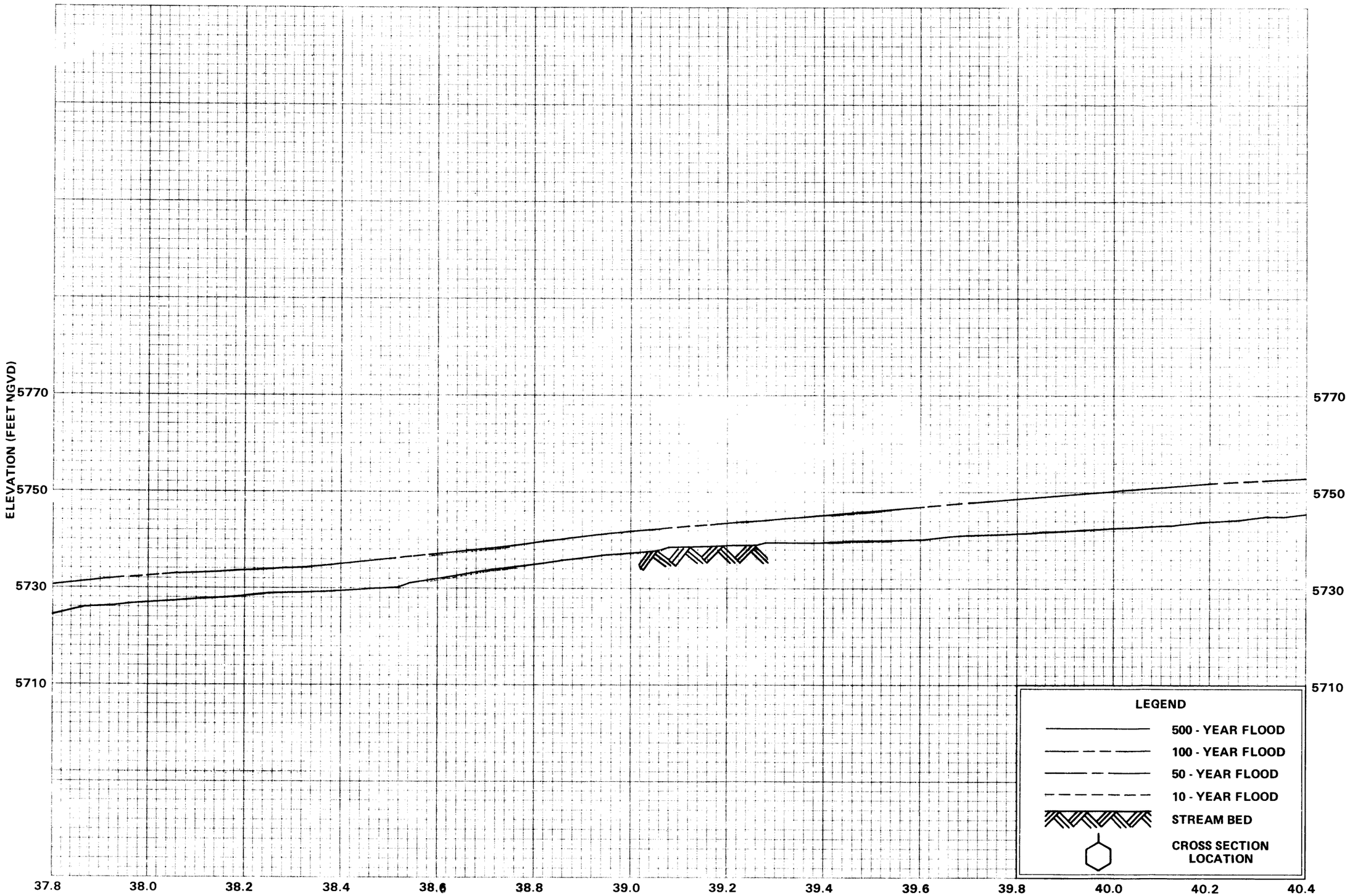
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

58P



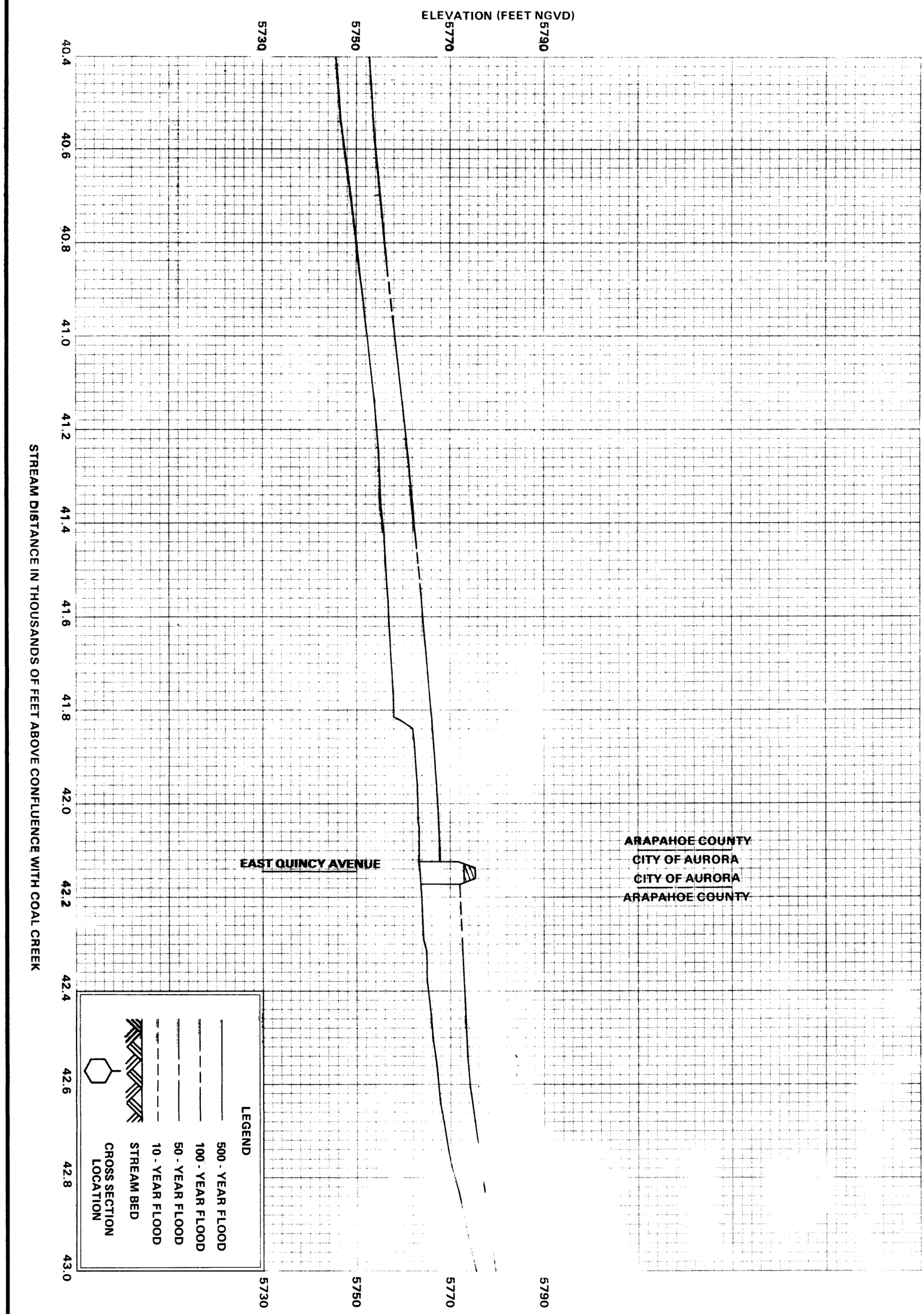
FLOOD PROFILES

MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)



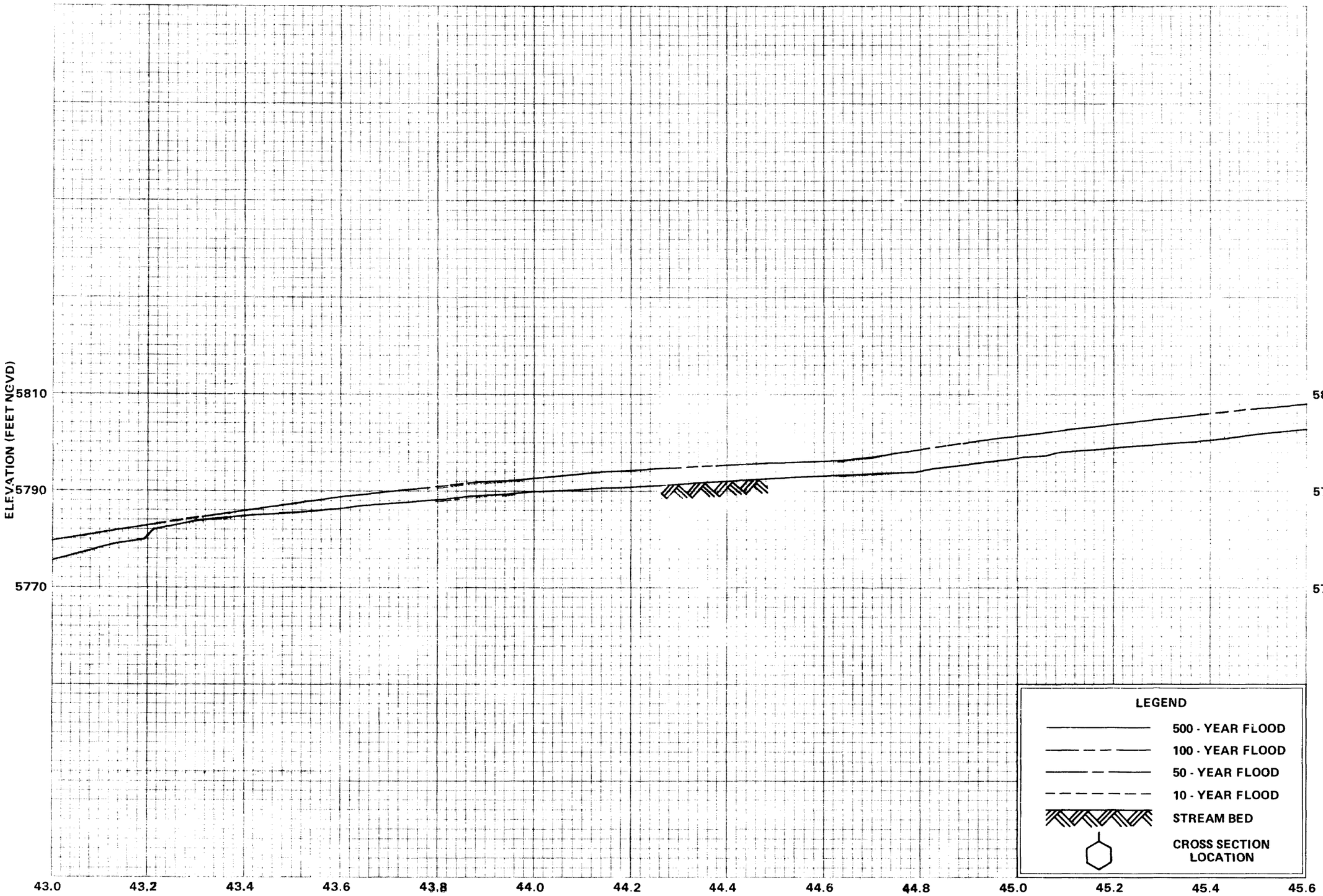
60P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK



FLOOD PROFILES

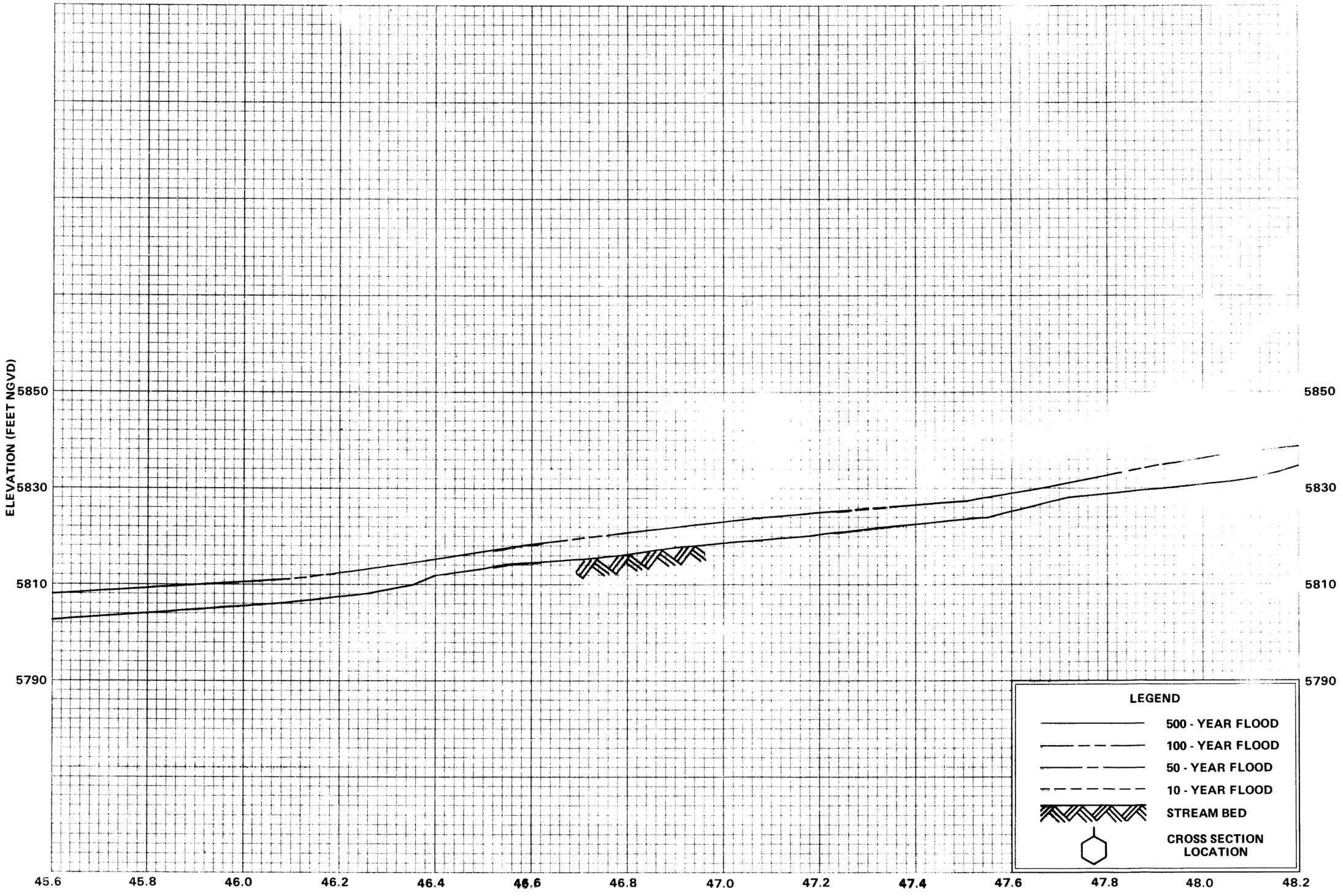
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

61P



FLOOD PROFILES

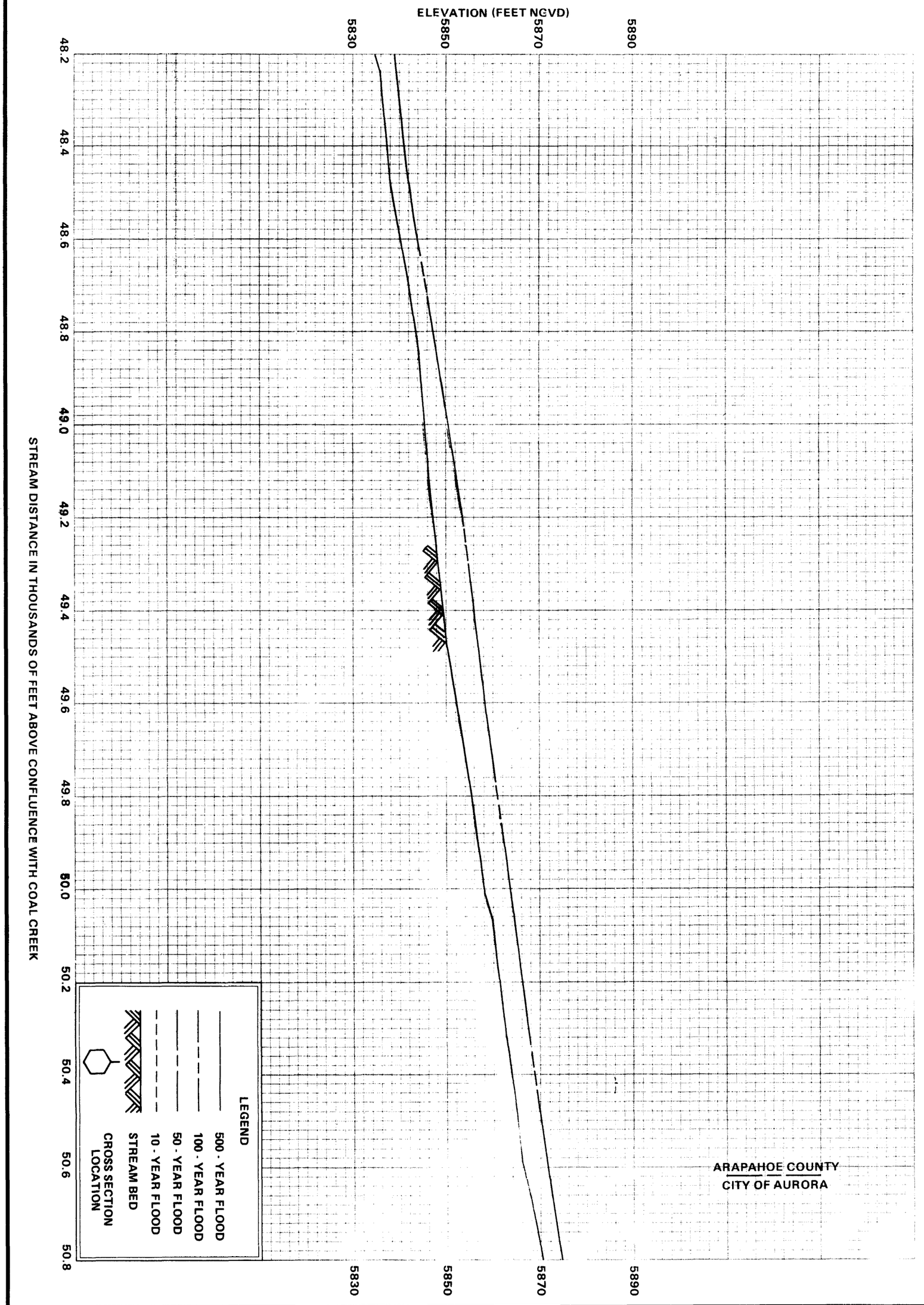
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

62P



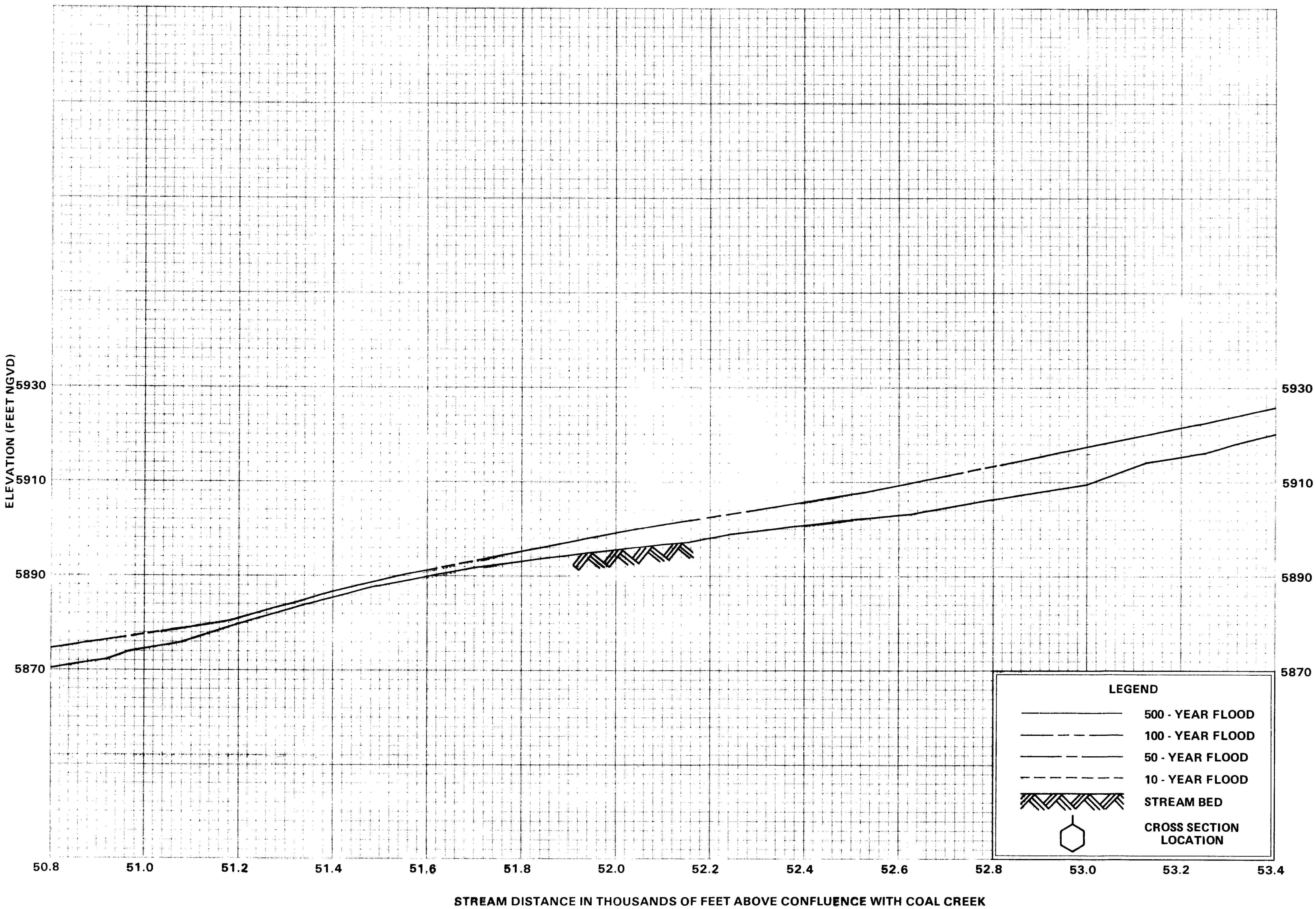
63P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK



FLOOD PROFILES

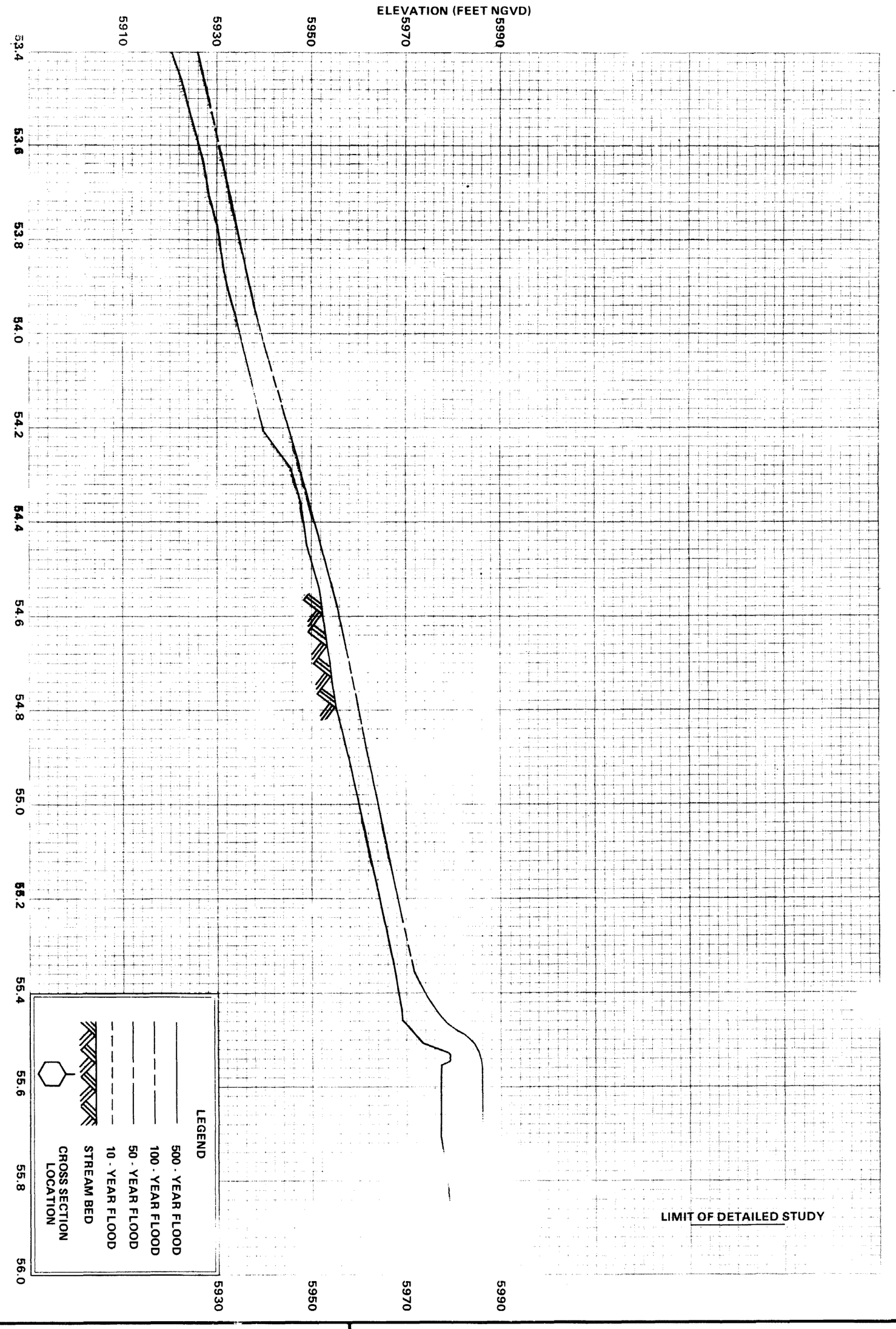
MURPHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

64P



65P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

MURPHY CREEK

ELEVATION (FEET NGVD)

5850 5870 5890

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH CHERRY CREEK

31.4 31.6 31.8 32.0 32.2 32.4 32.6 32.8 33.0 33.2 33.4 33.6 33.8 34.0

ARAPAHOE COUNTY
CITY OF AURORA

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

5850 5870 5890

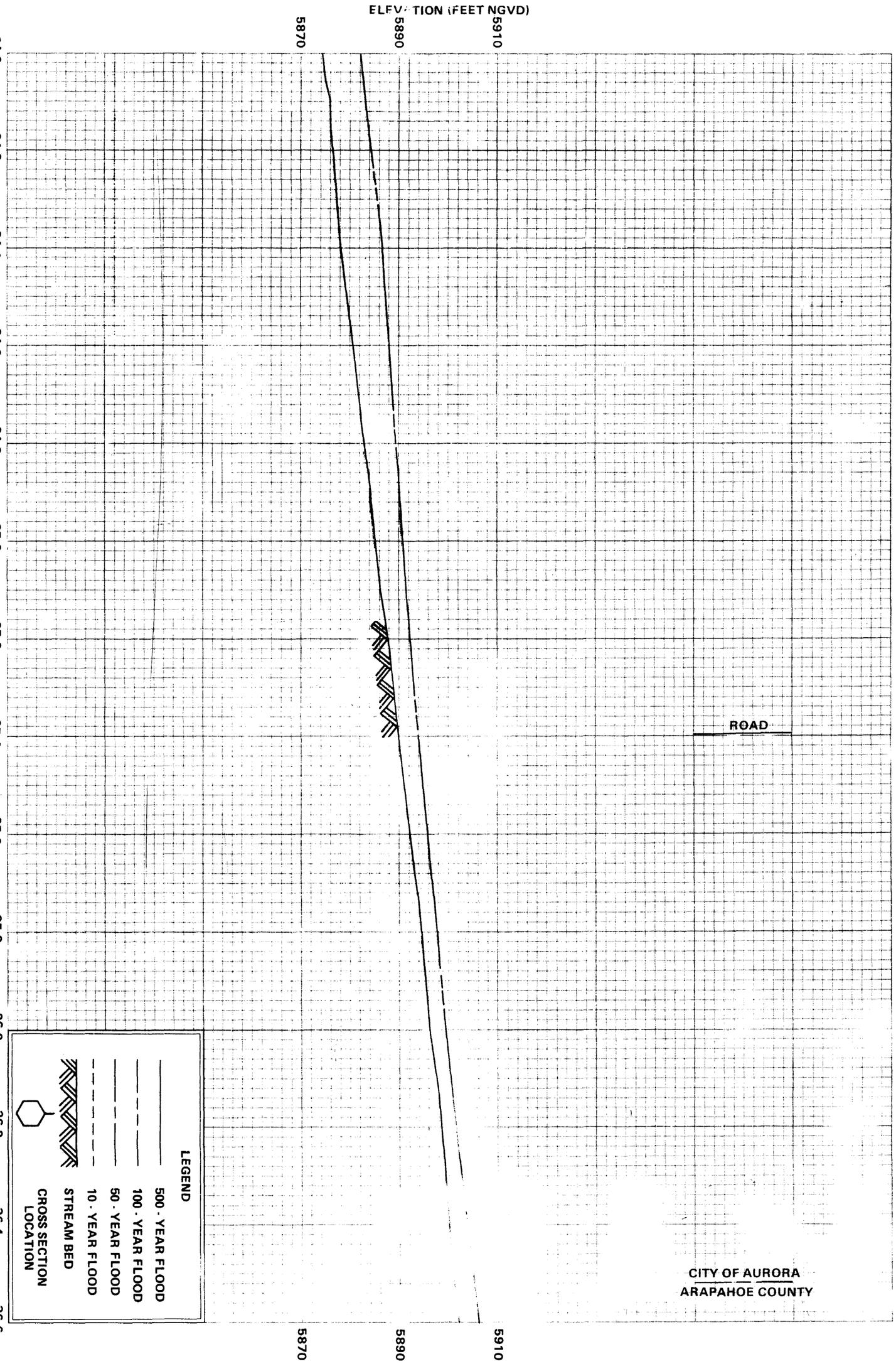
66P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

PINEY CREEK



67P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO
(ADAMS, DOUGLAS, AND ARAPAHOE COS.)

FLOOD PROFILES

PINEY CREEK

WESTERLY CREEK OVERFLOW

FLOOD PROFILES

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF AURORA, CO

(ADAMS, DOUGLAS, AND ARAPAHOE COS.)