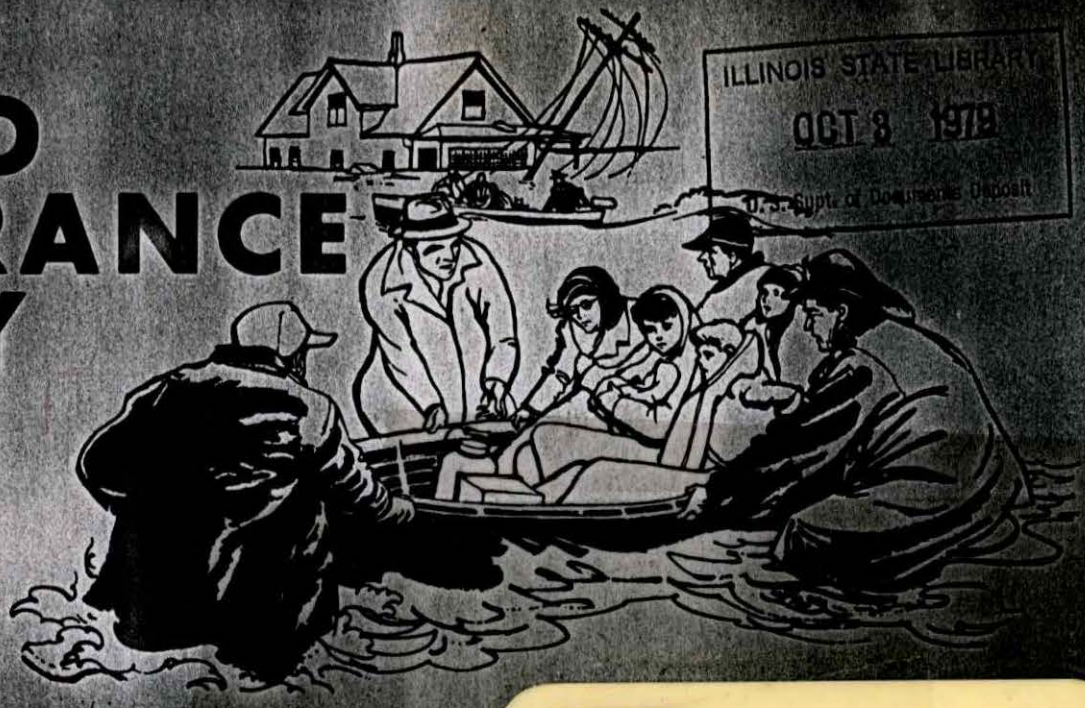
TINLEY PARK - FLOOD PLAIN

FLOOD INSURANCE STUDY

FLOOD INSURANCE STUDY



VILLAGE OF TINLEY PARK, ILLINOIS

COOK AND WILL COUNTIES

JUNE 1979

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
UNION DRAINAGE DITCH							
A	2200	49	285	1.26	692.3	692.2	0.1
B	3190	61	354	1.02	692.5	692.4	0.1
C	5010	45	185	1.95	693.2	693.1	0.1
D	7630	71	301	1.20	694.0	693.9	0.1
NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH							
A	1220[2]	91	330	0.78	693.6	693.5	0.1
B	2400[2]	40	139	1.85	694.4	694.3	0.1
C	4980[2]	104	238	1.08	696.4	696.3	0.1

[1]FEET ABOVE 76th AVENUE
[2]FEET ABOVE 80th AVENUE

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOODWAY DATA

UNION DRAINAGE DITCH - NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
MIDLOTHIAN CREEK							
A	42,200	139	460	2.18	680.1	680.0	0.1
B	43,840	200	419	2.31	684.1	684.0	0.1
C	45,670	60	430	2.20	687.5	687.5	0.0
D	47,280	70	280	3.25	691.0	690.9	0.1
E	49,260	120	322	2.79	693.9	693.8	0.1
F	50,340	115	605	1.32	694.6	694.5	0.1
G	53,120	670	1000	0.85	695.3	695.2	0.1
H	57,600	408 / 380[2]	1214	0.54	696.1	696.0	0.1
76TH AVENUE DITCH							
A	0	1808	7145	0.08	695.3	695.2	0.1
B	540	1592	6292	0.09	695.3	695.2	0.1
C	1630	597 / 110[2]	1038	0.53	695.4	695.3	0.1
D	2470	60	514	1.07	695.5	695.4	0.1
E	2670	60	393	1.40	695.6	695.5	0.1
F	2940	60	334	1.65	696.3	696.2	0.1
G	3225	60	404	1.36	698.9	698.8	0.1
H	3525	109	535	1.03	701.8	701.7	0.1
I	3825	263	656	0.84	702.1	702.0	0.1
J	4133	628	1284	0.24	702.2	702.1	0.1
K	4453	437	928	0.33	702.2	702.1	0.1
L	4703	520	1104	0.28	702.2	702.1	0.1
M	5963	257	370	0.82	702.5	702.4	0.1
N	6723	1272	1477	0.21	705.8	705.7	0.1

[1] FEET ABOVE MOUTH
[2] TOTAL WIDTH / WIDTH WITHIN CORPORATE LIMITS

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOODWAY DATA

MIDLOTHIAN CREEK - 76TH AVENUE DITCH

Tributary to UDD were obtained from Hydrologic Investigation Atlas Maps (Reference 13) published by the USGS. Flood boundaries for the downstream portion of Midlothian Creek were obtained from previous studies by the SCS (Reference 1).

Boundaries of flooding caused by inadequate drainage for two areas near Ravinia Drive and Oak Park Avenue were identified by the village and by its engineering consultant, Robinson and Associates Company. No further hydraulic studies were made. Areas from the Flood Hazard Boundary Map (Reference 14) were added, including the area in the northwestern corner of the community and ponding areas in central and eastern parts of the community.

The boundaries of the 100-year and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations, and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity and increases flood heights, thus increasing flood hazard in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. As minimum standards, the Federal Insurance Administration limits such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. In Illinois though, under Revised Statutes, Section 65f, Chapter 19 as amended 1973 (Reference 15), encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights. Thus at the recommendation of the DOWR, a floodway having no more than a 0.1 foot surcharge has been delineated for this study.

The floodways proposed for this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The floodways for 76th Avenue Ditch and the Northern Tributary to UDD were computed without considering backwater effects from their receiving streams. Results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2). Portions of the floodways for Midlothian Creek and 76th Avenue Ditch are in adjacent communities.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

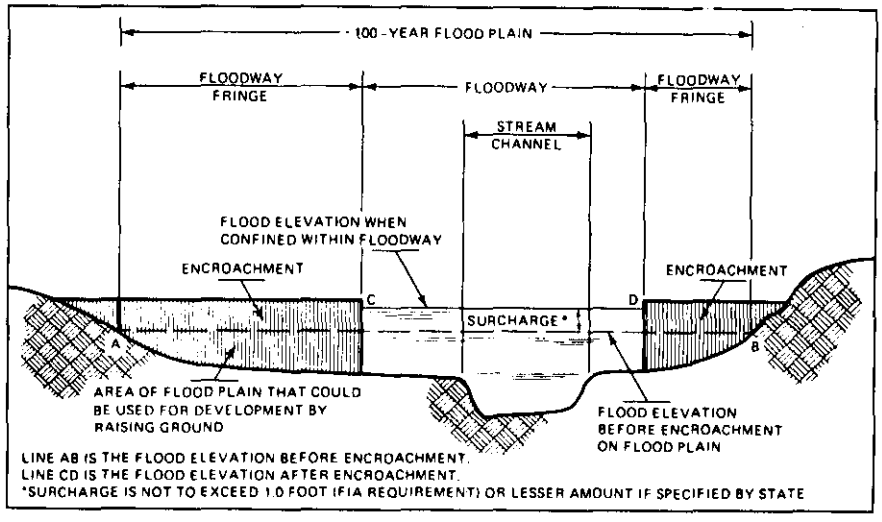


FIGURE 2. Floodway Schematic

The floodways in this report are recommended to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting the Village of Tinley Park.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
MIDLOTHIAN CREEK							
REACH 1	0005	−0.9	−0.3	0.6	010	A2	VARIES–SEE MAP
REACH 2	0005	−1.9	−0.5	1.0	020	A4	VARIES–SEE MAP
76TH AVENUE DITCH							
REACH 1	0005	−1.7	−0.4	0.8	015	A3	695.0
REACH 2	0005	−0.7	−0.1	0.2	005	A1	VARIES–SEE MAP
UNION DRAINAGE DITCH							
REACH 1	0010	−2.3	−0.7	1.4	025	A5	VARIES–SEE MAP
NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH							
REACH 1	0010	−1.1	−0.3	1.0	010	A2	VARIES–SEE MAP

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOOD INSURANCE ZONE DATA

MIDLOTHIAN CREEK - 76TH AVENUE DITCH -
UNION DRAINAGE DITCH - NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH

Detailed hydrologic and hydraulic studies for the Western Tributary to Midlothian Creek, 76th Avenue Ditch, UDD, and the Northern Tributary to UDD were not made prior to this report.

Flood boundaries shown for areas of approximate study agree with Hydrologic Investigation Atlas Maps published by the USGS and NIPC (Reference 13).

The Flood Insurance Study for Tinley Park, Illinois was prepared by Harza concurrently with Flood Insurance Studies for the adjacent City of Oak Forest, unincorporated Cook County, and unincorporated Will County (References 16, 17, and 18). Profiles, flood boundaries, and floodways for common streams are continuous at the community boundaries. All data shown for the Tinley Park report agree exactly with data at adjacent political boundaries.

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

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance Administration, Regional Director, One North Dearborn Street, Chicago, Illinois 60602.

8.0 REFERENCES AND BIBLIOGRAPHY

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4. Illinois Department of Transportation, Division of Water Resources, Report on the Regulation of Construction within the Flood Plain of the Little Calumet River and Tributaries in Cook and Will Counties, Springfield, Illinois, November 1976.

5. U.S. Geological Survey, Water Resources Data for Illinois, Part 1, Surface Water Records, Champaign, Illinois, 1975.

6. Little Calumet River Steering Committee, assisted by U.S. Department of Agriculture, Soil Conservation Service, Little Calumet River Floodwater Management Plan and Environmental Assessment, May 1975.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Six reaches meeting the above criteria were required for the flooding sources in Tinley Park. These include two reaches each on Midlothian Creek and 76th Avenue Ditch; and one reach each on UDD and the Northern Tributary to UDD. The locations of these reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their Flood Hazard Factors are used to set actuarial insurance premium rate tables based on Flood Hazard Factors from 005 to 200.

The Flood Hazard Factor for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the Flood Hazard Factor is 005; if the difference is 1.4 feet, the Flood Hazard Factor is 015; if the difference is 5.0 feet, the Flood Hazard Factor is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the Flood Hazard Factor is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the the entire incorporated area of the Village of Tinley Park was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or Flood Hazard Factors determined.

Zones A1-A5:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factor.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

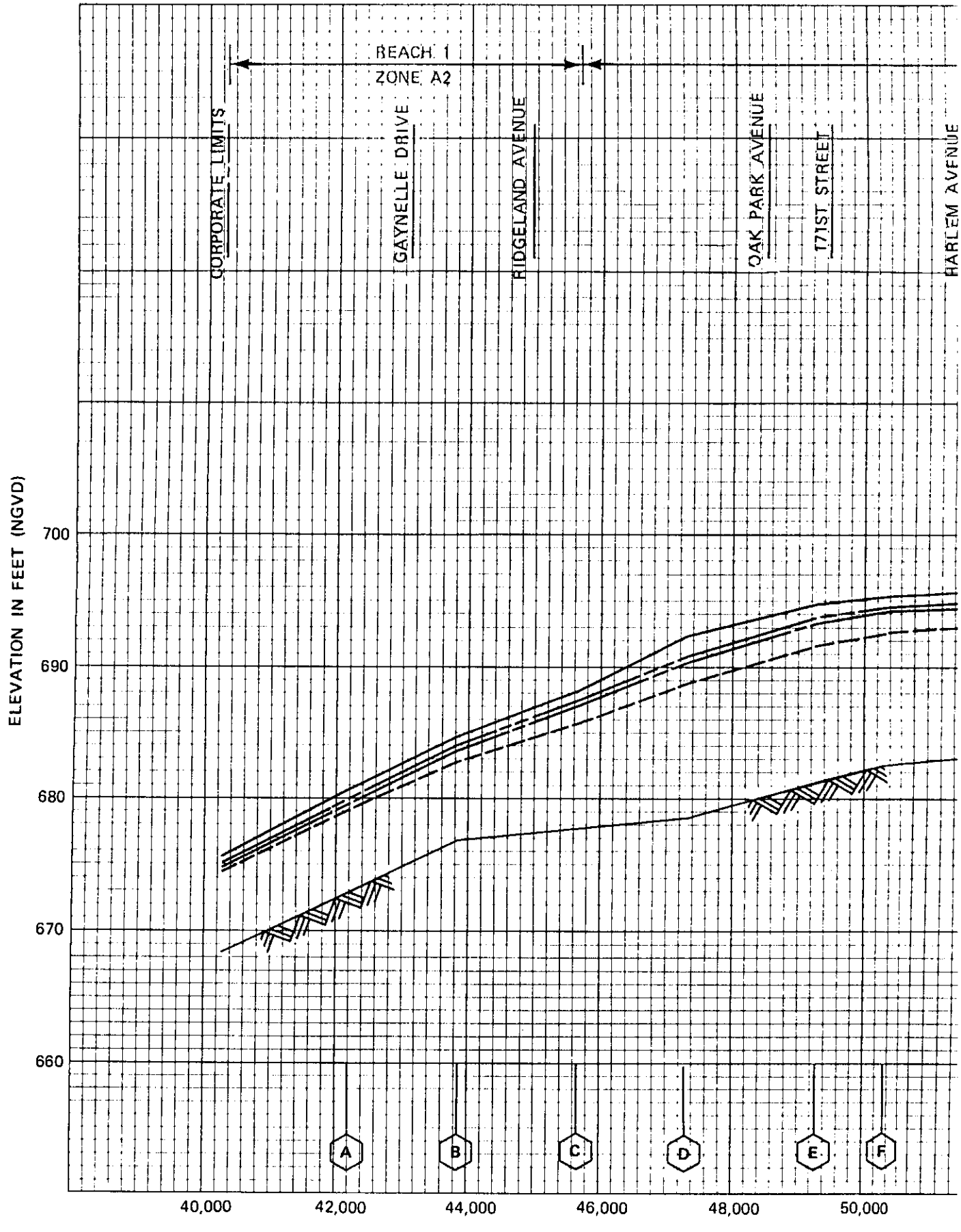
Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

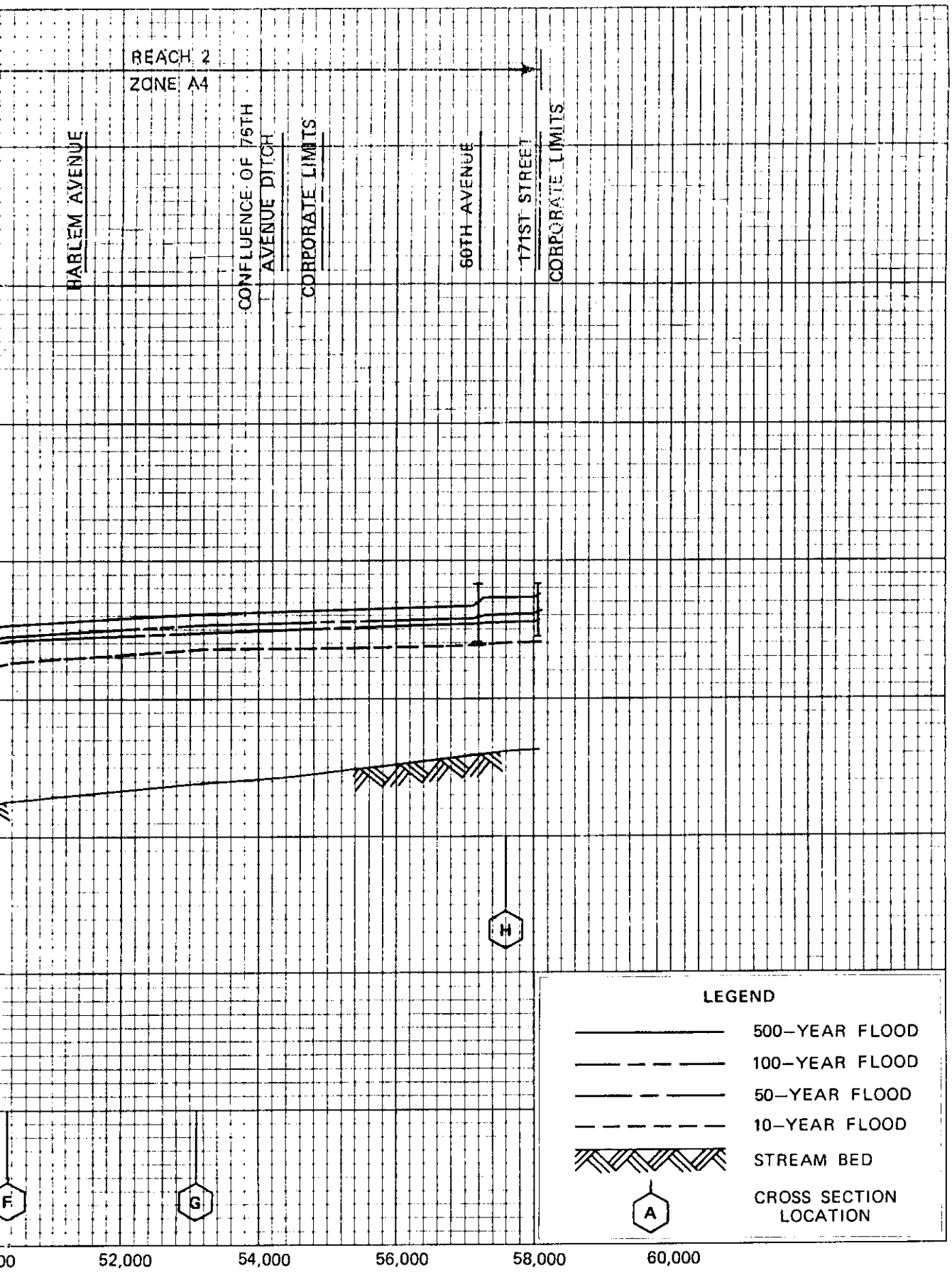
5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Tinley Park is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

Midlothian Creek was included in a floodwater management plan of the Little Calumet River prepared by the Little Calumet River Steering Committee with assistance from the SCS (Reference 6). The committee also published flood plain maps and profiles for Midlothian Creek (Reference 1). A flood plain regulation for Midlothian Creek (Reference 4) was implemented by the DOWR based on those maps and profiles. Profiles shown in this Flood Insurance Study for Midlothian Creek are the same as the regulatory profiles downstream from 76th Avenue Ditch. Upstream from 76th Avenue Ditch, profiles for Midlothian Creek had not been published prior to this study; these profiles have been certified by the DOWR for use in the state's flood plain regulation program.


REACH 1
ZONE A2
CORPORATE LIMITS
GAYNELLE DRIVE
RIDGELAND AVENUE
OAK PARK AVENUE
171ST STREET
HARLEM AVENUE
ELEVATION IN FEET (NGVD)
700
690
680
670
660
A
B
C
D
E
F
40,000
42,000
44,000
46,000
48,000
50,000
STREAM DISTANCE IN FEE



CE IN FEET ABOVE MOUTH

FLOOD PROFILES

MIDLOTHIAN CREEK

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Fed .al Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

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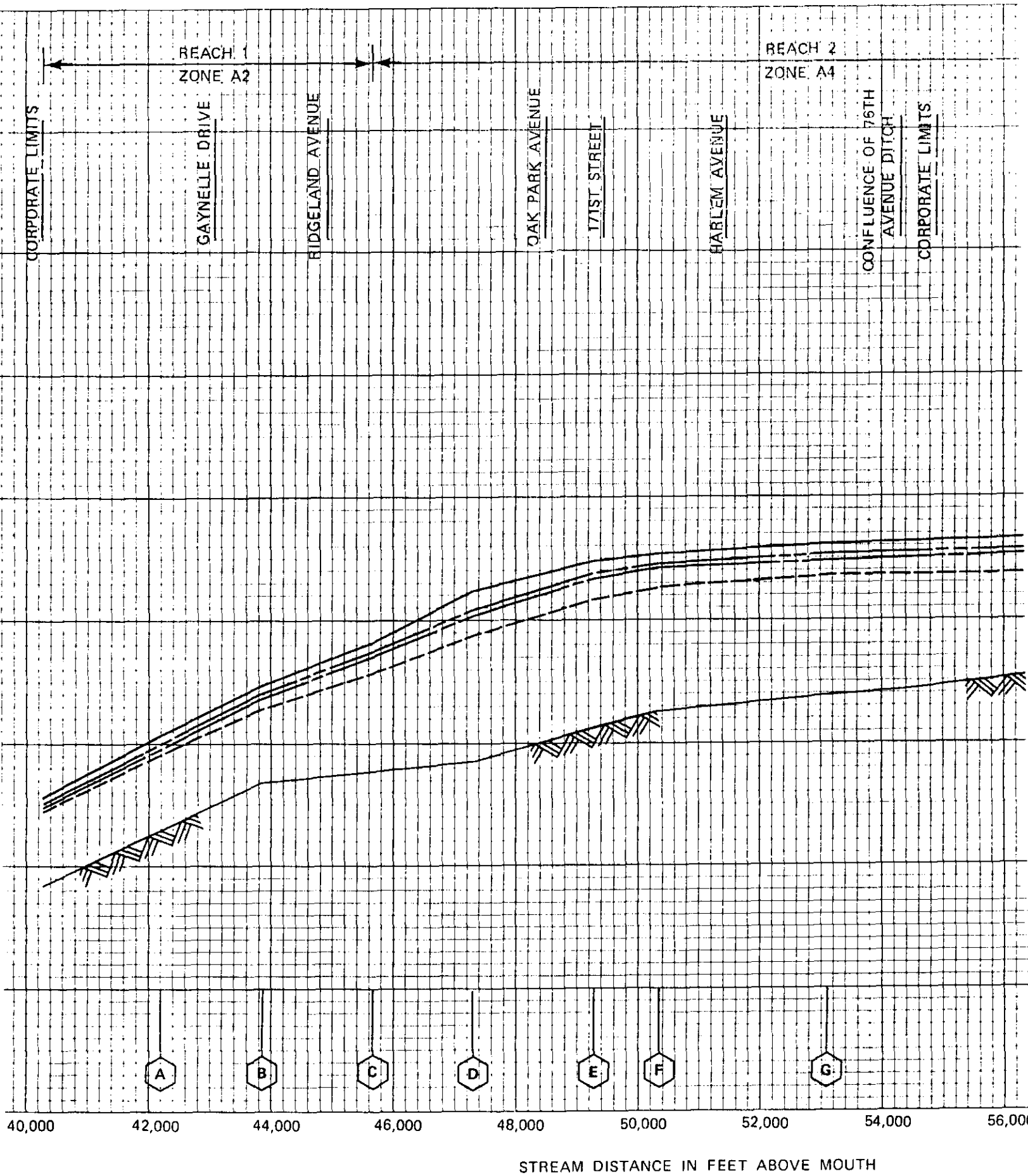
REACH 1
ZONE A2
REACH 2
ZONE A4
CORPORATE LIMITS
GAYNELLE DRIVE
RIDGELAND AVENUE
OAK PARK AVENUE
171ST STREET
HARLEM AVENUE
CONFLUENCE OF 76TH AVENUE DITCH
CORPORATE LIMITS
A
B
C
D
E
F
G
40,000
42,000
44,000
46,000
48,000
50,000
52,000
54,000
56,000
STREAM DISTANCE IN FEET ABOVE MOUTH

7. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 20, Computer Program for Project Formulation Hydrology, Washington, D.C., May 1965.

8. Illinois Department of Transportation, Division of Water Resources, Magnitude and Frequency of Floods in Illinois, J.M. Carns, Springfield, Illinois, 1973.

9. Chow, V.T., Open Channel Hydraulics. New York: McGraw-Hill, 1959.

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11. ----------, in cooperation with the Metropolitan Sanitary District of Greater Chicago, Orthophoto Maps, Scale 1:4800, Contour Intervals two feet: Tinley Park, Illinois, 1972.

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17. ----------, Flood Insurance Study, Cook County, Illinois, (in progress).

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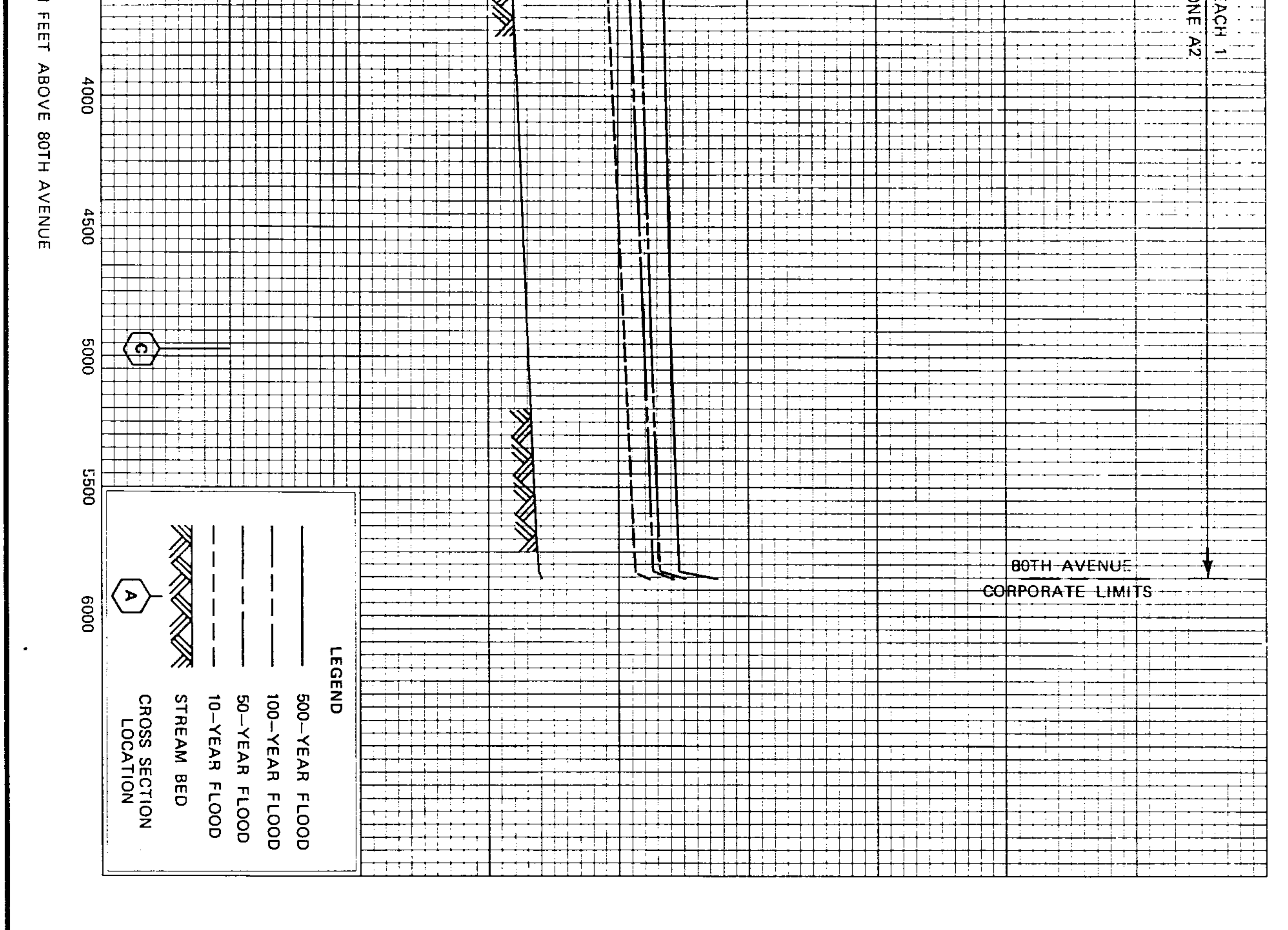
----------, Flood Insurance Study, Guidelines and Specifications, Washington, D.C., January 1976.

U.S. Water Resources Council, Guidelines for Determining Flood Flow Frequency, Bulletin No. 17, Washington, D.C., 1976.



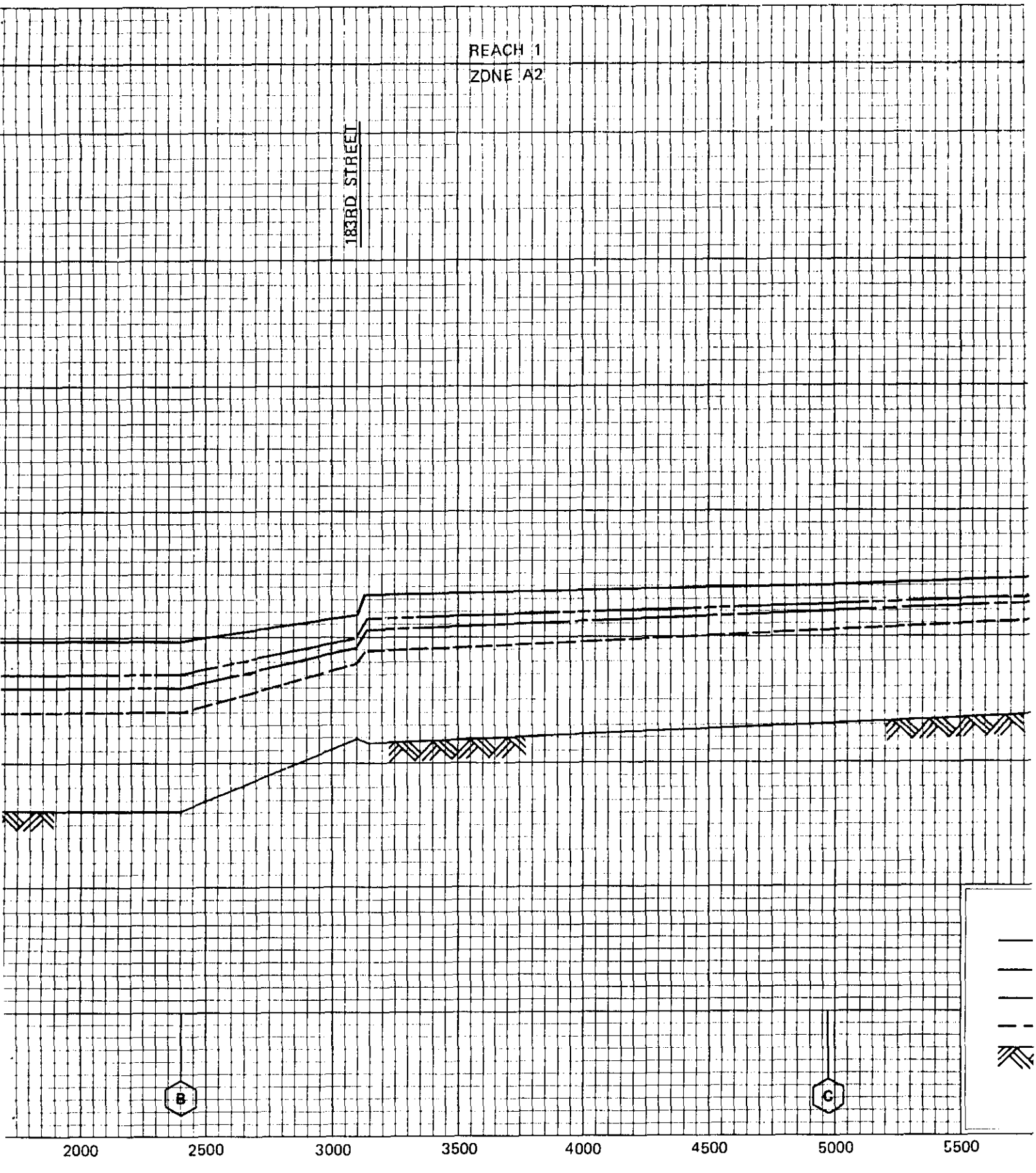
04P

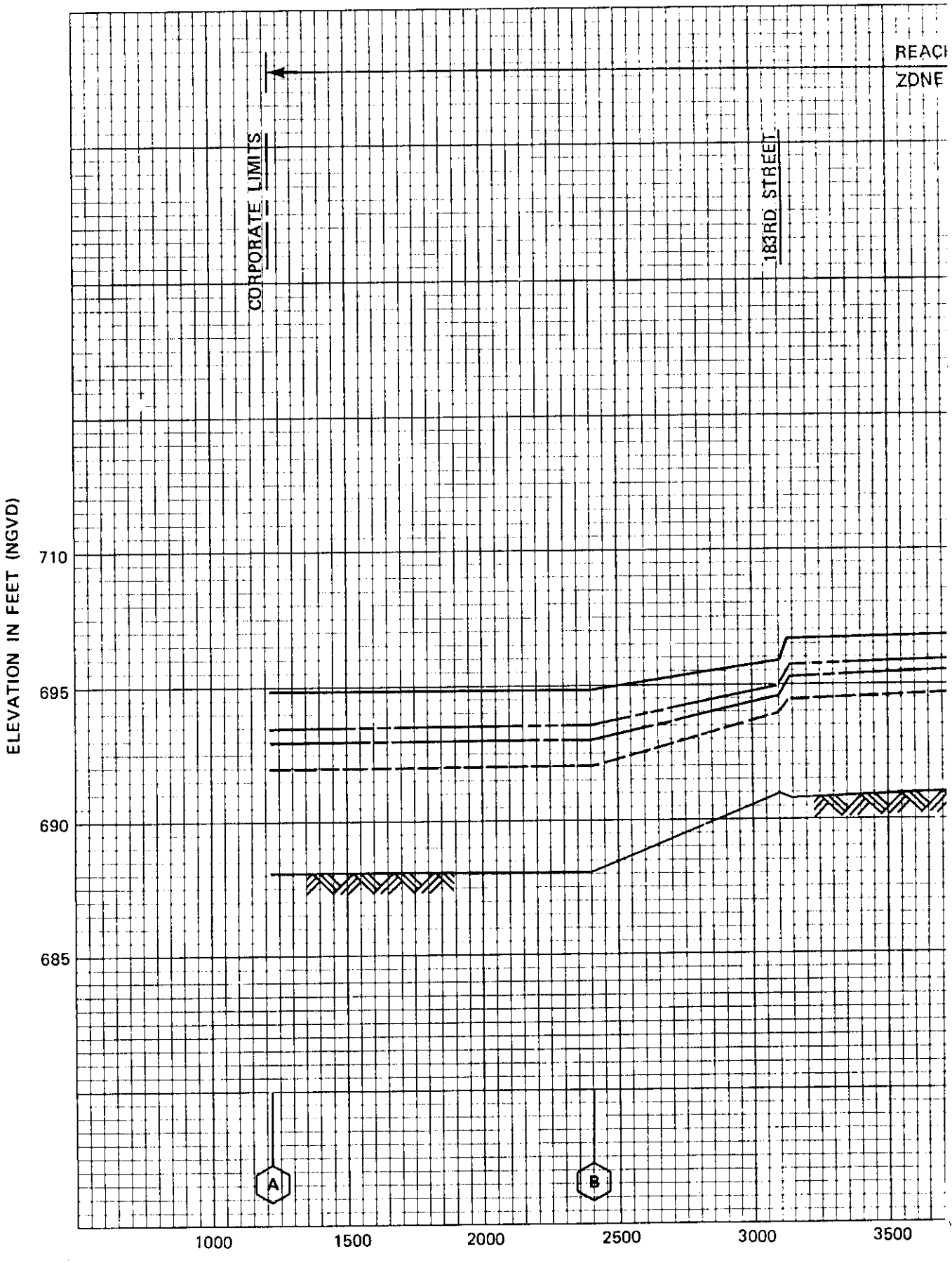
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

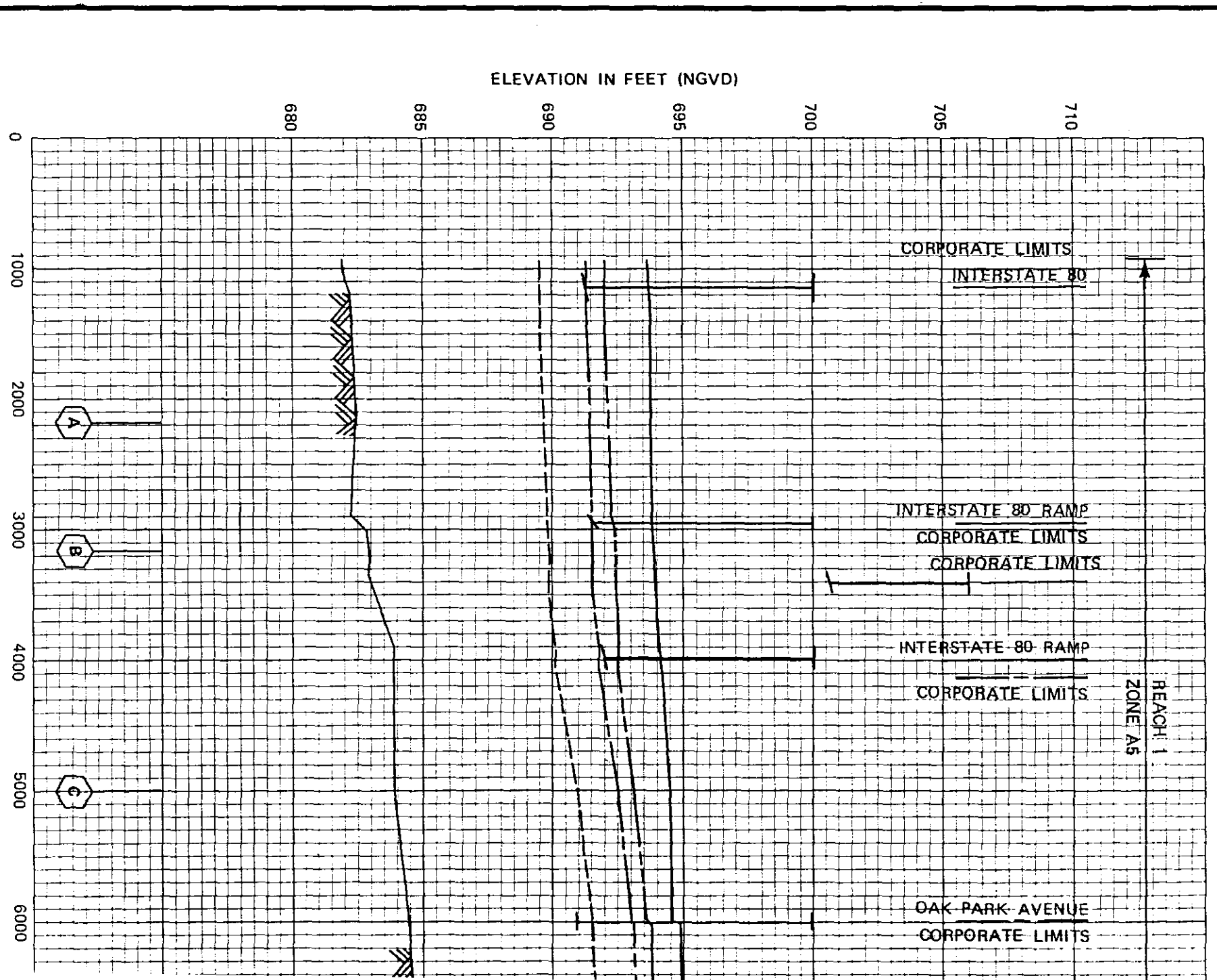
VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

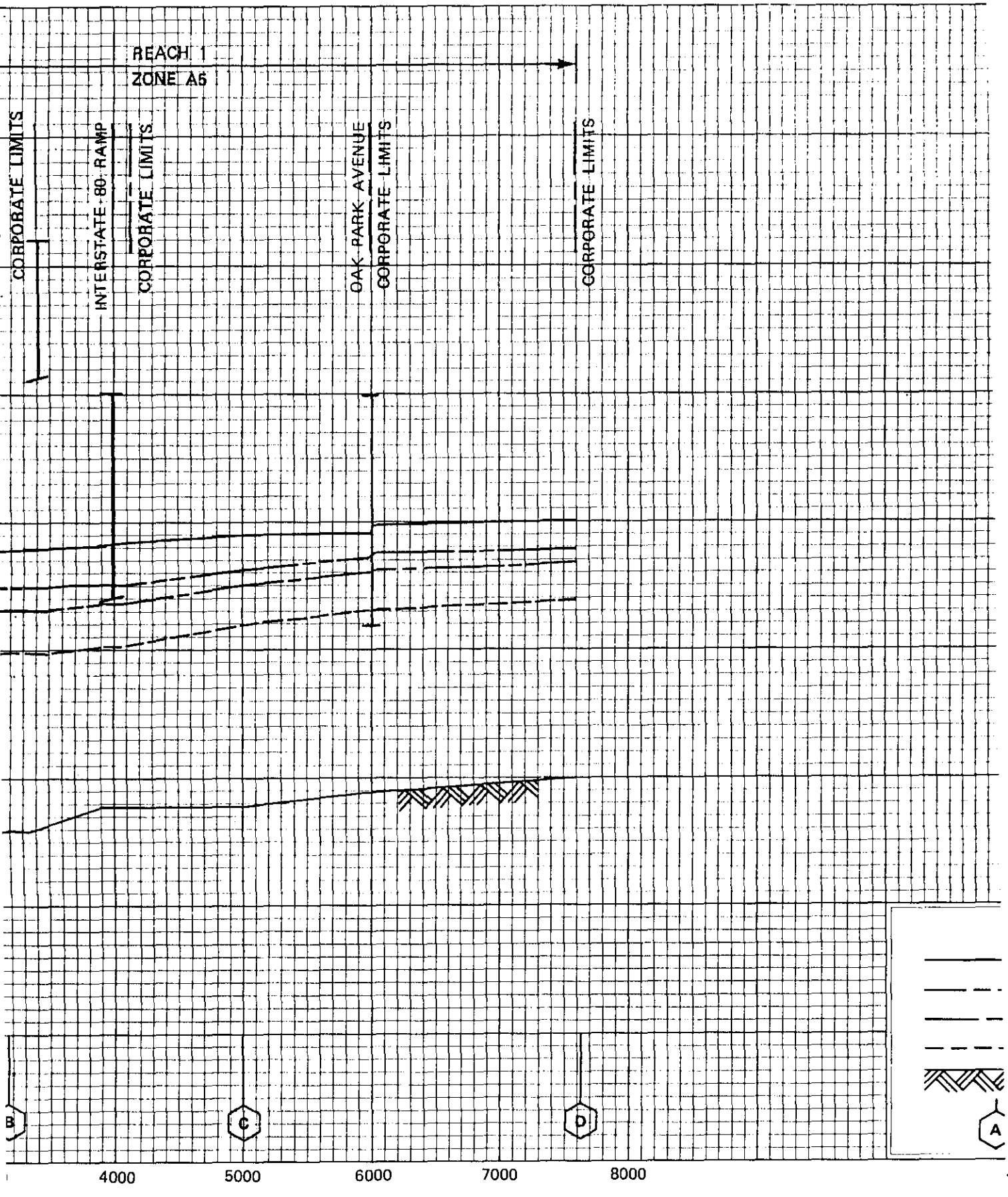
FLOOD PROFILES

NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH


REACH 1
ZONE A2
183RD STREET
B
C
2000
2500
3000
3500
4000
4500
5000
5500
STREAM DISTANCE IN FEET ABOVE 80TH AVENUE


REACH
ZONE
CORPORATE LIMITS
183RD. STREET
ELEVATION IN FEET (NGVD)
710
695
690
685
A
B
1000
1500
2000
2500
3000
3500
STREAM DISTANCE IN F


ELEVATION IN FEET (NGVD)
680
685
690
695
700
705
710
0
1000
2000
3000
4000
5000
6000
STREAM DISTANCE IN F
A
B
C
CORPORATE LIMITS
INTERSTATE 80
INTERSTATE 80 RAMP
CORPORATE LIMITS
CORPORATE LIMITS
INTERSTATE 80 RAMP
CORPORATE LIMITS
OAK PARK AVENUE
CORPORATE LIMITS
REACH 1
ZONE A5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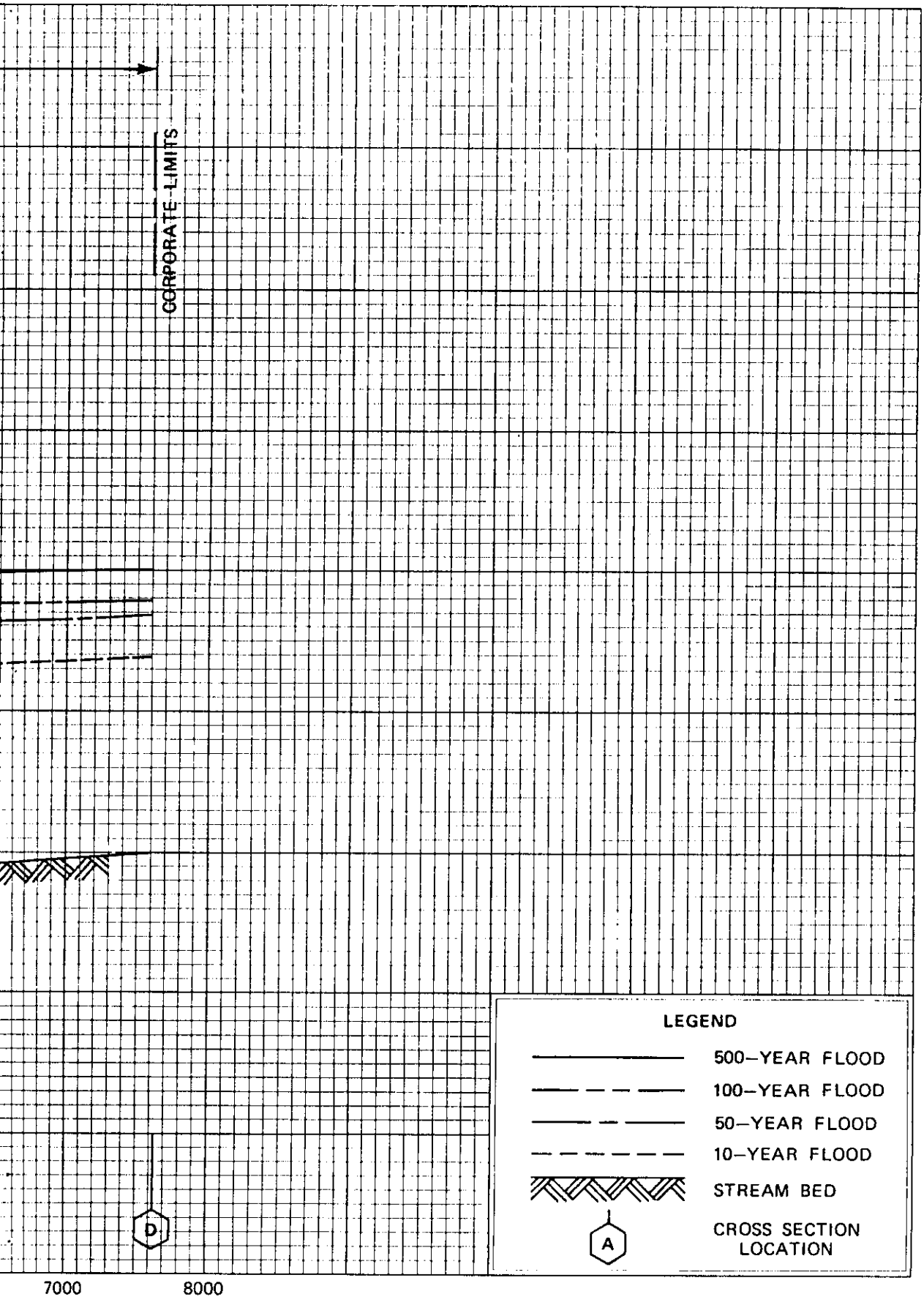
ZONE A5
CORPORATE LIMITS
INTERSTATE-80 RAMP
CORPORATE LIMITS
OAK PARK AVENUE
CORPORATE LIMITS
CORPORATE LIMITS
B
C
D
A
4000
5000
6000
7000
8000
STREAM DISTANCE IN FEET ABOVE 76TH AVENUE



ET ABOVE 76TH AVENUE

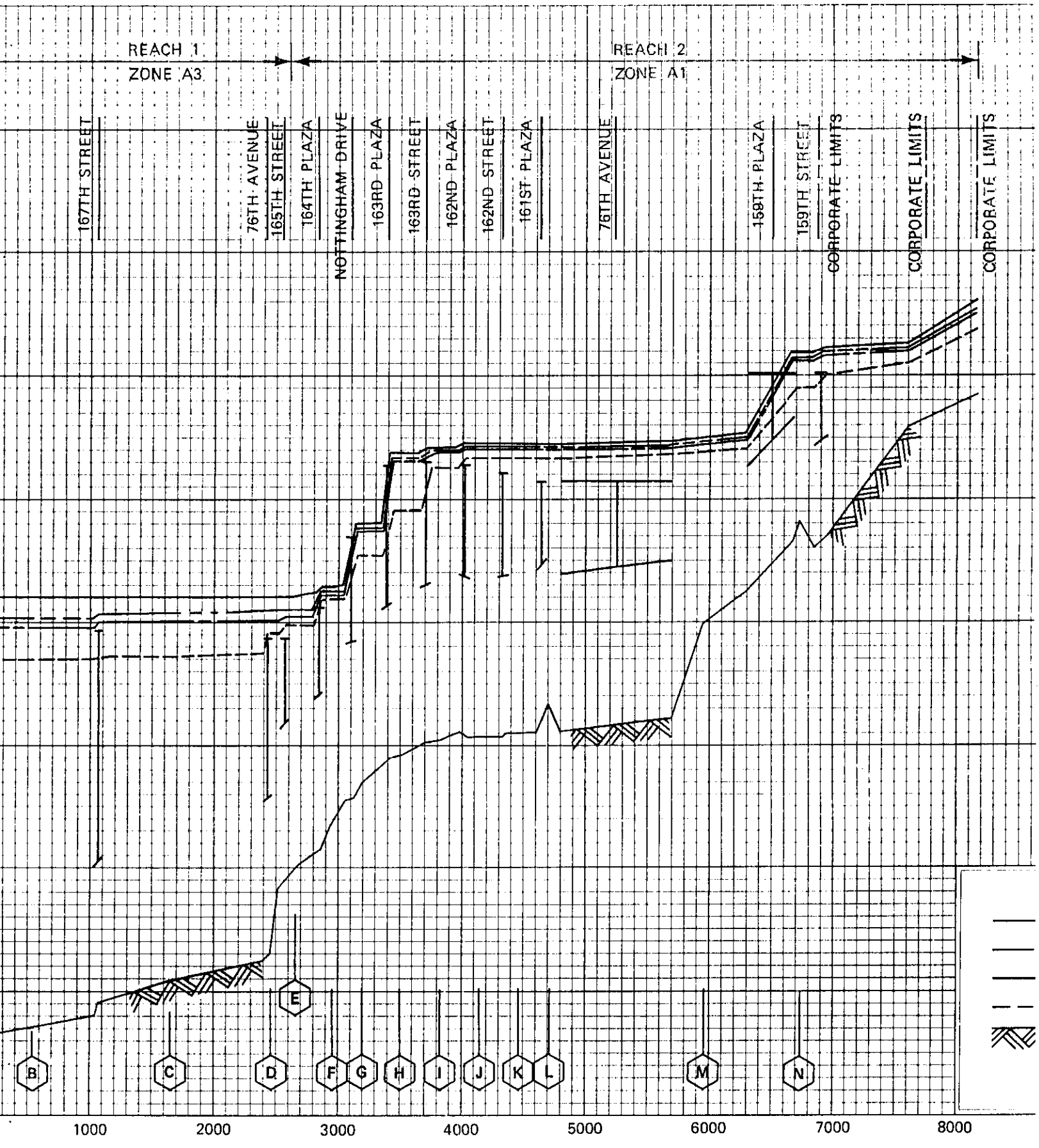
FLOOD PROFILES

UNION DRAINAGE DITCH

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

03P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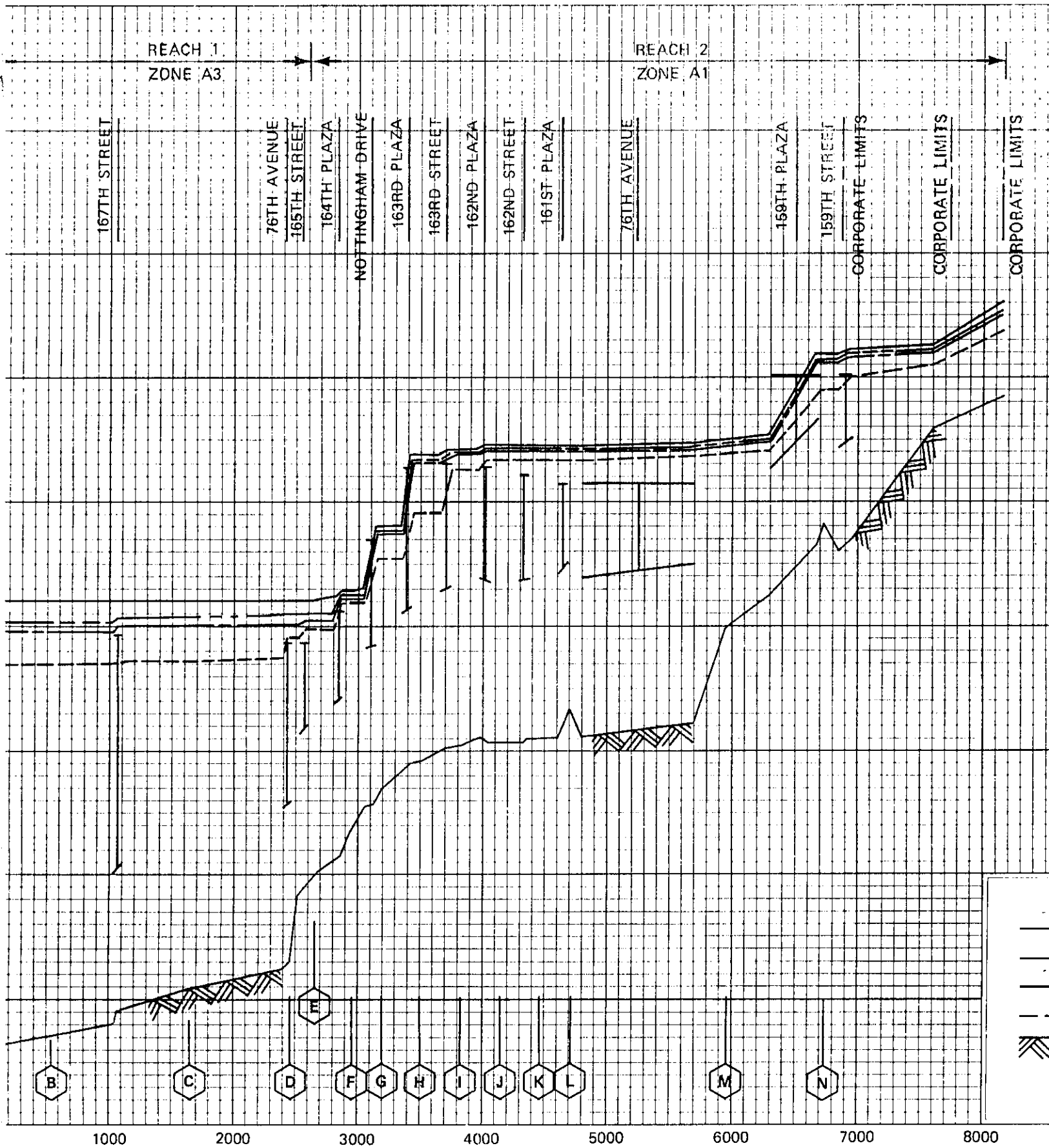
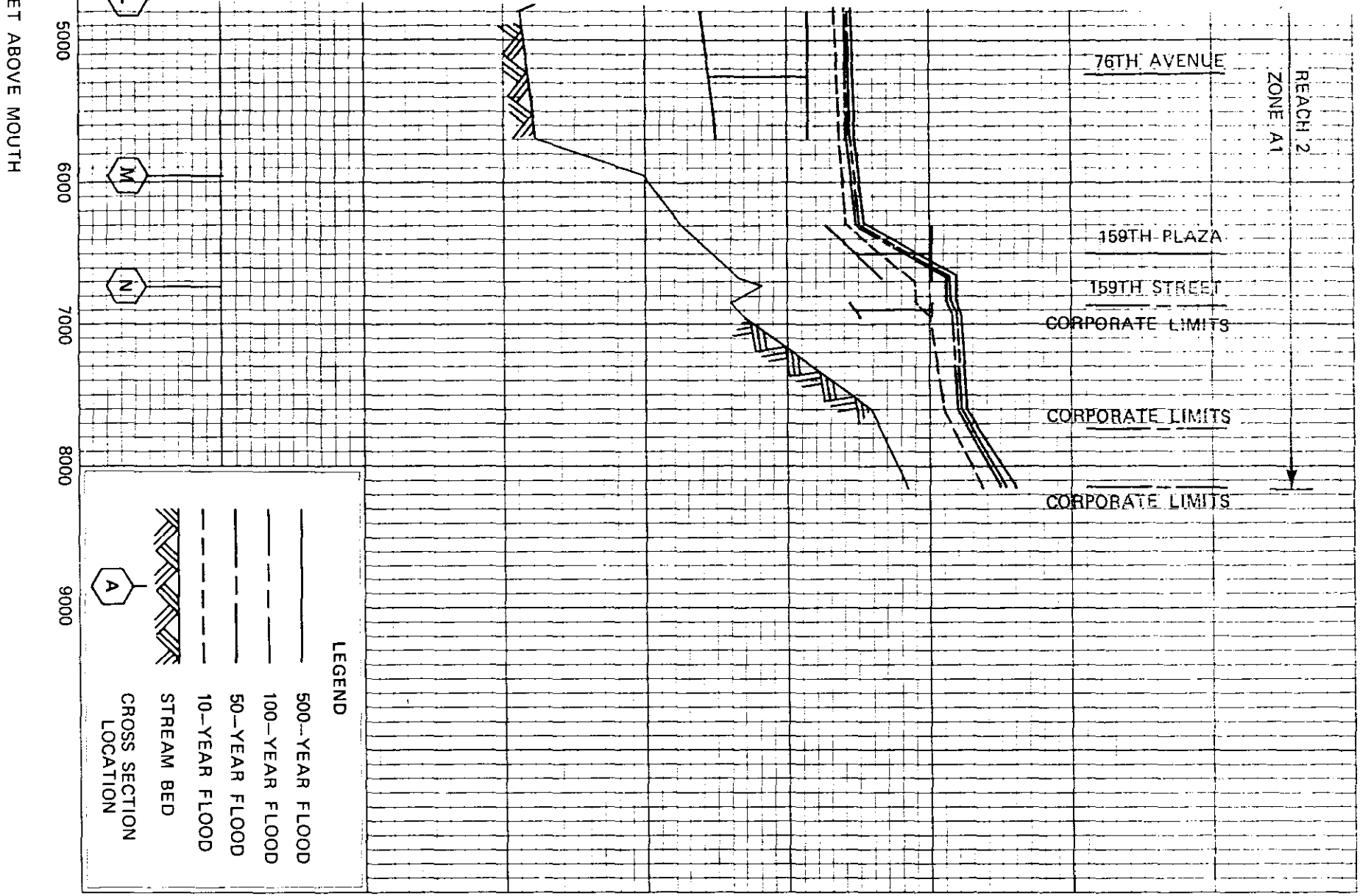
ZONE A3
REACH 2
ZONE A1
167TH STREET
76TH AVENUE
165TH STREET
164TH PLAZA
NOTTINGHAM DRIVE
163RD PLAZA
163RD STREET
162ND PLAZA
162ND STREET
161ST PLAZA
76TH AVENUE
159TH PLAZA
159TH STREET
CORPORATE LIMITS
CORPORATE LIMITS
CORPORATE LIMITS
B
C
D
E
F
G
H
I
J
K
L
M
N
1000
2000
3000
4000
5000
6000
7000
8000
STREAM DISTANCE IN FEET ABOVE MOUTH


REACH 1
ZONE A3
REACH 2
ZONE A1
167TH STREET
76TH AVENUE
165TH STREET
164TH PLAZA
NOTTINGHAM DRIVE
163RD PLAZA
163RD STREET
162ND PLAZA
162ND STREET
161ST PLAZA
76TH AVENUE
159TH PLAZA
159TH STREET
CORPORATE LIMITS
CORPORATE LIMITS
B
C
D
E
F
G
H
I
J
K
L
M
N
1000
2000
3000
4000
5000
6000
7000
8000
STREAM DISTANCE IN FEET ABOVE MOUTH



02P

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOOD PROFILES

76TH AVENUE DITCH

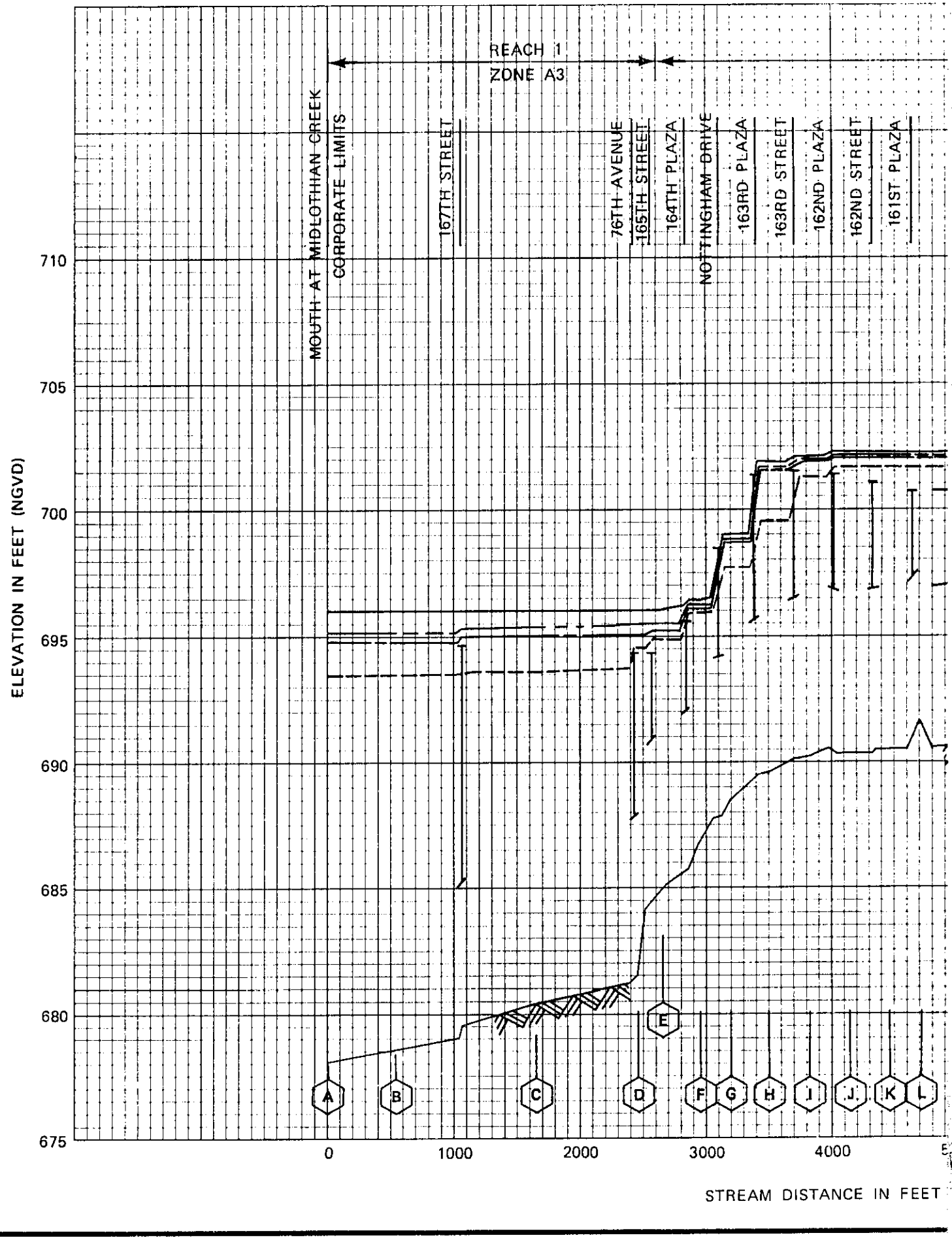

REACH 1
ZONE A3
MOUTH AT MIDLOTHIAN CREEK
CORPORATE LIMITS
167TH STREET
76TH AVENUE
165TH STREET
164TH PLAZA
NOTTINGHAM DRIVE
163RD PLAZA
163RD STREET
162ND PLAZA
162ND STREET
161ST PLAZA
ELEVATION IN FEET (NGVD)
710
705
700
695
690
685
680
675
0
1000
2000
3000
4000
A
B
C
D
E
F
G
H
I
J
K
L
STREAM DISTANCE IN FEET

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA SQ MILES	PEAK DISCHARGES (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MIDLOTHIAN CREEK					
Section A	9.53	563	870	1,001	1,370
Section B	9.02	544	830	967	1,310
Section C	8.52	531	810	945	1,280
Section D	7.92	511	780	911	1,240
Section E	7.31	505	770	900	1,200
Section F	6.55	446	685	798	1,085
Section G	5.41	407	628	729	1,000
76TH AVENUE DITCH					
Section A	2.80	330	480	551	720
Section J	1.18	183	267	304	400
UNION DRAINAGE DITCH					
Section A	5.92	215	315	361	470
NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH					
Section A	1.52	156	226	258	340

Water-surface elevations for floods on Midlothian Creek were computed from data from prior studies by the SCS (Reference 1) who had prepared a step-backwater model using the SCS WSP-2 program (Reference 10). The SCS model of Midlothian Creek extends from the eastern corporate limit to 1,200 feet downstream from 76th Avenue Ditch. Harza extended the existing model upstream for 5,200 feet to the confluence with the Western Tributary. The WSP-2 program also was used by Harza to prepare backwater models for 76th Avenue Ditch, UDD, and the Northern Tributary to UDD. Mathematical relationships used in the model include the standard step-backwater procedure which estimates total energy at each cross section and accounts for friction losses between sections using Manning's formula. The model requires discharge, cross section geometry, bridge geometry, starting water-surface elevation, and roughness data to simulate flood flow conditions.

For streams studied by approximate methods, a normal depth analysis was performed. Once depths were determined, boundaries were delineated on topographic maps (Reference 11).

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles (Exhibit 1) are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using topographic maps at scales of 1:4800, with contour intervals of two feet for Midlothian Creek (Reference 11) and of five feet for the other streams (Reference 12). Flood boundaries for the stream reaches studied by approximate methods for Midlothian Creek, the Western Tributary to Midlothian Creek, and the upstream portion of the Northern

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
UNION DRAINAGE DITCH							
A	2200	49	285	1.26	692.3	692.2	0.1
B	3190	61	354	1.02	692.5	692.4	0.1
C	5010	45	185	1.95	693.2	693.1	0.1
D	7630	71	301	1.20	694.0	693.9	0.1
NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH							
A	1220[2]	91	330	0.78	693.6	693.5	0.1
B	2400[2]	40	139	1.85	694.4	694.3	0.1
C	4980[2]	104	238	1.08	696.4	696.3	0.1

[1]FEET ABOVE 76th AVENUE
[2]FEET ABOVE 80th AVENUE

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOODWAY DATA

UNION DRAINAGE DITCH - NORTHERN TRIBUTARY TO UNION DRAINAGE DITCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	WITH FLOODWAY (NGVD)	WITHOUT FLOODWAY (NGVD)	DIFFERENCE
MIDLOTHIAN CREEK							
A	42,200	139	460	2.18	680.1	680.0	0.1
B	43,840	200	419	2.31	684.1	684.0	0.1
C	45,670	60	430	2.20	687.5	687.5	0.0
D	47,280	70	280	3.25	691.0	690.9	0.1
E	49,260	120	322	2.79	693.9	693.8	0.1
F	50,340	115	605	1.32	694.6	694.5	0.1
G	53,120	670	1000	0.85	695.3	695.2	0.1
H	57,600	408 / 380[2]	1214	0.54	696.1	696.0	0.1
76TH AVENUE DITCH							
A	0	1808	7145	0.08	695.3	695.2	0.1
B	540	1592	6292	0.09	695.3	695.2	0.1
C	1630	597 / 110[2]	1038	0.53	695.4	695.3	0.1
D	2470	60	514	1.07	695.5	695.4	0.1
E	2670	60	393	1.40	695.6	695.5	0.1
F	2940	60	334	1.65	696.3	696.2	0.1
G	3225	60	404	1.36	698.9	698.8	0.1
H	3525	109	535	1.03	701.8	701.7	0.1
I	3825	263	656	0.84	702.1	702.0	0.1
J	4133	628	1284	0.24	702.2	702.1	0.1
K	4453	437	928	0.33	702.2	702.1	0.1
L	4703	520	1104	0.28	702.2	702.1	0.1
M	5963	257	370	0.82	702.5	702.4	0.1
N	6723	1272	1477	0.21	705.8	705.7	0.1

[1]FEET ABOVE MOUTH
[2]TOTAL WIDTH / WIDTH WITHIN CORPORATE LIMITS

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

FLOODWAY DATA

MIDLOTHIAN CREEK - 76TH AVENUE DITCH

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Coordination	1
1.3	Authority and Acknowledgements	1
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	4
2.3	Principal Flood Problems	6
2.4	Flood Protection Measures	6
3.0	ENGINEERING METHODS	6
3.1	Hydrologic Analyses	7
3.2	Hydraulic Analyses	8
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	10
4.1	Flood Boundaries	10
4.2	Floodways	11
5.0	INSURANCE APPLICATION	12
5.1	Reach Determinations	15
5.2	Flood Hazard Factors	15
5.3	Flood Insurance Zones	15
5.4	Flood Insurance Rate Map Description	16

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Coordination	1
1.3	Authority and Acknowledgements	1
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	4
2.3	Principal Flood Problems	6
2.4	Flood Protection Measures	6
3.0	ENGINEERING METHODS	6
3.1	Hydrologic Analyses	7
3.2	Hydraulic Analyses	8
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	10
4.1	Flood Boundaries	10
4.2	Floodways	11
5.0	INSURANCE APPLICATION	12
5.1	Reach Determinations	15
5.2	Flood Hazard Factors	15
5.3	Flood Insurance Zones	15
5.4	Flood Insurance Rate Map Description	16

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Village of Tinley Park, Cook and Will Counties, Illinois, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert the Village of Tinley Park to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain management.

1.2 Coordination

Identification of streams requiring detailed study and of areas requiring approximate study was accomplished in meetings attended by personnel of Harza Engineering Company (Harza), the Federal Insurance Administration, and the Village of Tinley Park. Representatives of the village's consulting engineering firm, Robinson and Associates Company, provided information on flood problems and historic floods. Results of discharge-frequency analyses performed by the U.S. Department of Agriculture, Soil Conservation Service (SCS) and Harza were coordinated with the Illinois State Water Survey (SWS), Flood Plain Repository, and the Illinois Department of Transportation, Division of Water Resources (DOWR). Water-surface profiles on Midlothian Creek, from the eastern corporate limit to 1,200 feet downstream from 76th Avenue Ditch, were determined by the SCS (Reference 1).

During the course of the work by Harza, flood elevations, flood boundaries, and floodway delineations were reviewed with community officials, with the Federal Insurance Administration, and the DOWR. On July 13, 1978, Harza's results were reviewed and accepted at a final coordination meeting attended by personnel of Harza, the Federal Insurance Administration, representatives of DOWR, and community officials.

1.3 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by Harza Engineering Company for the Federal Insurance Administration, under Contract No. H-3978. This work, which was completed in September 1977, covered all significant flooding sources affecting the Village of Tinley Park.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the Village of Tinley Park. 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, areas of projected development and proposed construction until December 1978.

Approximate methods of analysis were used to study those areas having low development potential and/or minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the Federal Insurance Administration and the community.

By agreement among the village representatives, the Federal Insurance Administration, and Harza, reaches of four streams were designated for study by detailed methods and reaches of three streams were designated for study by approximate methods. Detailed study streams are:

1. Midlothian Creek from the junction with its Western Tributary to the Chicago Rock Island and Pacific Railroad, 600 feet south of 167th Street.

2. 76th Avenue Ditch from a point located 1,300 feet north of 159th Street and 1,300 feet east of 80th Avenue to its confluence with Midlothian Creek.

3. Union Drainage Ditch (UDD) from a point located 1,600 feet east of Oak Park Avenue and 1,600 feet south of 183rd Street to a point located 400 feet south of Interstate Highway 80 and 2,600 feet east of 80th Avenue.

4. Northern Tributary to UDD from a point located at 80th Avenue 1,100 feet north of 183rd Street and 600 feet east of 80th Avenue to its confluence with UDD.

Three reaches were determined to be special flood areas and were studied by approximate methods.

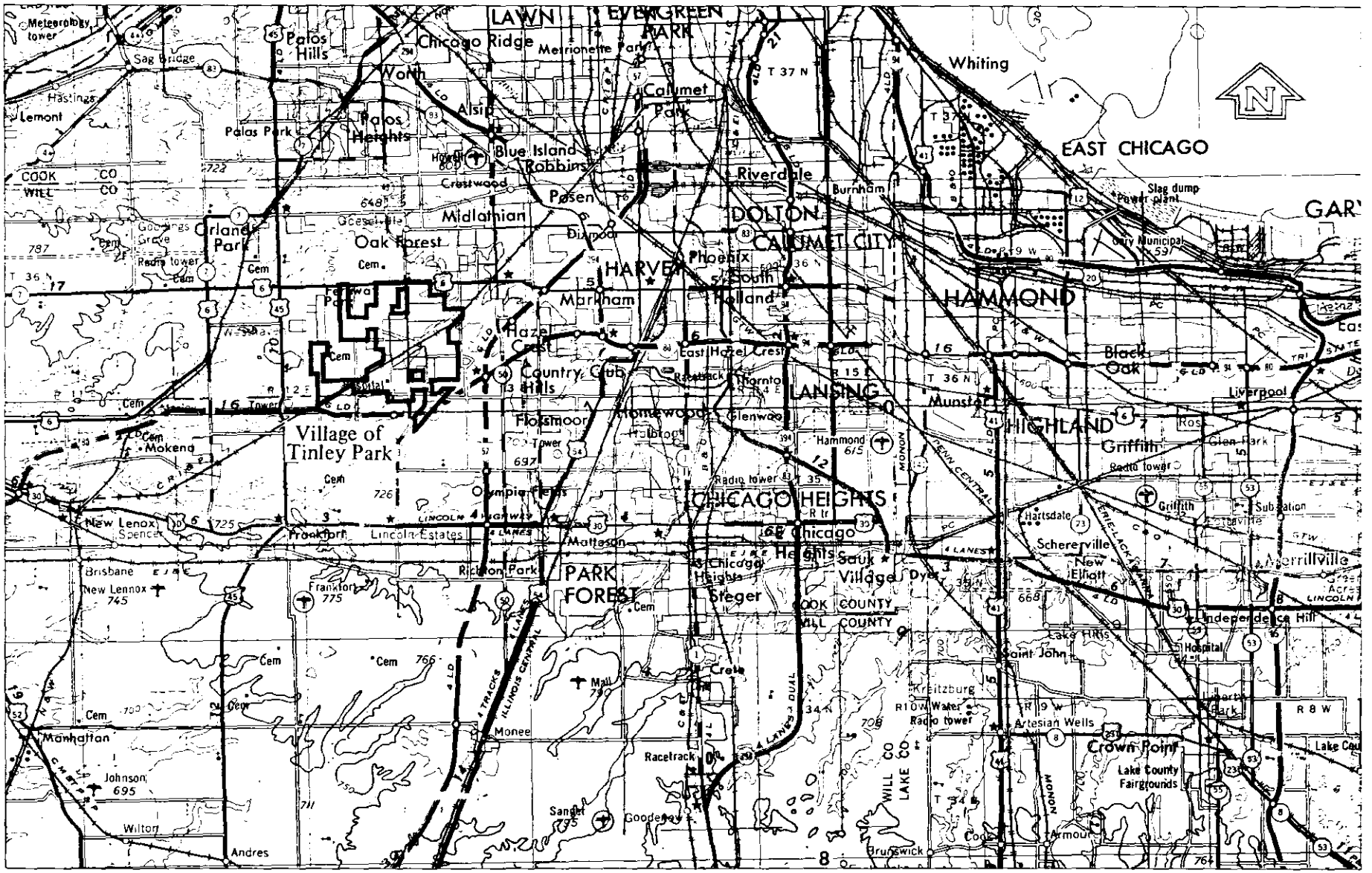


FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

VILLAGE OF TINLEY PARK, IL
(COOK AND WILL COS.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

1. Midlothian Creek from a point located 1,400 feet east of 94th Avenue and 1,300 feet south of 175th Street to a point located 2,700 feet west of 84th Avenue.

2. Western Tributary to Midlothian Creek from a point located 1,300 feet west of 84th Avenue and 500 feet south of 167th Street to a point located at 171st Street and 800 feet east of 84th Avenue.

3. Northern Tributary to UDD from a point located 2,000 feet north of Interstate Highway 80 in the direction of 84th Avenue to a point located 2,600 feet north of Interstate Highway 80 and 1,700 feet west of 80th Avenue.

2.2 Community Description

Tinley Park, a suburb of Chicago located in the northeastern part of Illinois, has an area of 7.5 square miles. Population of the village was 23,128 in January 1977. The village's corporate limits are very irregular. The community is bounded roughly by 159th Street on the north; 88th Avenue on the northwest; 94th Avenue on the southwest; Interstate Highway 80 on the south; and Ridgeland Avenue, Tinley Park High School, and the Chicago Rock Island and Pacific Railroad (CRI & P Railroad) on the east. Surrounding areas include the City of Oak Forest on the northeast and unincorporated Cook and Will Counties on all other boundaries. Nearby municipalities are Palos Heights to the north, Joliet to the west, and Hazel Crest to the east.

The topography of the village is nearly flat, except for the southwest and northeast portions which are gently sloping. Land surface elevations within the corporate limits range from 668 feet to 750 feet. Water-surface elevations of the 100-year flood on Midlothian Creek are 686.2 feet near Ridgeland Avenue and 694.7 feet near Harlem Avenue.

Soils of the study area are mostly of Montgomery-Milford-Martinton Association and Frankfort-Montgomery-Wauconda Association. They are deep and poorly drained to somewhat poorly drained. The soils are formed in deposits of silt and clay or lakebed sediments (Reference 2).

Vegetative covers of Midlothian Creek, its Western Tributary, 76th Avenue Ditch, UDD, and Northern Tributary to UDD are principally herbaceous with scattered trees, mostly box elder and willow. The study area is urbanized, and lands under development often are left without vegetative cover for long periods (up to two years). This condition results in excessive runoff and erosion from the construction sites.

Temperatures are typical of the Chicago metropolitan area. The average monthly temperature in January is 26 degrees Fahrenheit (F.) and in July is 76 degrees F. Extreme temperatures range from a low of -19 degrees F. to a high of 101 degrees F. The average annual precipitation is 33.2 inches. About 23 percent of the annual precipitation occurs in November through February; 17 percent occurs in March and April; 34 percent occurs in May, June, and July; and 26 percent occurs in August, September, and October (Reference 3).

The Village of Tinley Park is presently drained by five streams: Midlothian Creek and its Western Tributary, 76th Avenue Ditch, and UDD and its Northern Tributary. Midlothian Creek enters the village at its southwestern section, continues eastward through the central part of the village, and exits at the northeastern section of the village. This stream is normally slow moving with minor meanders in a relatively flat and wide valley. The stream bottom is predominantly silt with some gravel in riffles. The streambed of Midlothian Creek has an average slope of 0.0012 feet per mile in the study area.

76th Avenue Ditch is a tributary of Midlothian Creek. The Ditch enters Tinley Park from the north and flows southward to its mouth within the corporate limits. The bank-full elevation at the mouth is 689.0 feet, and at the northern village limit is 705.0 feet. The average slope of the streambed in Tinley Park is 0.0032 feet per mile.

UDD enters the village from the east and flows in a generally westward direction, exiting the village near Interstate Highway 80. The bank-full elevation just upstream from Interstate Highway 80 is 691.4 feet, and at the upstream limit of the study reach is 693.1 feet. The average slope of the streambed in Tinley Park is 0.0005 feet per mile. The Northern Tributary to UDD forms a loop in Tinley Park. The reach designated for detailed study enters the village from the west near the sewage treatment plant and flows first east then south to exit the village near the radio tower. Bank-full elevations at the southern and western corporate limits are 690.0 feet, and 695.0 feet, respectively. The average slope of the Northern Tributary to UDD is 0.0008 feet per mile in Tinley Park.

Flood plains of the streams in Tinley Park contain single-family residential, industrial, and commercial development. The flood plains of Midlothian Creek and the 76th Street Ditch are developed with single-family residences. The flood plains of UDD and its tributaries generally are undeveloped.

2.3 Principal Flood Problems

Principal flood problems in the Village of Tinley Park are out-of-bank flooding along 76th Avenue Ditch and street flooding caused by inadequate drainage in two areas near Ravinia Drive and Oak Park Avenue. Major damages during past floods can be attributed to basement flooding by direct overland flow through windows or seepage through wall or foundation cracks. Additional damage occurs in some residences due to storm runoff that backs up through sewers. Flood damages include residential damages, traffic disruptions, and associated neighborhood degradation caused by frequent flooding. Dollar estimates of the damages are not available. The most severe historic floods on Midlothian Creek and their approximate recurrence intervals are shown below:

HISTORIC FLOODS RECORDED
AT THE MIDLOTHIAN CREEK GAGE
AT OAK FOREST

Year	Discharge (cfs)	Recurrence Interval (years)
1973	627	28
1955	569	14
1957	550	9

2.4 Flood Protection Measures

The Illinois DOWR recently has completed construction of a floodwater retarding structure on Midlothian Creek between 163rd and 167th Streets near Cicero Avenue in Oak Forest, Illinois, about 3.6 miles upstream from the Village of Robbins. The structure will store 920 acre-feet of floodwater. Cook County Forest Preserve Dam on Midlothian Creek, located between Tinley Park and Oak Forest, was designed to control the 50-year flood and was completed in 1973. It has no significant effect on attenuating flood peaks whose recurrence intervals equal or exceed 100-years. There are no flood-protection structures within the incorporated boundary of the Village of Tinley Park. A regulatory flood plain along Midlothian Creek was established by the DOWR in November 1976 (Reference 4). No other flood protection measures or structural improvements are planned in the foreseeable future.

The Village of Tinley Park does not exercise extraterritorial jurisdiction with regard to flood plain management regulations.

3.0 ENGINEERING METHODS

For 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. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watersheds of the streams.

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 in detail in the community.

A U.S. Geological Survey (USGS) water-stage recorder on Midlothian Creek is located in the nearby City of Oak Forest. This gaging station, (no. 05536340, drainage area 12.6 square miles) was installed in 1950 (Reference 5). The SCS, in cooperation with the Little Calumet River Steering Committee, recently has completed a comprehensive flood management study for the Little Calumet River watershed as part of the Chicago Metropolitan Area River Basin Plan (References 6 and 7). That study included detailed watershed modeling utilizing the SCS hydrologic model TR-20 (Reference 7). The model was used for a regional analysis of the entire watershed; flood discharges for the 10-year and 100-year events on Midlothian Creek in Tinley Park were calculated by the SCS during their study. The 100-year discharges were reviewed and approved by the Illinois SWS and certified by the DOWR for use in the State's flood plain regulation program.

Harza reviewed the 100-year certified discharges on Midlothian Creek in accordance with Federal Insurance Administration guidelines, and at the request of the SWS and the village. Regional flood frequency equations (Reference 8) were used according to State Standard Methods, and the certified 100-year discharges calculated by the SCS were found to be suitable for use in this Flood Insurance Study.

Discharge-frequency data were not available from prior studies for the other three streams studied in detail in Tinley Park. Regional flood-frequency equations (Reference 8) were used by Harza to calculate the 10-, 50-, and 100-year flood discharges for 76th Avenue Ditch, UDD, and the Northern Tributary to UDD. The 100-year flood discharges for these streams were sent to the SWS for review. They were approved by the SWS and certified by the DOWR for use in the state's flood regulation program. Data are located in the State Flood Plain Repository administered by the SWS.

The 10- and 100-year discharges, calculated by the SCS, for Midlothian Creek were plotted on log-normal probability paper, and the 50- and 500-year discharges were estimated by straight-line interpolation and extrapola-

tion, respectively. Similarly, the 10-, 50-, and 100-year discharges for 76th Avenue Ditch, UDD, and the Northern Tributary to UDD were plotted on log-normal paper, and the 500-year discharges were estimated by straight-line extrapolation. The 500-year discharges are less reliable than the others because: 1) the precipitation-frequency relationship required for the TR-20 program is not well-defined for this rare event, 2) the period of gage record on Midlothian Creek is 26 years, 3) the average period record for gages used to develop the regional equations is about 30 years, and 4) the average period of record for gages used to develop urbanization adjustment factors is about 10 years.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of streams in the study area are shown in Table 1.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community are carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each stream studied in detail.

Cross section data for Midlothian Creek downstream from 76th Avenue Ditch were available from prior SCS surveys. Cross sections and bridge dimensions for Midlothian Creek upstream from 76th Avenue Ditch, UDD, and the Northern Tributary to UDD were field surveyed by Harza for this Flood Insurance Study.

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 is computed (Section 4.2), selected cross section locations are shown on the Flood Boundary and Floodway Map (Exhibit 2).

Roughness coefficients (Manning's "n") values for these computations were assigned on the basis of field inspection and previous analyses by the SCS. The range of "n" values for the four streams studied in detail in Tinley Park are: on Midlothian Creek, from 0.060 to 0.074 for the channel and from 0.060 to 0.048 for the overbanks; on 76th Avenue Ditch, 0.042 for the channel and 0.080 for the overbanks; on Union Drainage Ditch, from 0.040 to 0.045 for the channel and 0.055 to 0.060 for the overbanks; and on Northern Tributary to UDD, 0.045 for the channel and 0.060 for the overbanks.

Flood profiles of water-surface elevations were computed for floods of the selected recurrence intervals. Starting water-surface elevations for Midlothian Creek were determined from the existing SCS model. Starting elevations for 76th Avenue Ditch were determined from elevations on Midlothian Creek for the corresponding flood recurrence intervals. Starting elevations for UDD and the Northern Tributary to UDD were calculated by using normal depth equations (Reference 9) for a location about 0.5 mile downstream from the start of the study reach.