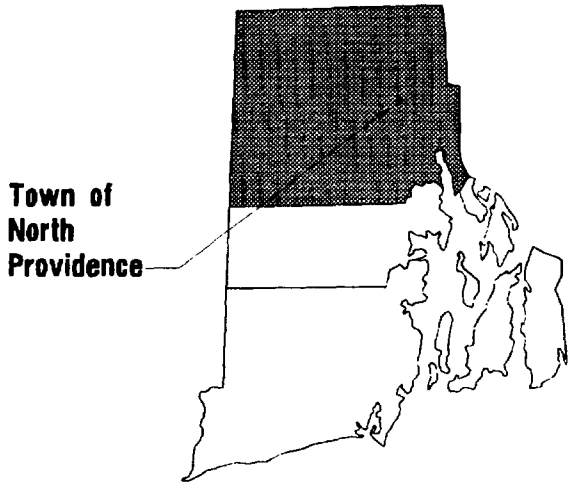
FLOOD INSURANCE STUDY

TOWN OF NORTH PROVIDENCE, RHODE ISLAND
PROVIDENCE COUNTY



REVISED:
DECEMBER 6, 1999

Federal Emergency Management Agency

COMMUNITY NUMBER - 440020

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

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

Initial FIS Effective Date: June 1977 (FIS report);
December 15, 1977 (Flood Insurance Rate Map)

Revised FIS Date: September 30, 1993
December 6, 1999

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FLOOD INSURANCE STUDY
TOWN OF NORTH PROVIDENCE, PROVIDENCE COUNTY, RHODE ISLAND

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates a previous FIS/Flood Insurance Rate Map (FIRM) for the Town of North Providence, Providence County, Rhode Island. This information will be used by the Town of North Providence to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (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 sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For the original, June 1977 FIS report and December 15, 1977, FIRM (hereinafter referred to as the 1977 FIS), the hydrologic and hydraulic analyses for the Woonasquatucket River, the West River, East Branch West River, Lincoln Downs Brook, and Upper Canada Pond Brook were prepared by the Soil Conservation Service (SCS) for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-4-73, Project Order No. 11.

For the September 30, 1993, FIS, the hydrologic and hydraulic analyses for the Woonasquatucket River and Wenscott Reservoir were prepared by the U.S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-89-E-2997, Project Order No. 5. This work was completed in January 1992.

For this revision, the hydrologic and hydraulic analyses for Centerdale Brook and Cranberry Brook were prepared by Green International Affiliates, Inc., for FEMA under Contract No. EMB-96-CO-0403, Task 5. This work was completed in October 1997.

The digital base mapping information was provided by the Rhode Island Department of Administration, One Capitol Hill, Providence, Rhode Island, 02908-5872. These files were compiled by the Rhode Island Department of Transportation at a scale of 1:24,000 from U.S. Geological Survey 7.5-Minute Series Topographic Maps, and updated in 1991 using aerial photography dated 1988. The digital FIRMs were produced using Universal Transverse Mercator coordinates referenced to the North American Datum of 1927 and the Clarke 1866 spheroid.

1.3 Coordination

The purpose of an initial Consultation Coordination Officer's (CCO) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study.

For the September 30, 1993, FIS, an initial CCO meeting was held on July 19, 1989. This meeting was attended by representatives of the town, the USGS, and FEMA.

For this revision, an initial CCO meeting was held on September 17, 1996. It was attended by representatives of Green International Affiliates, Inc., the Town of North Providence, and the NFIP State Coordinator. A final CCO meeting was held on December 8, 1998. It was attended by representatives of the Town of North Providence and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the incorporated area of the Town of North Providence, Providence County, Rhode Island. The area of study is shown on the Vicinity Map (Figure 1).

For the 1977 FIS, the Woonasquatucket River, the West River, East Branch West River, Lincoln Downs Brook, and Upper Canada Pond Brook were studied by detailed methods. For the September 30, 1993, FIS, the Woonasquatucket River was revised for its entire length within the town, and the Wenscott Reservoir was studied by detailed methods.

For this revision, Centerdale Brook was studied by detailed methods from its confluence with the Woonasquatucket River to a point just upstream of Locust Avenue. Also, Cranberry Brook was studied by detailed methods from its confluence with the Woonasquatucket River at Allendale Pond to a point downstream of Humbert Street.

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI
(PROVIDENCE CO.)

VICINITY MAP

Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2). The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

All or portions of the following flooding sources were studied by approximate methods: the West River, East Branch West River, Lincoln Downs Brook, Cranberry Brook, Upper Canada Pond Brook, and Centerdale Brook. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of North Providence.

2.2 Community Description

The Town of North Providence is located in the eastern part of Providence County. It is bordered by the Towns of Smithfield and Lincoln to the north, the City of Providence to the south, the City of Pawtucket to the east, and the Town of Johnston to the west. In 1990, the town had a population of 32,090 and a population density of 5.80 persons per square mile. In 1996, the population of North Providence was 31,194 (Reference 1).

The climate of the town is moderate and is characterized by the even distribution of approximately 45 inches of precipitation during the year. The town experiences a large range of temperature both on a daily and an annual basis and a considerable variety of weather in short periods of time (Reference 2). The topography of the town ranges from gently rolling terrain in the valleys to steep, hilly terrain in several upland areas. The land area of the town consists mainly of well drained, glacial, stratified drift in the valleys and glacial till and bedrock in the uplands.

2.3 Principal Flood Problems

Flood problems in the town have occurred in every season of the year. Spring floods are common and are caused by rainfall in combination with snowmelt. Floods in late summer and fall are usually the result of above normal precipitation. Winter floods result from the occasional thaws, particularly in years of heavy snow cover.

Major floods of this century have occurred in March 1913, November 1927, March 1936, September 1938, and August 1955. Of these, the flood of August 1955 was the most severe.

2.4 Flood Protection Measures

There are currently no flood protection measures within the Town of North Providence.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this 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 FIS. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

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

For the West River, East Branch West River, Lincoln Downs Brook, and Upper Canada Pond Brook, flood discharges were determined using the SCS TR-20 project formulation hydrology program. This program was selected because of its capability to analyze the different magnitude storm runoffs, as modified by the numerous ponds and reservoirs located in the area. The 10-, 50-, 100-, and 500-year frequency storm runoffs were computed and flood routed through the study area. Rainfall intensity-frequency relationships were obtained from U.S. Weather Bureau Rainfall Atlas TP-40 (Reference 3). All reservoirs that were flood routed were assumed to be at spillway crest.

Drainage area-peak discharge relationships for Lincoln Downs Brook, Upper Canada Pond Brook, and the West River are shown in Figure 2.

For Woonasquatucket River, the 100-year flood discharge was based on stream gaging records at USGS gaging station No. 01114500 located in Centerdale (Reference 4). The 100-year peak discharge was then extended to the Providence-North Providence corporate limits. The resultant peak discharge of 2,600 cubic feet per second (cfs) agrees with the 1977 FIS for the Town of North Providence (Reference 5).

The 100-year flood elevation of 205.00 feet National Geodetic Vertical Datum of 1929 (NGVD) was computed for the Wenscott Reservoir. The 100-year flood discharge entering the reservoir was determined from USGS estimating equations for peak flows. A reasonable lag time due to storage in the reservoir was determined and the resultant flood elevation was computed by using that storage-reduced flow in the height-over-dam computation.

For this revision, peak discharges for Centerdale Brook and Cranberry Brook were calculated using the U.S. Army Corps of Engineers (USACE) HEC-1 Computer Program (Reference 6). The amount of flow being carried in each closed drainage system was subtracted from the total 100-year peak discharge, and the remaining overland flow was then determined using the HEC-RAS Computer Program (Reference 7).

A summary of the drainage area-peak discharge relationships for Centerdale Brook, Cranberry Brook, and the Woonasquatucket River is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 100-YEAR	100-YEAR FLOW IN PIPE	100-YEAR FLOW OVERLAND
CENTERDALE BROOK				
At the confluence with Woonasquatucket River	.47	417	37	380
Just downstream of Angell Avenue	.41	317	37	280
Just upstream of Angell Avenue	.41	317	*	317
Just downstream of Mineral Spring Avenue	.35	184	12	172
Just downstream of Locust Avenue	.26	99	12	87
Just upstream of Locust Avenue	.26	99	0	99
CRANBERRY BROOK				
At Allendale Pond	.43	620	146	474
At Orchard Street	.31	508	146	362

*Data not applicable

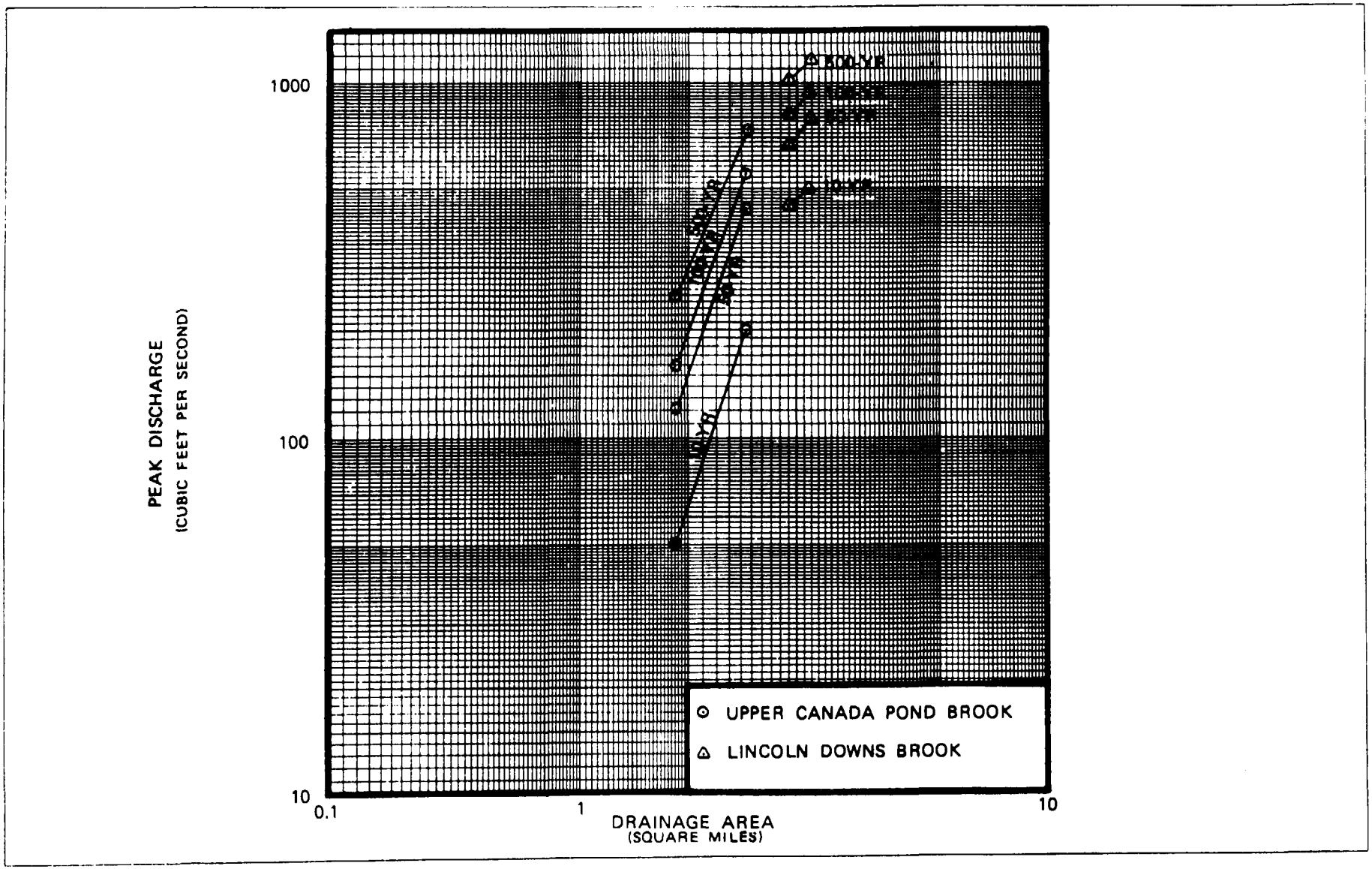


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI
(PROVIDENCE CO.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

UPPER CANADA POND BROOK AND LINCOLN DOWNS BROOK

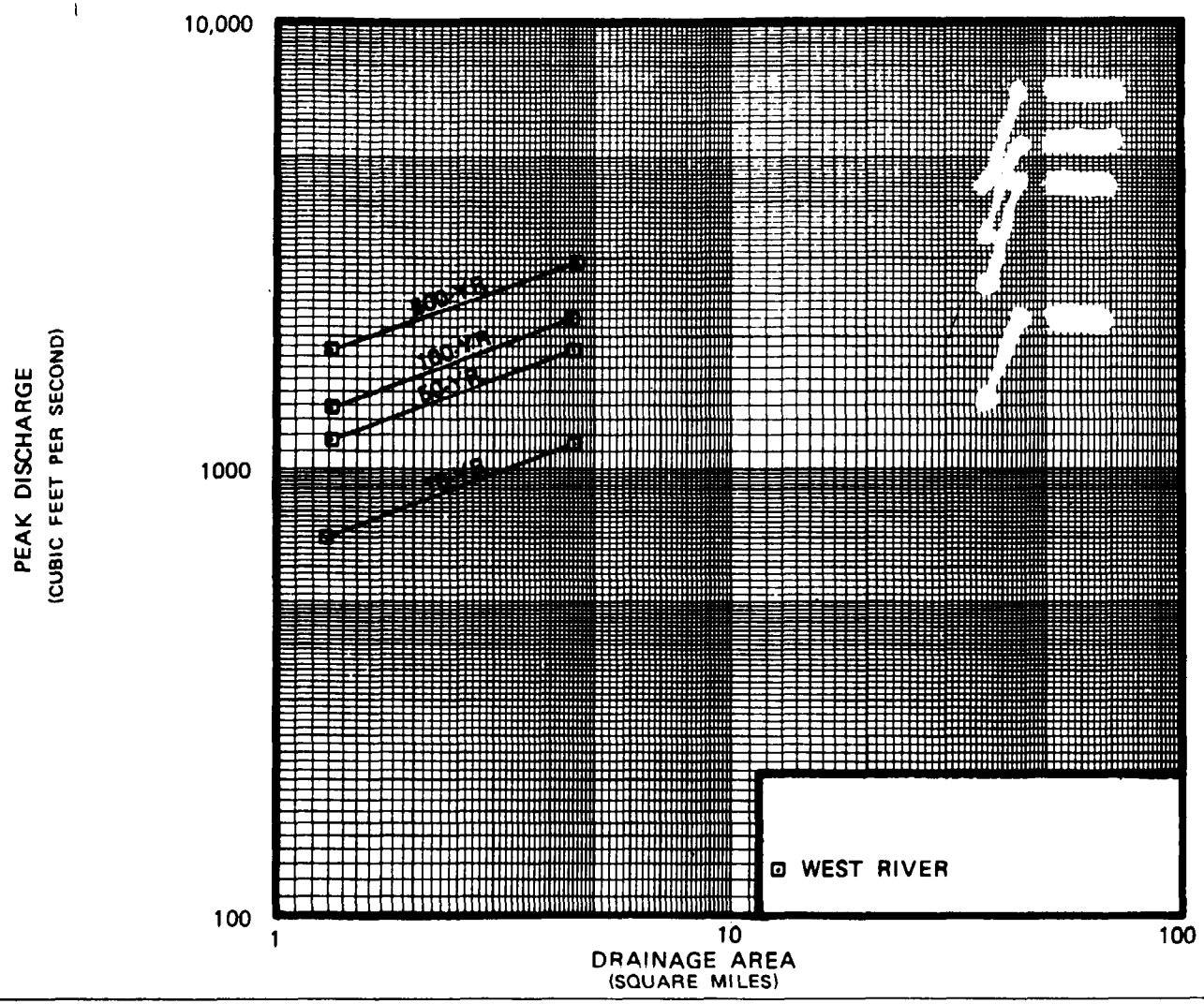


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI
(PROVIDENCE CO.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

WEST RIVER

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 100-YEAR	100-YEAR FLOW IN PIPE	100-YEAR FLOW OVERLAND
WOONASQUATUCKET RIVER				
At downstream corporate limits	43.8	2,600	*	*
At upstream corporate limits	36.5	2,170	*	*

*Data not applicable

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 sections for the flooding sources studied by detailed methods were obtained from field surveys. All bridges, dams, 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).

Along certain portions of Centerdale Brook and Cranberry Brook, a profile base line is shown on the maps to represent channel distances as indicated on the flood profiles and floodway data tables.

In the 1977 FIS, water-surface elevations of floods at selected intervals were computed through use of the SCS WSP-2 Program (Reference 8). In the September 30, 1993, FIS, rating curves were developed at each cross section that were used in the 1977 FIS to develop water-surface profiles (Reference 5). The rating curves consist of discharges from the 1977 FIS. In the September 30, 1993, FIS, at each cross section plot, the new 100-year flood elevation was read from the graph at the point of intersection with the updated 100-year flood discharge. The flood elevation of 68.8 feet NGVD at the downstream corporate limits agrees with the elevation published in the FIS for the City of Providence (Reference 9). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the Woonasquatucket River were obtained from the FIS for the City of Providence (Reference 9).

For this revision, water-surface elevations for the 100-year flood events associated with Centerdale Brook and Cranberry Brook were computed using the USACE HEC-RAS step backwater computer program (Reference 6). Both of these brooks have been diverted into closed drainage systems. The maximum surcharge capacity of the closed drainage system was calculated using a standard step backwater analysis (References 10, 11, 12).

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment. For the Woonasquatucket River, the channel "n" values ranged from 0.025 to 0.045, and the overbank "n" values ranged from 0.035 to 0.080.

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 NGVD of 1929. Elevation reference marks used in this study, and their descriptions, are shown on the FIRM.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist 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 the streams studied in detail, 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 1:24,000 with a contour interval of 10 feet (Reference 13).

The 100- and 500-year floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 100-year floodplain boundaries correspond to the boundaries of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundaries correspond to the boundaries of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundaries have 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).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 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 a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study 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 for selected cross sections (Table 2). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The floodway for the Woonasquatucket River extends beyond the corporate limits.

Floodways were not determined for Centerdale Brook, Cranberry Brook, East Branch West River, and Lincoln Downs Brook.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 2, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

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 by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Woonasquatucket River								
A	0	217[2]	1,401	1.86	68.8	68.8	68.8	0.0
B	965	74[2]	323	8.05	69.4	69.4	69.4	0.0
C	2,540	156[2]	936	2.78	74.0	74.0	74.3	0.3
D	2,650	465[2]	2,405	1.08	80.7	80.7	81.7	1.0
E	7,065	123[2]	592	4.40	82.1	82.1	82.9	0.8
F	7,261	48[2]	217	11.96	85.1	85.1	85.3	0.2
G	7,350	55[2]	226	11.50	91.5	91.5	91.5	0.0
H	7,399	89[2]	815	3.19	93.6	93.6	93.6	0.0
I	10,888	49[2]	223	11.66	101.2	101.2	101.3	0.1
J	11,196	182[2]	1,124	2.31	105.1	105.1	106.0	0.9
K	11,261	38[2]	228	11.40	105.1	105.1	106.0	0.9
L	12,636	282[2]	1,200	2.17	111.7	111.7	112.0	0.3
M	13,550	231[2]	1,201	2.16	113.0	113.0	113.3	0.3
N	14,021	306[2]	1,282	2.03	114.6	114.6	115.0	0.4
West River								
A	1,724	36	259	8.34	88.5	88.5	89.5	1.0
B	3,665	25	173	9.56	110.0	110.0	111.0	1.0
C	4,476	266	802	1.98	126.2	126.2	127.2	1.0
D	4,838	81	365	4.32	126.3	126.3	127.3	1.0
E	6,134	27	107	12.76	139.6	139.6	140.6	1.0
F	7,373	23	137	9.95	157.7	157.7	158.7	1.0
G	8,214	29	168	7.99	172.5	172.5	173.5	1.0
Upper Canada Pond Brook								
A	1,124	113	680	0.79	59.5	59.5	60.5	1.0
B	2,536	16	73	5.76	65.0	65.0	66.0	1.0

[1]Feet above corporate limits
[2]Width extends beyond corporate limits

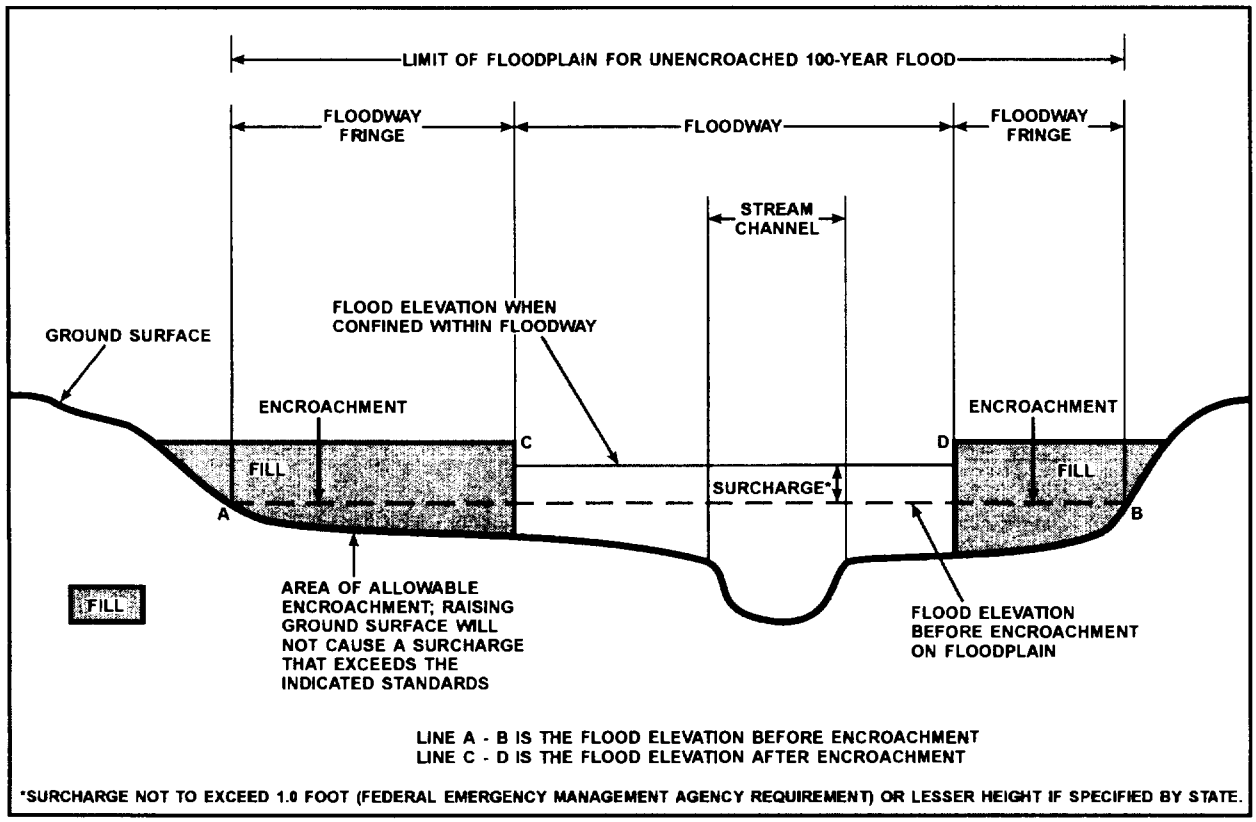
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI
(PROVIDENCE CO.)

FLOODWAY DATA

WOONASQUATUCKET RIVER – WEST RIVER - UPPER CANADA POND BROOK



FLOODWAY SCHEMATIC Figure 3

5.0 INSURANCE APPLICATIONS

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

Zone A

Zone A is the flood insurance rate zone that corresponds to the 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 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. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100 year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations 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, and to 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 base flood elevations or depths are shown within this zone.

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

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

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

7.0 OTHER STUDIES

FISs have been prepared for the Towns of Smithfield and Johnston and the Cities of Providence and Pawtucket (References 14, 15, 9, and 16).

Because it is based on more up-to-date analyses, this FIS supersedes the previously printed FIS for the Town of North Providence (Reference 17).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, Mitigation Division, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

9.0 BIBLIOGRAPHY AND REFERENCES

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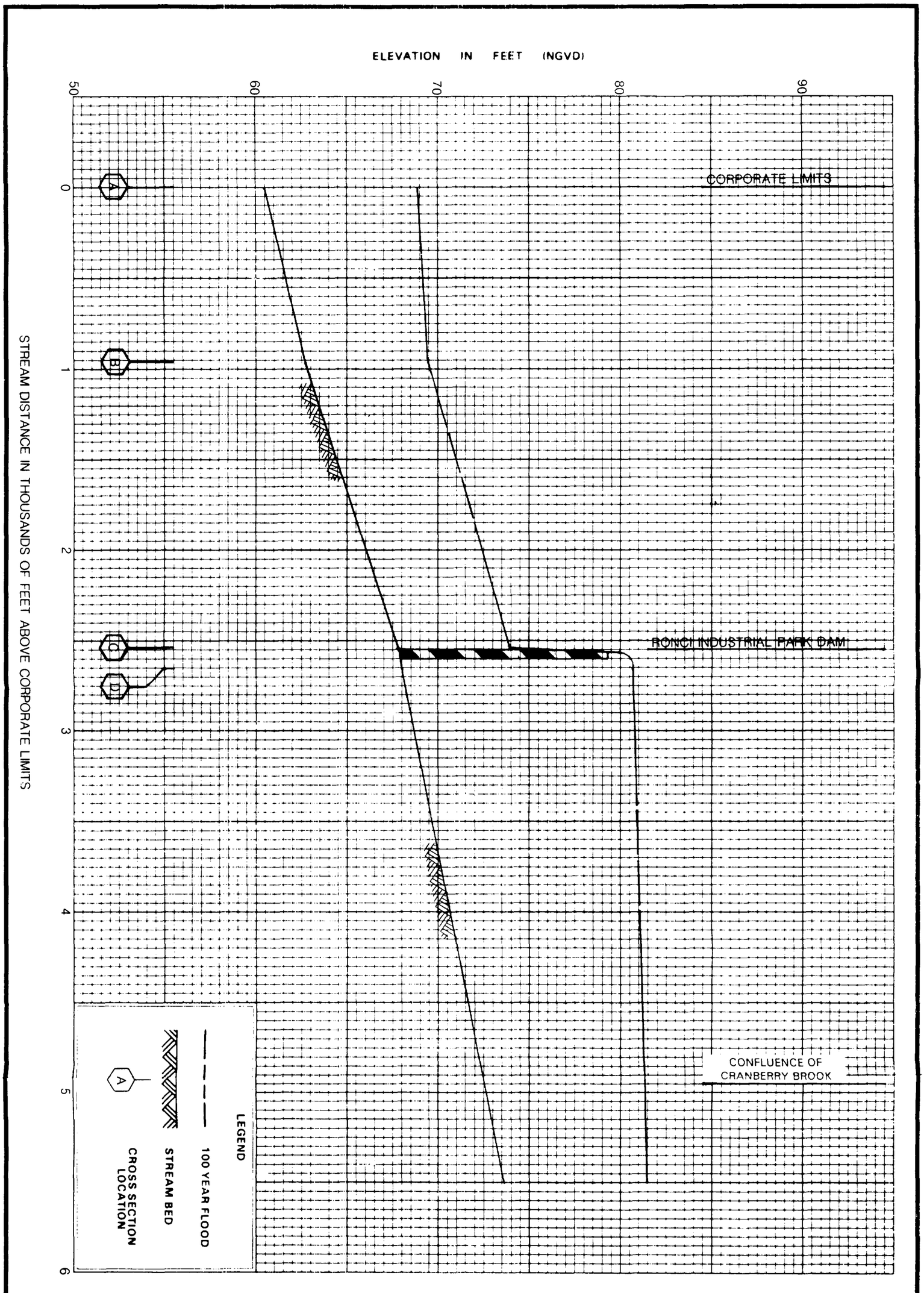
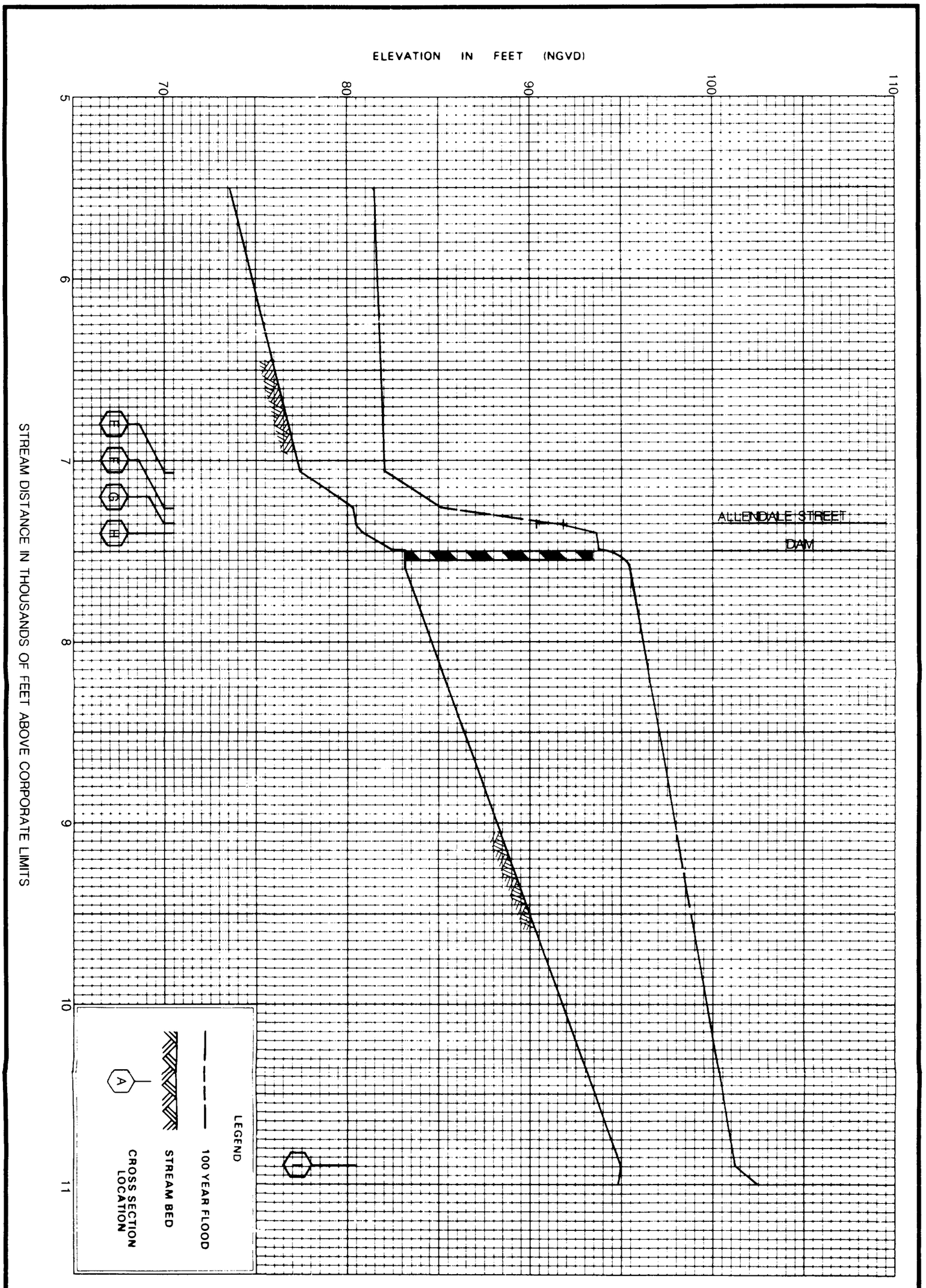


01P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF NORTH PROVIDENCE, RI** (PROVIDENCE CO.)	**FLOOD PROFILES** **WOONASQUATUCKET RIVER**



02P

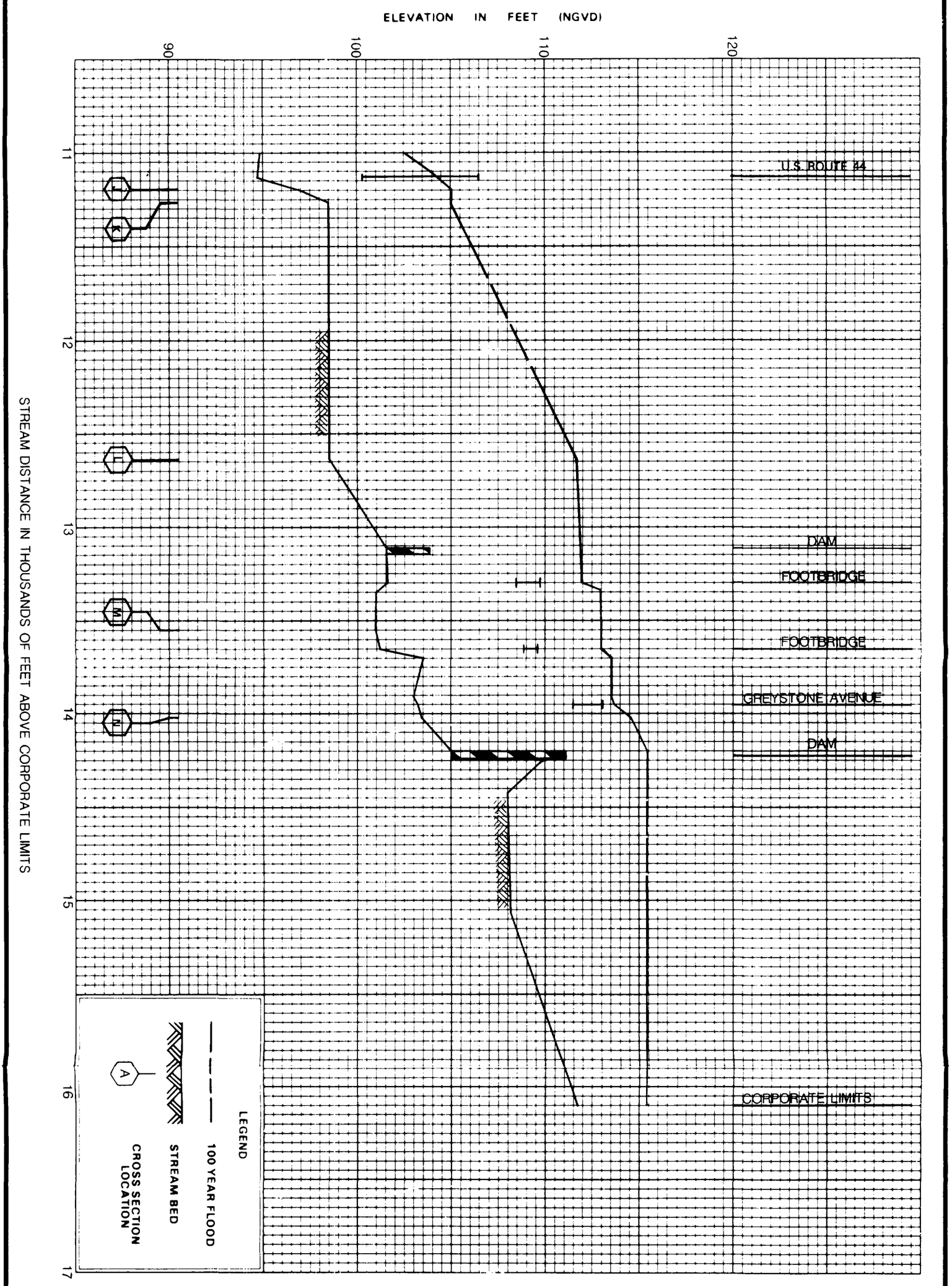
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

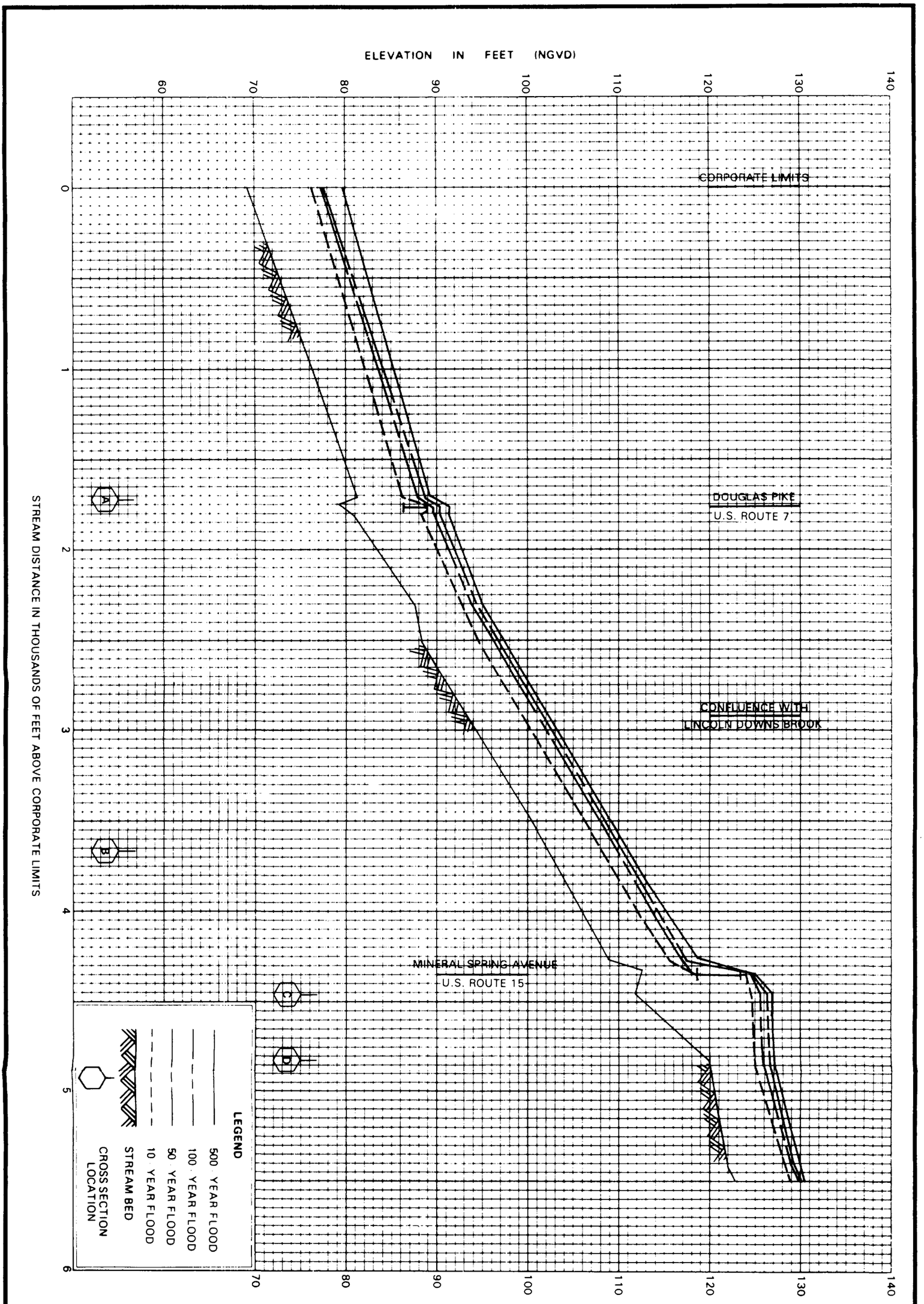
(PROVIDENCE CO.)

FLOOD PROFILES

WOONASQUATUCKET RIVER



03P	FEDERAL EMERGENCY MANAGEMENT AGENCY TOWN OF NORTH PROVIDENCE, RI (PROVIDENCE CO.)	FLOOD PROFILES WOONASQUATUCKET RIVER



04P

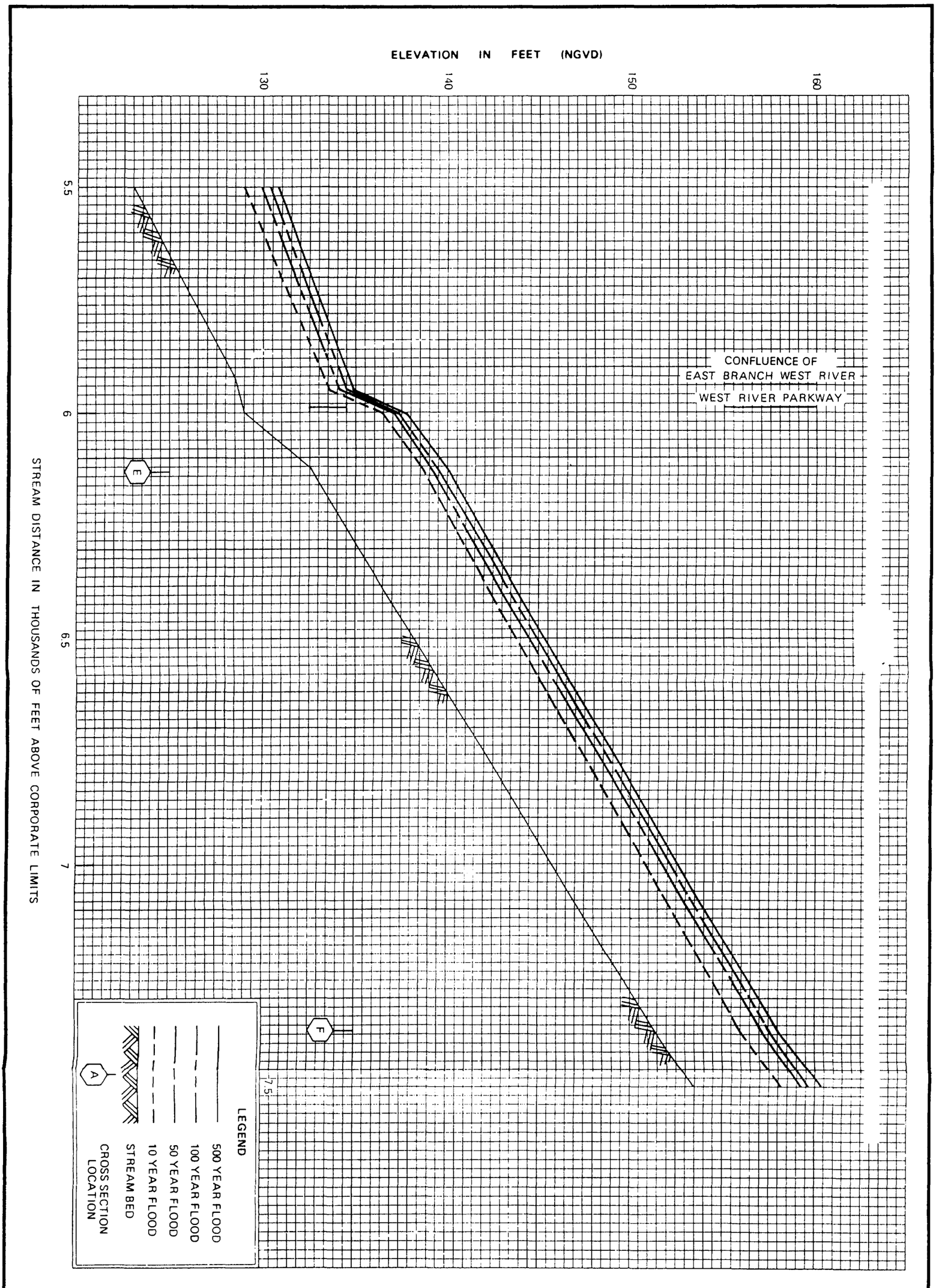
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

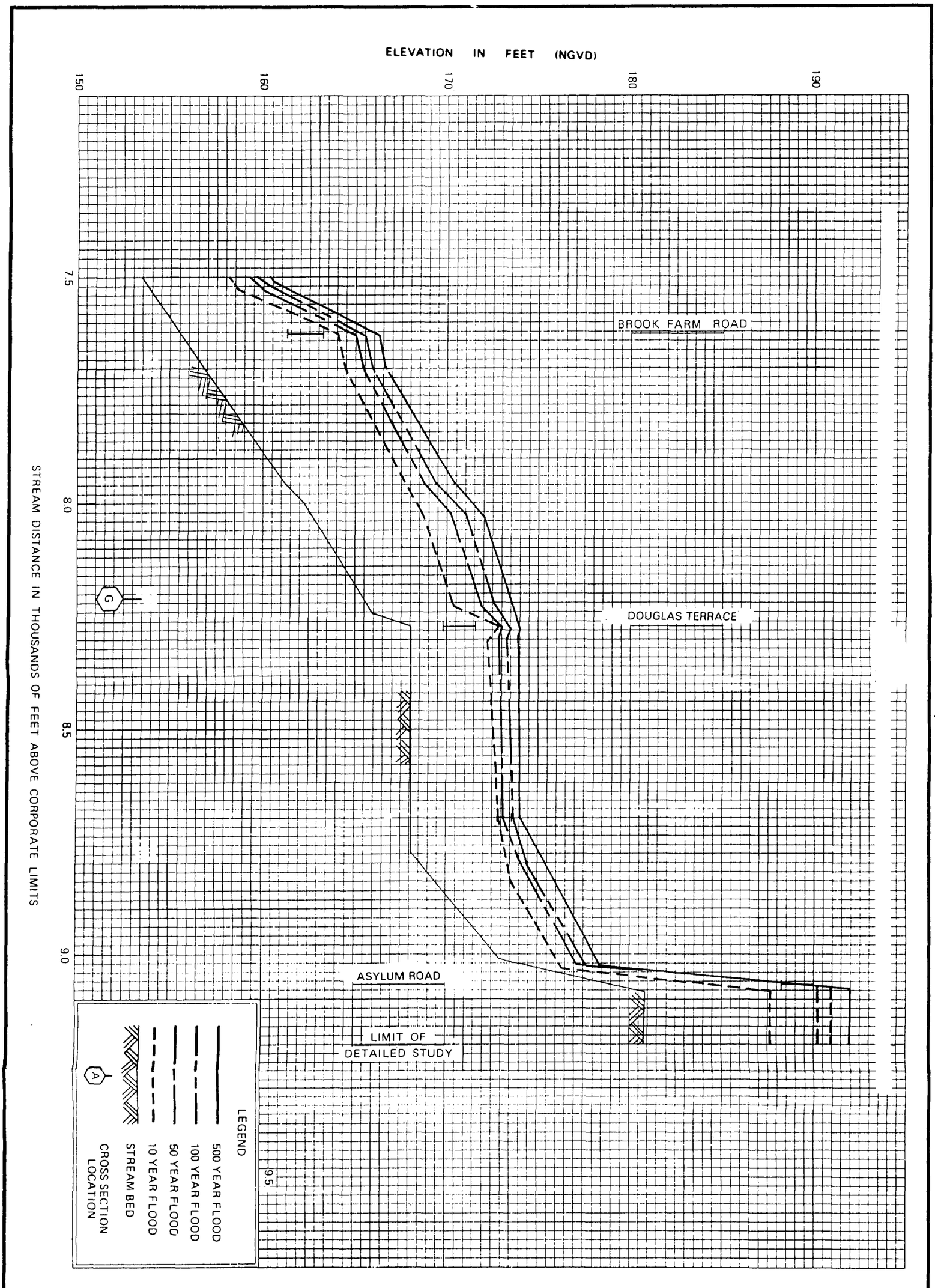
(PROVIDENCE CO.)

FLOOD PROFILES

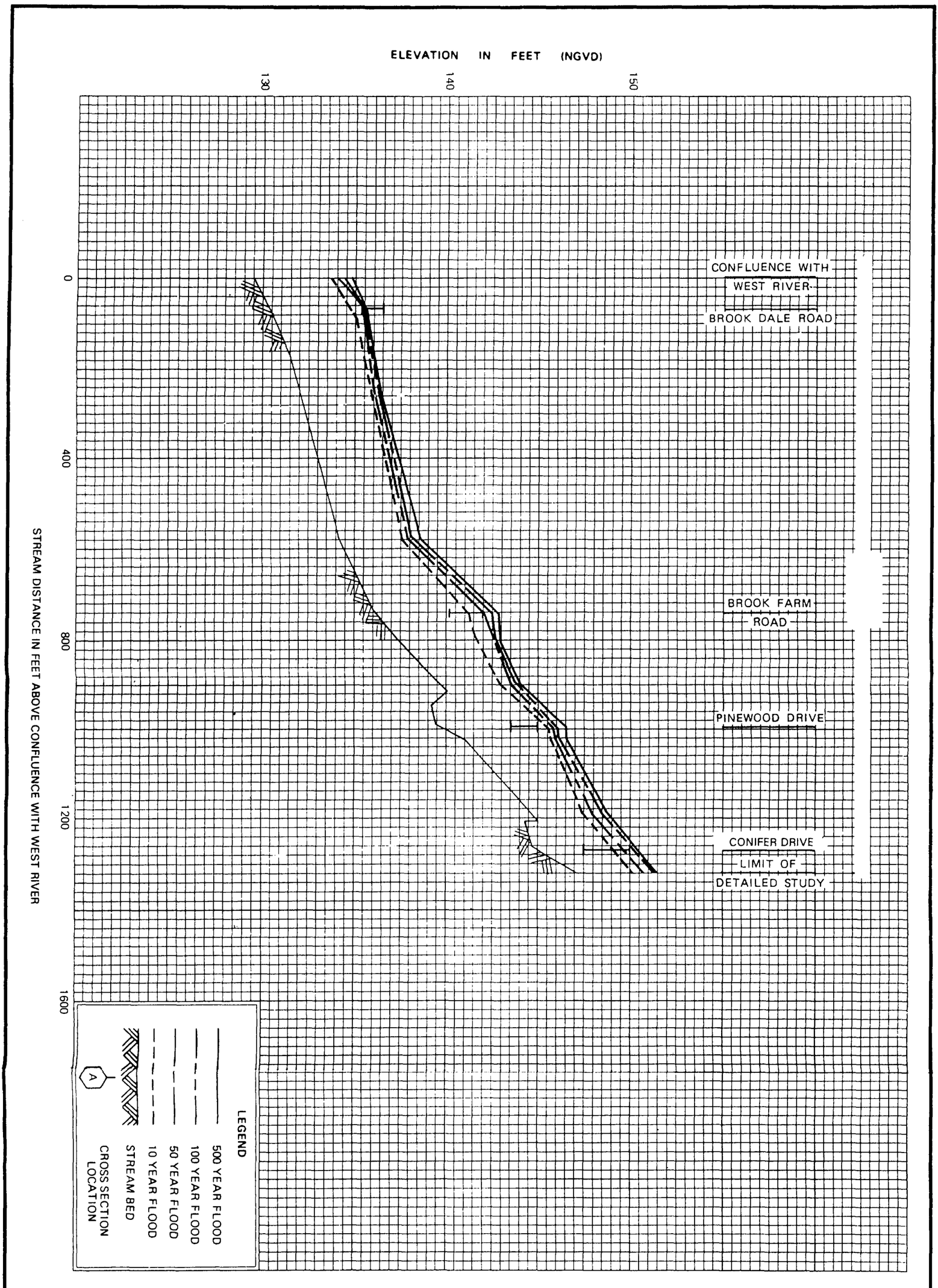
WEST RIVER



05P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF NORTH PROVIDENCE, RI** **(PROVIDENCE CO.)**	FLOOD PROFILES WEST RIVER



09P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF NORTH PROVIDENCE, RI** **(PROVIDENCE CO.)**	FLOOD PROFILES WEST RIVER



07P

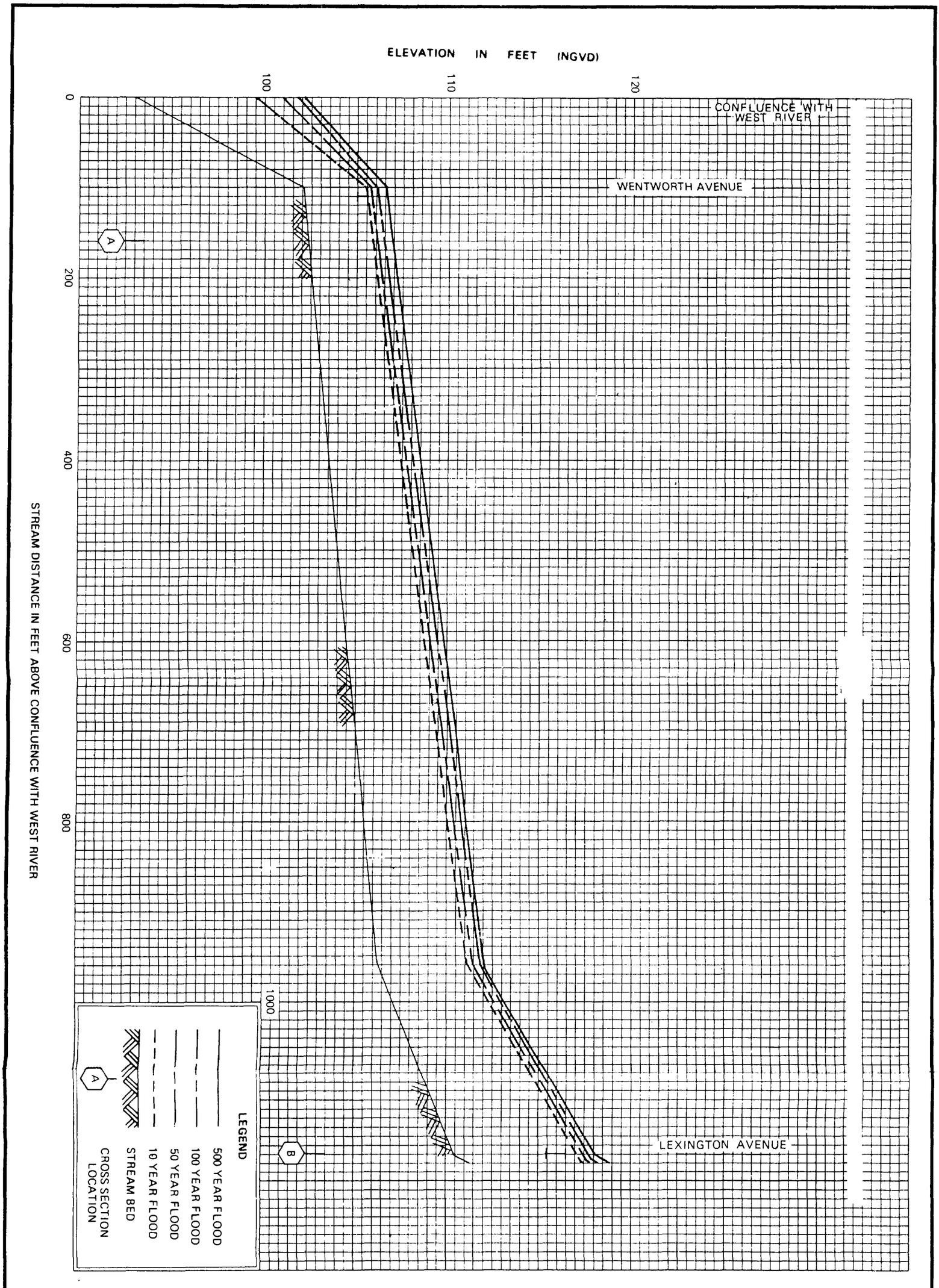
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

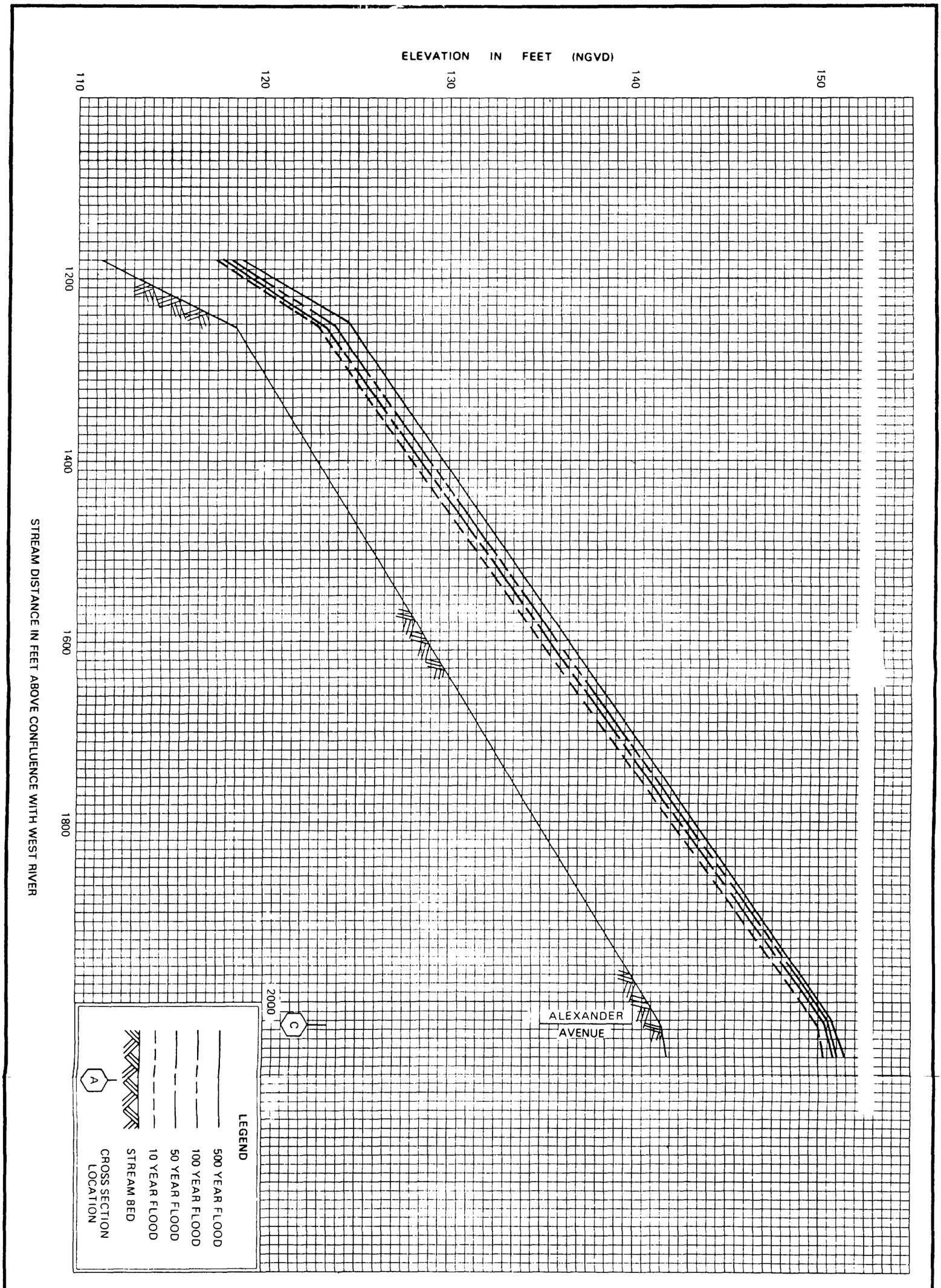
(PROVIDENCE CO.)

FLOOD PROFILES

EAST BRANCH WEST RIVER



08P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF NORTH PROVIDENCE, RI** **(PROVIDENCE CO.)**	**FLOOD PROFILES** **LINCOLN DOWNS BROOK**



09P

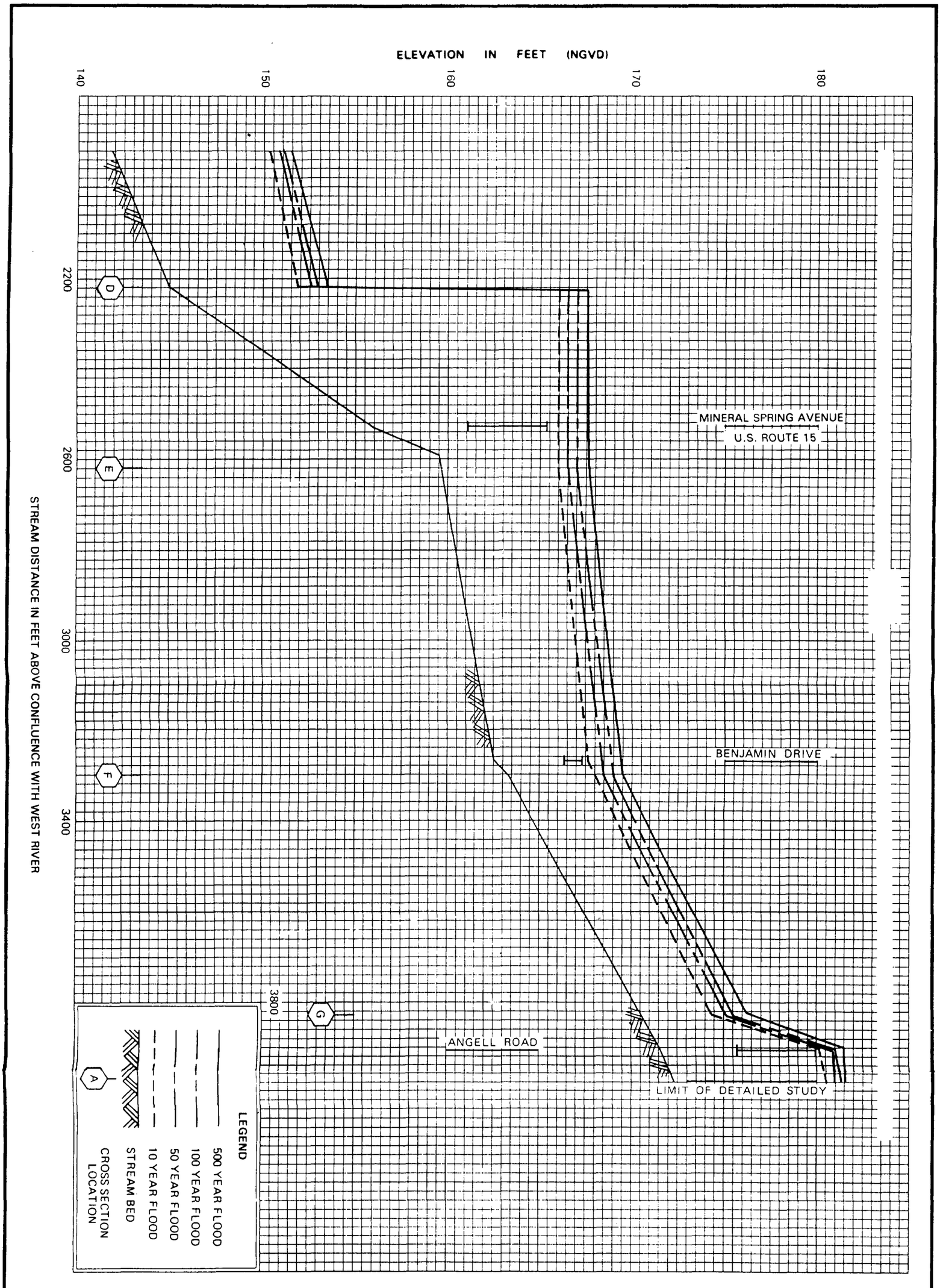
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

(PROVIDENCE CO.)

FLOOD PROFILES

LINCOLN DOWNS BROOK



10P

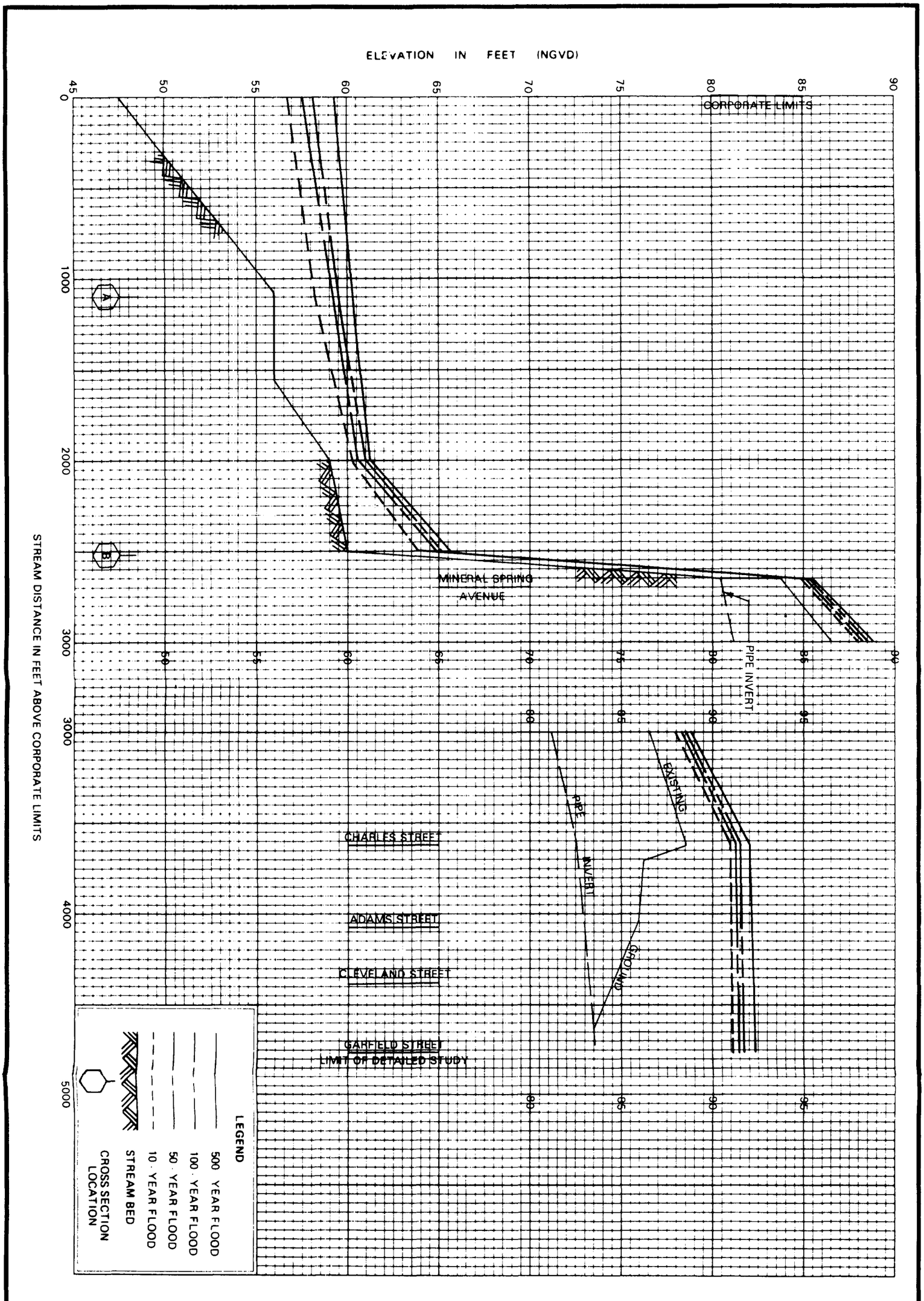
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

(PROVIDENCE CO.)

FLOOD PROFILES

LINCOLN DOWNS BROOK



11P

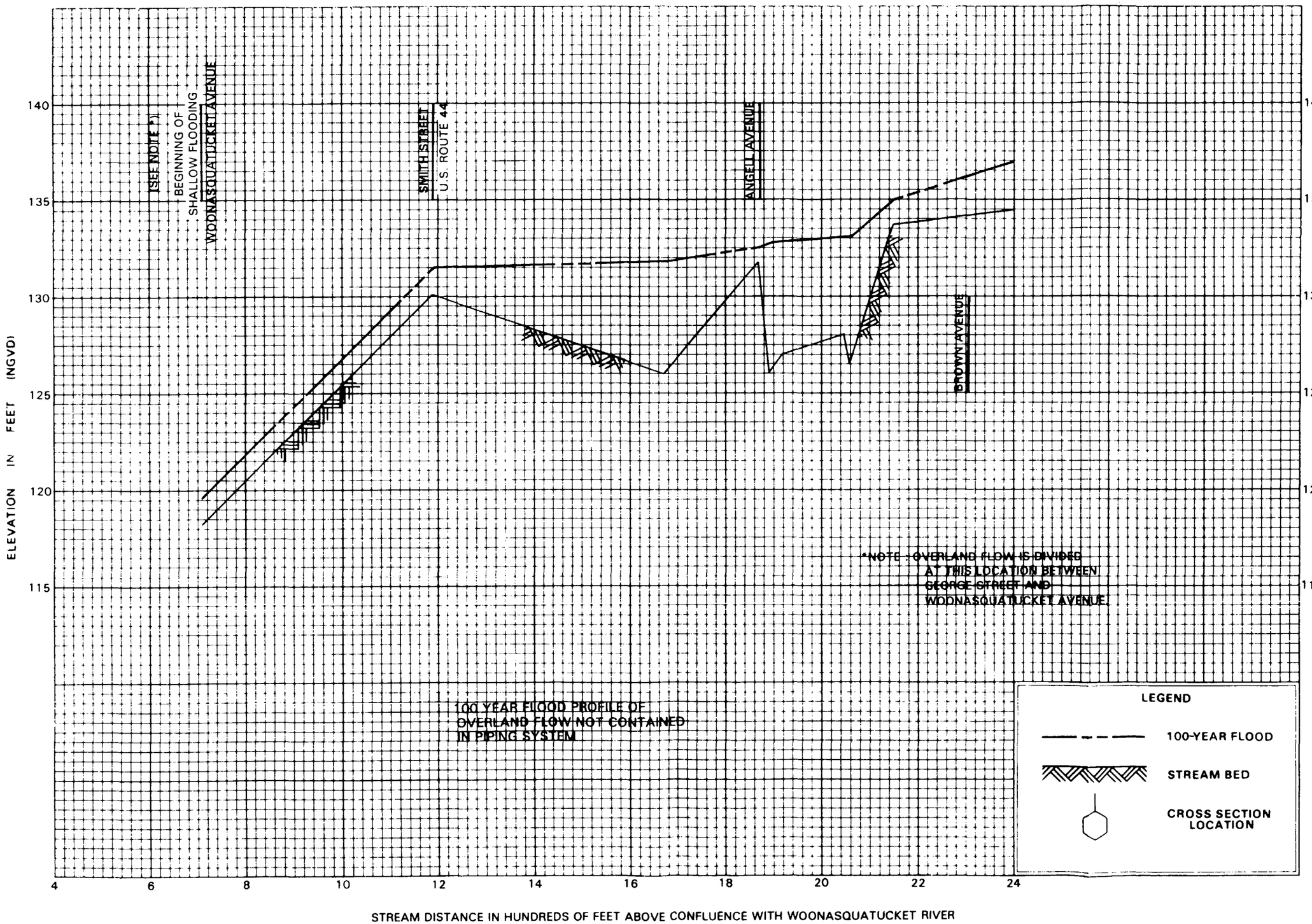
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

(PROVIDENCE CO.)

FLOOD PROFILES

UPPER CANADA POND BROOK

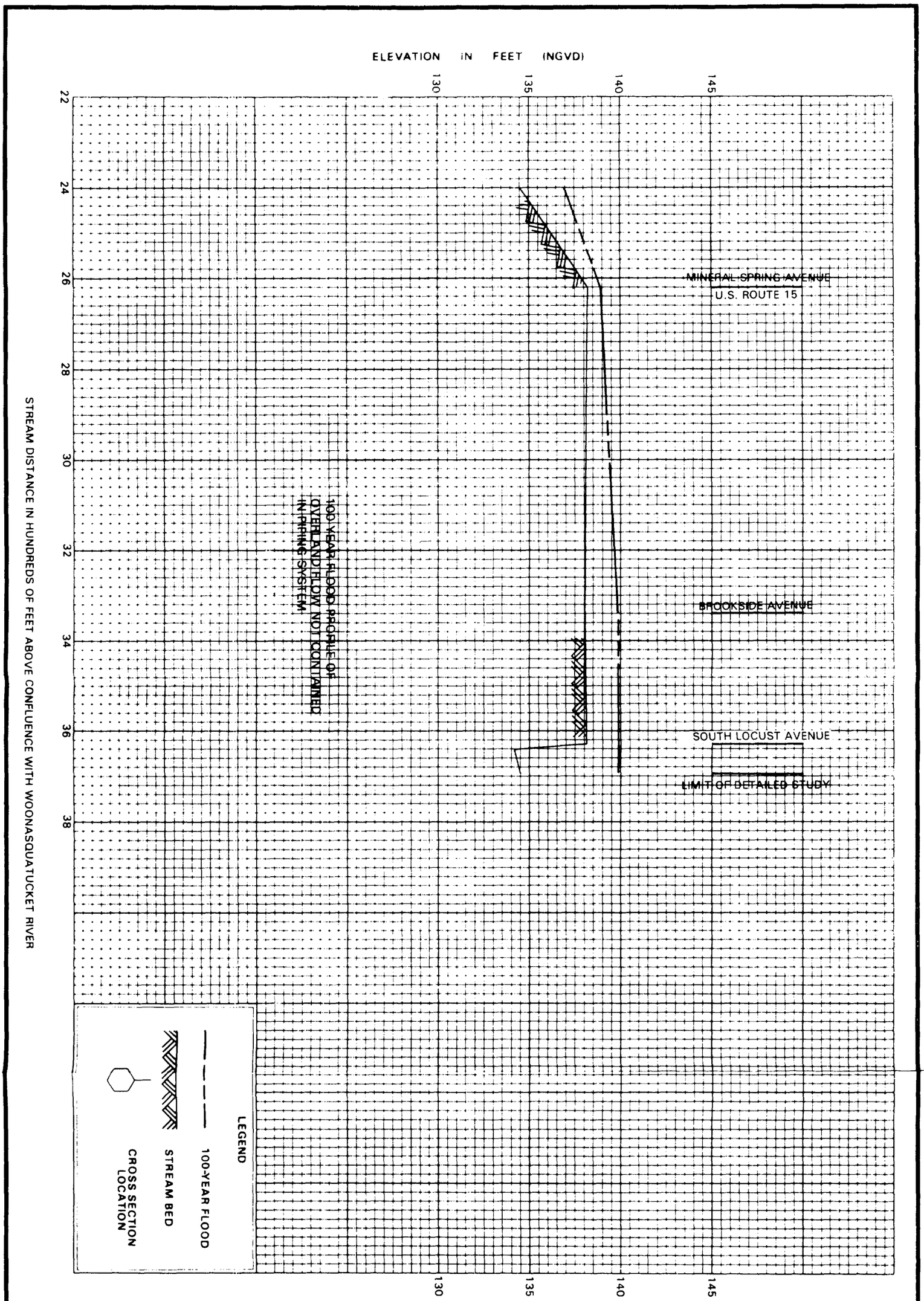


FLOOD PROFILES

CENTERDALE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI
(PROVIDENCE CO.)



13P

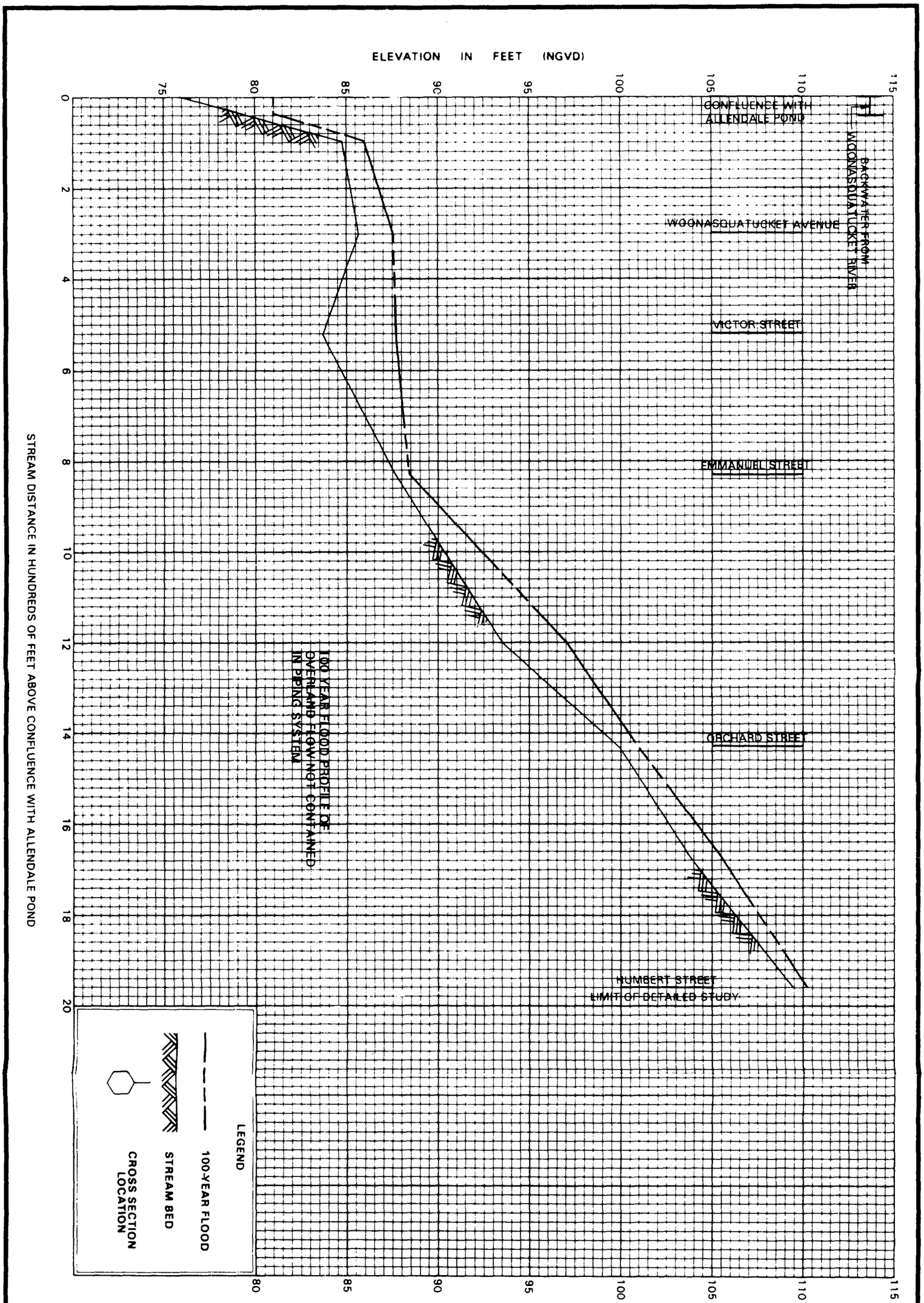
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF NORTH PROVIDENCE, RI

(PROVIDENCE CO.)

FLOOD PROFILES

CENTERDALE BROOK



14P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF NORTH PROVIDENCE, RI** (PROVIDENCE CO.)	**FLOOD PROFILES** **CRANBERRY BROOK**