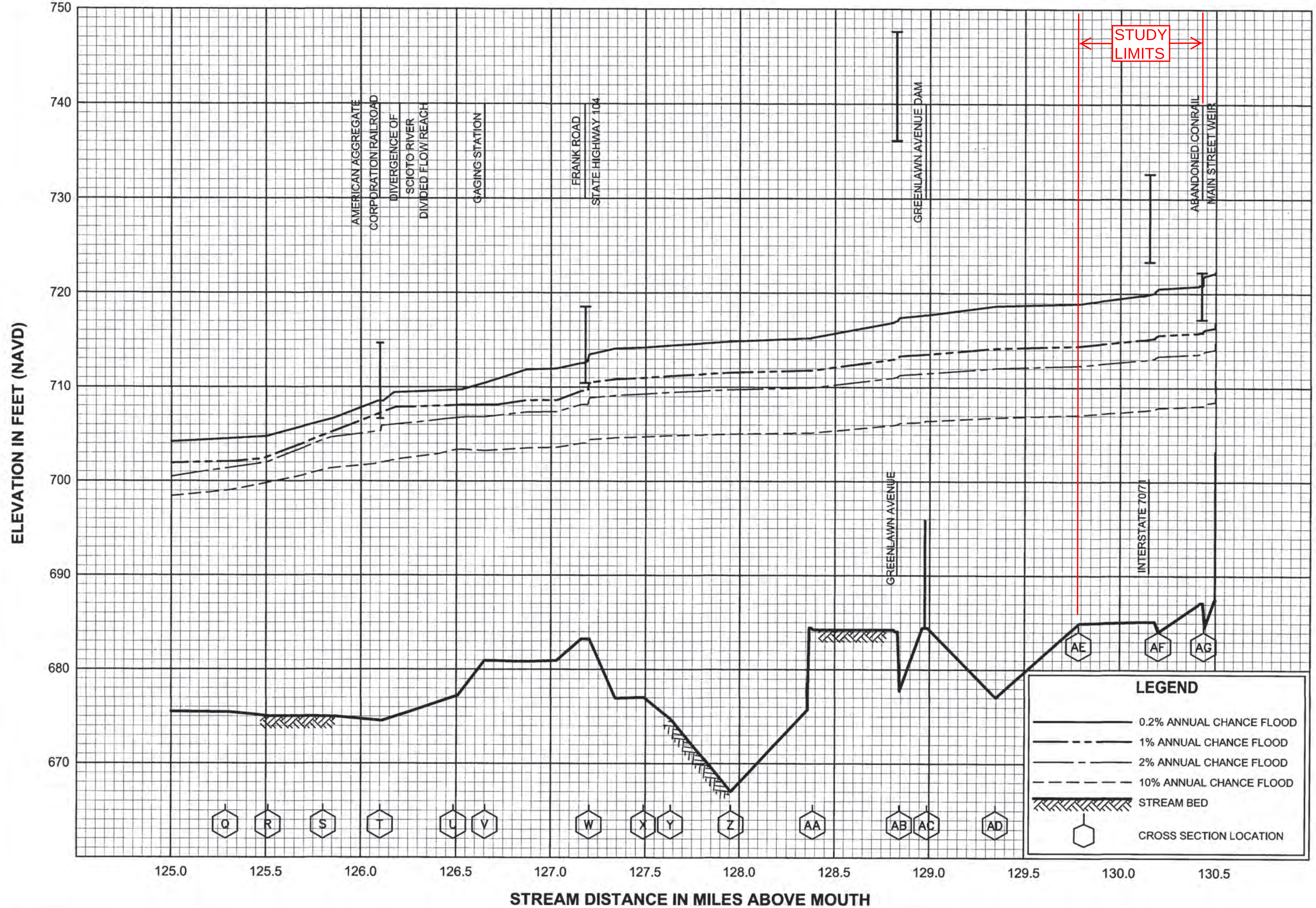


FLOOD PROFILES

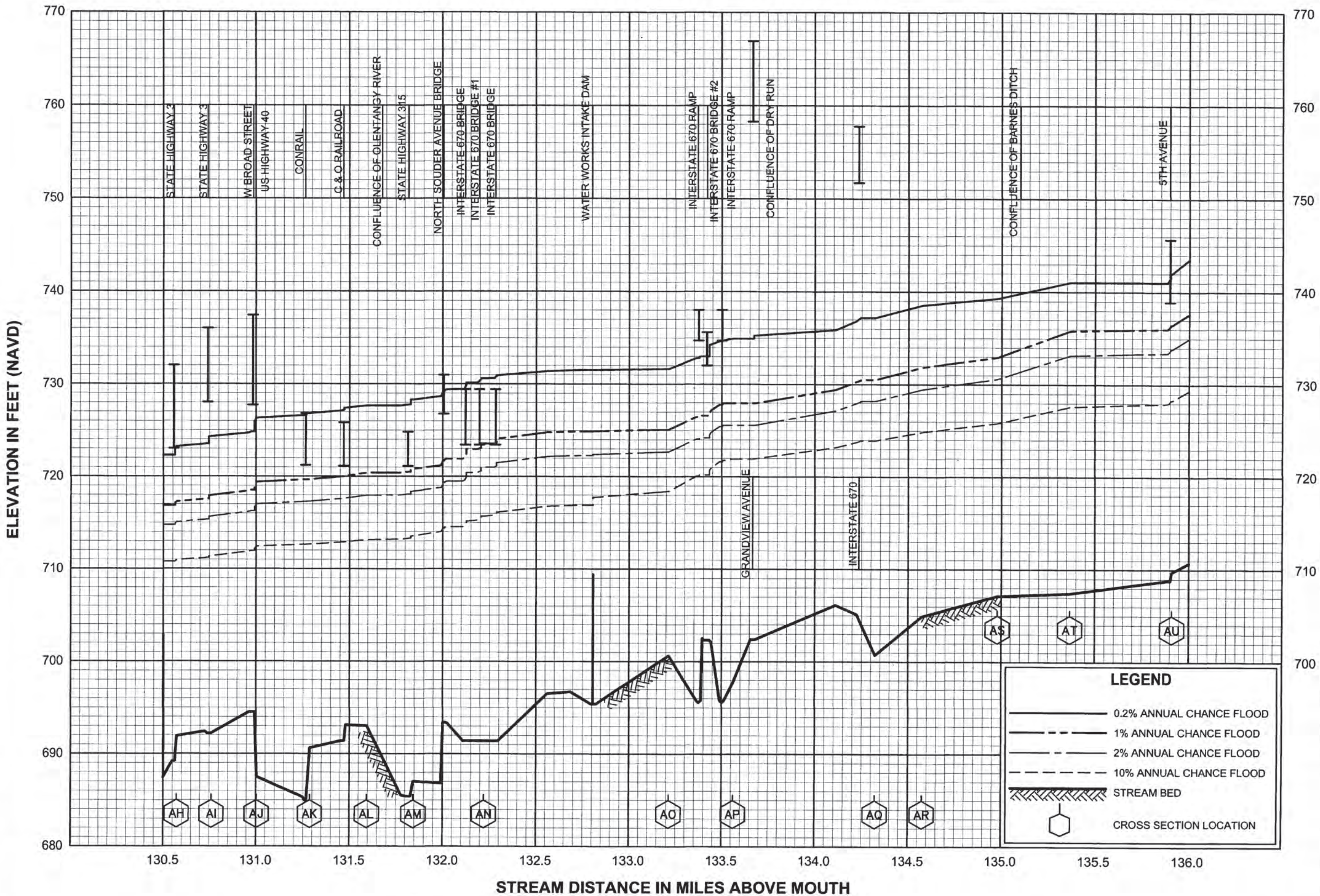
SCIOTO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

175P



FLOOD PROFILES

SCIOTO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OH

AND INCORPORATED AREAS

176P

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Scioto River									
A	117.346	4,906		23,500	3.1	692.2	692.2	692.6	0.4
B	117.731	1,296		24,394	3.0	692.4	692.4	692.8	0.4
C	117.975	1,282		20,184	3.6	692.6	692.6	693.0	0.4
D	118.170	4,306		40,667	1.9	693.4	693.4	693.8	0.4
E	118.813	2,171		29,973	2.6	694.0	694.0	694.4	0.4
F	119.573	3,310		41,000	1.9	696.1	696.1	696.6	0.5
G	119.839	3,486		40,058	1.9	696.3	696.3	696.8	0.5
H	120.034	3,422		34,210	2.2	696.4	696.4	696.9	0.5
I	121.299	3,331		39,013	2.0	697.1	697.1	697.6	0.5
J	121.626	3,401		32,953	2.3	697.4	697.4	697.9	0.5
K	121.968	3,304		41,365	1.9	697.7	697.7	698.2	0.5
L	122.368	3,545		41,469	1.8	698.0	698.0	698.5	0.5
M	122.683	3,586		43,395	1.8	698.3	698.3	698.8	0.5
N	122.966	4,056		39,894	1.9	698.5	698.5	699.0	0.5
O	124.007	1,986		16,053	3.4	699.6	699.6	700.1	0.5
P	124.927	644		12,195	4.4	701.6	701.6	702.0	0.4
Q	125.290	617		9,674	5.6	701.7	701.7	702.1	0.4
R	125.510	385		7,468	7.2	702.3	702.3	702.7	0.4
S	125.798	374		7,933	6.8	704.6	704.6	704.9	0.3
T	126.099	387		7,560	7.1	707.0	707.0	707.2	0.2
U	126.489	426		12,890	5.7	707.7	707.7	708.2	0.5
V	126.656	404		11,634	6.3	708.0	708.0	708.5	0.5
W	127.206	642		13,628	5.5	710.5	710.5	711.2	0.7
X	127.495	585		14,376	5.2	711.0	711.0	711.7	0.7
Y	127.639	562		16,305	4.6	711.2	711.2	711.9	0.7
Z	127.960	608		21,189	3.5	711.5	711.5	712.3	0.8

[1]Miles above mouth

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Scioto River

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Scioto River									
AA	128.391	509		13,929	5.4	711.8	711.8	712.5	0.7
AB	128.849	572		16,520	4.5	713.3	713.3	714.0	0.7
AC	128.993	515		14,846	5.1	713.5	713.5	714.1	0.6
AD	129.353	1,096		26,157	2.9	714.1	714.1	714.8	0.7
AE	129.795	515		13,690	5.5	714.4	714.4	715.0	0.6
AF	130.205	522		14,240	5.3	715.6	715.6	716.1	0.5
AG	130.448	569		13,919	5.4	716.1	716.1	716.7	0.6
AH	130.579	617		12,933	5.8	717.2	717.2	717.6	0.4
AI	130.767	645		12,067	6.2	717.9	717.9	718.3	0.4
AJ	131.009	598		14,710	5.1	719.4	719.4	719.7	0.3
AK	131.292	584		12,512	6.0	719.5	719.5	719.9	0.4
AL	131.601	660		15,182	5.0	720.4	720.4	720.7	0.3
AM	131.850	433		8,106	7.0	720.8	720.8	721.1	0.3
AN	132.226	299		6,723	8.5	723.2	723.2	723.4	0.2
AO	133.220	211		4,459	9.4	725.1	725.1	725.5	0.4
AP	133.568	270		10,931	5.2	727.9	727.9	728.2	0.3
AQ	133.329	314		6,922	8.2	730.5	730.5	730.8	0.3
AR	134.582	279		6,836	8.3	731.8	731.8	732.3	0.5
AS	134.986	285		5,574	10.2	732.9	732.9	733.3	0.4
AT	135.374	577		16,231	3.5	735.8	735.8	736.2	0.4
AU	135.918	231		5,637	10.1	736.4	736.4	736.8	0.4
AV	136.076	310		7,930	7.2	738.3	738.3	738.9	0.6
AW	136.769	336		6,471	8.8	741.6	741.6	742.3	0.7
AX	136.865	664		7,995	7.1	743.2	743.2	743.7	0.5
AY	137.346	380		8,921	6.4	745.3	745.3	746.1	0.8
AZ	137.829	514		11	5.4	747.7	747.7	748.1	0.4

[1]Miles above mouth

Table 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

FLOODWAY DATA

Scioto River

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	WIDTH REDUCED FROM PRIOR STUDY	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE (FEET)
Scioto River									
BA	138.300	746		30,665	1.9	768.1	768.1	768.1	0.0
BB	135.578	593		21,185	2.8	768.2	768.2	768.2	0.0
BC	139.241	536		15,645	3.7	768.4	768.4	768.9	0.5
BD	139.875	495		15,397	3.8	768.9	768.9	769.4	0.5
BE	140.575	409		11,524	5.1	769.9	769.9	770.4	0.5
BF	141.301	499		15,046	3.9	770.9	770.9	771.4	0.5
BG	142.085	665		14,554	4.0	771.6	771.6	772.1	0.5
BH	142.700	582		15,974	3.6	772.3	772.3	772.8	0.5
BI	143.080	523		11,707	5.0	772.7	772.7	773.2	0.5
BJ	143.352	577		11,350	5.1	773.4	773.4	773.9	0.5
BK	143.703	697		13,941	4.2	774.5	774.5	774.9	0.4
BL	144.040	591		10,983	5.3	775.3	775.3	775.7	0.4
BM	144.350	438		7,570	7.7	776.3	776.3	776.6	0.3
BN	144.670	547		8,551	6.8	777.5	777.5	777.7	0.2
BO	145.010	477		9,100	6.4	779.9	779.9	780.2	0.3
BP	145.210	338		6,599	8.8	781.1	781.1	781.5	0.4
BQ	145.400	351		7,441	7.8	783.2	783.2	783.6	0.4
BR	145.660	539		10,064	5.8	784.8	784.8	785.3	0.5
BS	145.970	468		8,927	6.5	786.2	786.2	786.7	0.5
BT	146.200	317		7,567	7.7	787.3	787.3	787.8	0.5
BU	146.430	382		8,101	7.2	788.8	788.8	789.3	0.5
BV	146.680	339		7,725	7.5	790.2	790.2	790.7	0.5
BW	146.680	361		7,432	7.8	791.8	791.8	792.1	0.3
BX	147.180	344		7,977	7.3	793.8	793.8	794.3	0.5
BY	147.470	383/226[2]		7,229	7.2	795.9	795.9	796.9	1.0

[1]Miles above mouth [2]Total width/width within county boundary

Table 9	FEDERAL EMERGENCY MANAGEMENT AGENCY FRANKLIN COUNTY, OHIO AND INCORPORATED AREAS	FLOODWAY DATA Scioto River

FLOOD INSURANCE STUDY

VOLUME 1 of 4

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BEXLEY, CITY OF	390168
BRICE, VILLAGE OF	390898
CANAL WINCHESTER, VILLAGE OF	390169
COLUMBUS, CITY OF	390170
DUBLIN, CITY OF	390673
FRANKLIN COUNTY (UNINCORPORATED AREAS)	390167
GAHANNA, CITY OF	390171
GRANDVIEW HEIGHTS, CITY OF	390172
GROVE CITY, CITY OF	390173
GROVEPORT, VILLAGE OF	390174
HARRISBURG, VILLAGE OF	390897
HILLIARD, CITY OF	390175
LOCKBOURNE, VILLAGE OF	390691
MARBLE CLIFF, VILLAGE OF	390896
*MINERVA PARK, VILLAGE OF	390791
NEW ALBANY, VILLAGE OF	390895
OBETZ, VILLAGE OF	390176
REYNOLDSBURG, CITY OF	390177
RIVERLEA, VILLAGE OF	390692
UPPER ARLINGTON, CITY OF	390178
URBANCREST, VILLAGE OF	390893

COMMUNITY NAME	COMMUNITY NUMBER
VALLEYVIEW, VILLAGE OF	390669
WESTERVILLE, CITY OF	390179
WHITEHALL, CITY OF	390180
WORTHINGTON, CITY OF	390181

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED WITHIN COMMUNITY

REVISED: June 17, 2008

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

39049CV001C

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 (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Effective Date:	August 2, 1995
Revised Date(s):	July 16, 1997 April 21, 1999 March 16, 2004 September 19, 2007 June 17, 2008

TABLE OF CONTENTS

Volume 1

Volume 2

TABLE OF CONTENTS

Volume 2 (Continued)

LIST OF TABLES

Table **Page No.**

LIST OF FIGURES

Figure **Page No.**

LIST OF EXHIBITS

TABLE OF CONTENTS

Volume 2 (Continued)

LIST OF EXHIBITS

Volume 3

LIST OF EXHIBITS

TABLE OF CONTENTS

Volume 3 (Continued)

LIST OF EXHIBITS

Volume 4

LIST OF EXHIBITS

TABLE OF CONTENTS

Volume 4 (Continued)

LIST OF EXHIBITS

Published Separately –

FLOOD INSURANCE STUDY

FRANKLIN COUNTY, OHIO
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the previous countywide-format FIS reports, Flood Insurance Rate Maps (FIRMs) and/or Flood Boundary and Floodway Maps (FBFMs) in the geographic area of Franklin County, Ohio, including: the Cities of Bexley, Columbus, Dublin, Gahanna, Grandview Heights, Grove City, Hilliard, Reynoldsburg, Upper Arlington, Westerville, Whitehall, and Worthington; the Villages of Brice, Canal Winchester, Groveport, Harrisburg, Lockbourne, Marble Cliff, New Albany, Obetz, Riverlea, Urbancrest, and Valleyview; and the unincorporated areas of Franklin County (hereinafter referred to collectively as Franklin County). No Special Flood Hazard Areas (SFHA) have been identified in the Village of Minerva Park.

There are several communities in Franklin County that span multiple counties. The Village of Canal Winchester is located in Franklin and Fairfield Counties; the City of Columbus is located in Franklin, Fairfield, and Delaware Counties; the City of Dublin is located in Franklin, Delaware, and Union Counties; the Village of Harrisburg is located in Franklin and Pickaway Counties; and, the City of Westerville is located in Franklin and Delaware Counties. The flood hazard information for all five of these communities is included entirely within the Franklin County FIS report.

The City of Reynoldsburg is located in Franklin, Licking, and Fairfield Counties. Flood hazard information for the portion of the City that is located in Licking County is included in the Licking County FIS report. Flood hazard information for the remaining portions of the City is included in the Franklin County FIS report.

The Village of Lithopolis and the City of Pickerington are both located in Fairfield and Franklin Counties. Flood hazard information for these communities is included in the Fairfield County FIS report.

The Village of New Albany lies in Franklin and Licking Counties. No SFHAs have been identified within the portion of the community that lies within Licking County. Therefore, the flood hazard information for the Village of New Albany is included in its entirety in the Franklin County FIS report.

The FIS report aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS report has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Franklin County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

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.

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the FEMA DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgements

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The August 2, 1995, countywide FIS report was prepared to include incorporated communities within Franklin County in a countywide FIS report. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS report, as compiled from their previously printed FIS reports, is shown below.

City of Bexley

The hydrologic and hydraulic analyses for the FIS report dated May 1978 were prepared by the U.S. Army Corps of Engineers (USACE), Huntington District, for the Federal Insurance Administration (FIA), under Inter-Agency Agreement No. IAA-H-7-76, Project Order No. 7. That work was completed in April 1977.

Village of Canal Winchester

The hydrologic and hydraulic analyses for the FIS report dated December 1979, were prepared by Burgess & Niple, Ltd., for the FIA, under Contract No. H-3981. That work was completed in December 1978.

City of Columbus

The hydrologic and hydraulic analyses for the FIRM dated July 5, 1983, were prepared by the USACE, Huntington District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. H-7-76, Project Order No. 8; and No. H-1077, Project Order No. 1. The analyses for the Little Walnut Creek basin were performed under Inter-Agency Agreement No. H 18 78, Project Order No. 38. The work for both analyses was completed in November 1980. For the revision dated January 16, 1987, the hydrologic and hydraulic analyses were performed by the U.S. Department of Agriculture, Soil Conservation Service (SCS); the Ohio Department of Natural Resources (ODNR); and Burgess & Niple, Limited.

at the original compilation scale of 1" = 500'. The coordinate system used for the production of this FIRM is State Plane Ohio South Zone 3901 (FIPSZONE 3402). The horizontal datum is North American Datum of 1983 (NAD83). Flood elevations are referenced to the North American Vertical Datum of 1988 (NAVD88). Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on this FIRM.

The current update includes, redelineation of the previously effective flood hazard information and conversion of the maps to DFIRMs and was completed by Fuller Mossbarger Scott and May Engineers for FEMA under Contract No. HSFE05-05-D-0026, Task No. 10.

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 detailed study. The dates of the initial and final CCO meetings held for prior FISs for the incorporated communities within Franklin County are shown in Table 1.

Table 1. CCO Meeting Dates for Prior FISs

Community Name	Initial CCO Date	Final CCO Date
City of Bexley	*	December 7, 1977
Village of Canal Winchester	March 25, 1975	April 24, 1979
City of Columbus	November 21, 1974	January 20, 1982
City of Dublin	October 30, 1975	April 25, 1979
City of Gahanna	March 22, 1975	August 10, 1982
City of Grandview Heights	August 25, 1976	August 15, 1979
City of Grove City	March 23, 1976	July 20, 1982
Village of Groveport	March 22, 1976	August 23, 1982
City of Hilliard	October 30, 1975	September 19, 1978
Village of Lockbourne	August 25, 1976	April 25, 1979
Village of Obetz	June 9, 1975	November 28, 1979
City of Reynoldsburg	November 8, 1974	July 20, 1976
City of Upper Arlington	June 9, 1975	April 11, 1979
Village of Valleyview	*	June 22, 1978
City of Westerville	August 18, 1987	April 29, 1992
City of Whitehall	March 23, 1976	November 22, 1982
City of Worthington	November 13, 1975	August 16, 1979
Franklin County, Unincorporated Areas	November 21, 1974	January 20, 1982

* Data not available.

For the July 16, 1997 revision, FEMA notified the Village of Canal Winchester that a revision would be prepared using information developed by Dewberry & Davis.

For the April 21, 1999, revision, Franklin County was notified by FEMA in a letter dated March 27, 1997, that its countywide FIS report would be revised using the analyses prepared for Delaware County.

For the March 2004 revision, the results of the study were reviewed at the final CCO meeting held on August 27, 2002, and attended by representatives of FEMA, the ODNR, the USACE, Huntington District and local officials and residents of Marble Cliff, Upper Arlington, Columbus, Grandview Heights, and the Unincorporated Areas of Franklin County.

For this FIS report, an initial CCO meeting was held on August 17, 2005. The meeting was attended by representatives from FEMA, Franklin County, communities within Franklin County, and Fuller, Mossbarger, Scott, and May Engineers, Inc. (FMSM). The final CCO meeting was held on January 30, 2007. The meeting was attended by representatives from communities throughout the county as well as representatives from ODNR, FEMA, and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Franklin County, Ohio.

All or portions of the flooding sources listed in Table 2 were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

Table 2. Streams Studied by Detailed Methods

Alum Creek	Faust County Ditch	Patzer Ditch
Barbee Ditch	French Run	Plum Run
Barnes Ditch	French Run (Lateral G-A)	Plum Run Tributary
Baumgardner Ditch	Georges Creek,	Powell Ditch
Beem Ditch	Georges Creek Overland Flow	Rhodes Ditch
Big Darby Creek	Grant Run	Rocky Fork Creek
Big Run	Grove City Creek 1	Scioto Big Run
Big Walnut Creek	Grove City Creek 2	Scioto River
Billingsley Ditch	Haines Ditch	Scioto River Divided Flow Reach
Bishop Run	Hamilton Ditch	Snyder Run
Blacklick Creek	Hayden Run	South Fork Dry Run
Blacklick Creek Lateral D	Hellbranch Run	South Fork Georges Creek
Blacklick Creek Lateral G-B	Indian Run	South Fork Georges Creek
Blacklick Creek Lateral K	Lisle Ditch	Spring Run
Blacklick Creek Tributary C	Little Darby Creek	Sugar Run
Blau Ditch	Little Walnut Creek	Swisher Creek
Brown Run	Marsh Run	Sycamore Run
Bush Ditch	Martin Grove Ditch	Tri-County Ditch
Clover Groff Ditch	Mason Run	Tudor Ditch
Coble-Bowman Ditch	McCoy Ditch	Turkey Ditch

Table 2. Streams Studied by Detailed Methods

Cosgray Ditch	Molcomb Ditch	Tussing-Bachman Ditch
Cramer Ditch	Mulberry Run	Utzinger Ditch
Dry Run	North Fork Indian Run	West Water Run
Dysar Ditch	Olentangy River	Whims Ditch
Early Run	Orders & Wallace Ditch	

As part of the August 2, 1995, countywide FIS report, updated analyses were included for the flooding sources shown in Table 3.

Table 3. Limits of Detailed Studies

Flooding Source	Limits of Detailed Study
Barbee Ditch	From its confluence with Barnes Ditch US to Trabue Road.
Barnes Ditch	From its confluence with the Scioto River US to Wilson Road.
Big Run	From its confluence with Little Walnut Creek to the county boundary.
Bishop Run	From its confluence with Little Walnut Creek to the county boundary.
Blacklick Creek	From Central College Road to a point approximately 0.69 US of Walnut Street.
Blau Ditch	From its confluence with Dry Run to a point approximately 1,200 feet US of Maclam Drive.
Clover Groff Ditch	From Interstate Route 70 to Elliott Road (within the unincorporated areas of Franklin County).
Cosgray Ditch	From its confluence with the Scioto River to a point approximately 0.42 mile US of Wilcox Road.
Cramer Ditch	From its confluence with the Scioto River to a point approximately 0.48 mile US of Wilcox Road.
Dry Run	From its confluence with the Scioto River US to the confluence of Blau Ditch.
Faust County Ditch	From its confluence with Hayden Run to a point approximately 1.7 miles US of Hayden Run Road.
Georges Creek	From its confluence with Little Walnut Creek to approximately 2,200 feet upstream of Long Road/County Highway 220.
Molcomb Ditch	From its confluence with Tudor Ditch US to a point approximately 200 feet DS of Lyman Court.
Hayden Run	From the US side of the CONRAIL US to the confluence of Faust County Ditch.
Lisle Ditch	From its confluence with Big Run to a point approximately 0.60 mile US of an unnamed dirt road.
Little Walnut Creek	From the DS county boundary US to DS side of an unnamed golf course bridge.
Snyder Run	From its confluence with Barnes Ditch to a point approximately 1,600 feet US of an unnamed private driveway.

Table 3. Limits of Detailed Studies

Flooding Source	Limits of Detailed Study
South Fork Dry Fun	From its confluence with Dry Run to a point approximately 1,400 feet US of the CONRAIL.
South Fork Indian Run	From approximately 200 feet DS of the confluence of Tri-County Ditch to the City of Dublin corporate limits.
Tri-County Ditch	From its confluence with South Fork Indian Run to the US county boundary.
Tudor Ditch	From its confluence with the Scioto River to a point approximately 100 feet DS of Parkway Lane.
Turkey Run	From its confluence with the Olentangy River US to a point approximately 100 feet DS of Kenny Road.
Utzinger Ditch	From its confluence with Blacklick Creek to a point approximately 0.8 mile US of East Broad Street.

The August 2, 1995, countywide FIS report incorporated the effects of annexations or deannexations by the following communities: the Cities of Columbus, Dublin, Gahanna, and Hilliard and the Villages of New Albany, Obetz, Reynoldsburg and Worthington. In addition, the FIS report incorporated the determinations of Letters of Map Revision (LOMRs) issued by FEMA, for the projects listed by community in Table 4.

Table 4. Previously Incorporated Letters of Map Revision

Community	Stream	Date
City of Columbus		
DS of Hayden Run Road	Cramer Ditch	August 14, 1985
Refugee Road Ditch Enclosure Project	Refugee Ditch	July 29, 1991
DS of Dublin-Granville Road	Alum Creek	April 5, 1988
The Quarry of the Scioto River	Scioto River	August 14, 1985
Near confluence of Tributary 1	Blacklick Creek	August 3, 1988
Just US of Main Street	Big Walnut Creek	January 16, 1987
Grandview Storage Assoc. Property	Scioto River	June 18, 1993
DS of Dublin-Granville Road	Big Walnut Creek	March 3, 1989
From approximately 1.3 miles US of Interstate Route 70 to approx. 1.0 US of Roberts Road	Clover Groff Ditch	June 17, 1993
City of Dublin		
Between Brand Road bridge and Muirfield Drive	Tributary 11 (Bear Run)	May 21, 1993
City of Gahanna		
Between Stygler Rd and Woodside Green South Development	Maple Run, West Branch, Sycamore Creek, East Branch, Sycamore Creek and Tributaries 8A and 8B	November 7, 1988
Cherry Run and Cherry Ridge Subdivisions Floodway	Big Walnut Creek	April 14, 1992

Table 4. Previously Incorporated Letters of Map Revision

Community	Stream	Date
Floodway change just DS of Hamilton Road	Rocky Fork Creek	December 5, 1986
City of Grove City		
Channel relocation US of Demorest Road	Brown Run	December 8, 1989
US of Marlane Drive	Tributary A to Brown Run, To Brown Run, and Tributary No. 6 to Brown Run	January 3, 1991
Christina Villas Development, from approximately 1,400 feet US of Hoover Road to 2,000 feet US of Hoover Road	Tributary No. 1 to Tributary to Grant Run	August 22, 1994
City of Hilliard		
From approximately 600 feet DS of a maintenance road bridge to approximately 2,600 feet US	Clover Groff Ditch	October 12, 1993
City of Reynoldsburg		
Jordan Crossing Subdivision	Lateral G-B	February 9, 1993
Crystal Lakes Subdivision	Lateral G	February 2, 1993
City of Westerville		
Sunbury Lake Drive bridge over Spring Run in the vicinity of Mariners Cove Subdivision	Spring Run	December 15, 1993
Blue Heron Drive to approximately 750 ft US of Blue Heron Drive	Spring Run	April 25, 1995
Unincorporated Areas		
Intersection of Berger Road and Baird Drive	West Branch Sycamore Creek	November 7, 1988
Intersection of Berger Road and Baird Drive	Big Run	January 28, 1988
Near mouth of Plum Run	Scioto River	September 26, 1988
Near Meachum Run Court located DS of Schrock Road	Alum Creek	August 16, 1993
Interstate Route 71 bridge to Brown Road Bridge	Scioto Big Run	February 16, 1995

The August 2, 1995 countywide FIS report also incorporated the determinations of Best Available Data Letters issued by FEMA for the following projects: a Base (1-percent-annual-chance) Flood Elevation (BFE) mismatch along the Scioto River in Grandview Heights; an area near the confluence of Plum Run and the Scioto River in the unincorporated areas of Franklin County; and Granville Road along Big Walnut Creek in Columbus. The FIS report also incorporated the determinations of Letters of Map Amendment (LOMA) issued by FEMA on the following dates: August 14, 1994; September 29, 1994; October 7, 1994; and February 1, 1995.

For the July 16, 1997, revision, Tussing-Bachman Ditch, from its confluence with Little Walnut Creek to State Route 674, and Bush Ditch, from State Route 674 to a point approximately 900 feet upstream of High Street, were restudied. Georges Creek Overland Flow was studied by detailed methods from its confluence with Georges Creek to a point approximately 2,100 feet upstream of its confluence with Georges Creek.

For the April 21, 1999, revision, the Olentangy River was restudied from a point approximately 0.8 mile upstream of Henderson Road to the upstream county boundary. In addition, portions of the Cities of Dublin and Westerville within Delaware County were removed from this countywide FIS report.

The March 16, 2004, revision incorporates the results of analyses along the Scioto River within the corporate/municipal boundaries of City of Columbus and Franklin County, as well as along Indian Run and North Fork Indian Run from the mouth of the Scioto River to the end of the Franklin County/Union County line within the City of Dublin. South Fork Indian Run was also revised from the confluence with Indian Run upstream for a distance along the channel of approximately 350 feet. There were changes to the one-percent-annual-chance flood elevations on the FIRMs that include the communities of Columbus, Grandview Heights, Marble Cliff, Upper Arlington and portions of the Unincorporated Areas of Franklin County. The communities of Bexley, Grove City, and Obetz were included on the updated FIRMs; however, they did not experience any changes to their one-percent-annual-chance-flood elevations.

The March 2004 revision incorporates determination letters issued by FEMA resulting in LOMAs, Letters of Map Revision (LOMRs), and Letters of Map Revision Based on Fill (LOMR-F). The information in this FIS report supersedes the information shown in the previously printed FIS report and FIRM for Franklin County, Ohio and Incorporated Areas, dated April 21, 1999.

Table 5. Previously Incorporated Letters of Map Change

Community	Case Number	Flooding Source(s) and Project Identifier	Date Issued
Columbus, City of	95-05-243P	Scioto River and Hidden Lake; LOMR; Updated the decrease in the SFHAs for the Scioto River and the shoreline of Hidden Lake and the decreases in BFEs for Hidden Lake	August 23, 1995
Columbus, City of	96-05-486A	Scioto Big Run; LOMR-F Removed Kingbury Subdivision, Area One, Lots 117-134, and Area Two, Lots 141-146 from the SFHA	February 29, 1996
Columbus, City of	97-05-173P	Scioto Big Run ; LOMR; Updated the increases and decreases in the SFHAs and the BFE changes for Scioto Run	August 5, 1997

Table 5. Previously Incorporated Letters of Map Change

Community	Case Number	Flooding Source(s) and Project Identifier	Date Issued
Dublin, City of	97-05-5196A	South Fork Indian Run; LOMR-F; Removed a 0.309-acre tract north of Post Road and south of South Fork Indian Run from the SFHA	January 9, 1998
Dublin, City of	98-05-007P	Cosgrove Ditch; LOMR; Updated the increases in the SFHA and the BFE changes for a culvert located on Wilcox Road	April 8, 1998
Upper Arlington, City of	98-05-181P	Scioto River; LOMR; Updated the increases in the SFHAs from a point approximately 260 feet upstream of the CONRAIL bridge to a point just upstream of the Julian Griggs Dam*	March 4, 1999*
Dublin, City of	99-05-012A	Tributary 12 of the North Fork Indian Run; LOMR-F; Removed a portion of land, Shannon Glen, Section 4, Avery Road, for the SFHA	February 12, 1999
Columbus, City of	99-05-630A	Scioto Big Run; Removed a portion of the 11.05-acre parcel, Gantz Road, from the SFHA	November 13, 1998
Dublin, City of	99-05-3100A	Tributary 12; Shannon Glen, 15.388-acre tract, 777 Swan Street	September 29, 1999
Grandview Heights, City of	01-05-098A	Scioto Olentangy Overland Flow; 3.556-acre tract, 777 Swan Street	August 29, 2001
Dublin, City of	01-05-355A	Tributary 12; 7.347-acre parcel	January 3, 2001
Dublin, City of	01-05-1063A	Tributary 12; 68.714-acre parcel	March 9, 2001
Dublin, City of	02-05-2572A	Tributary 12 to North Fork Indian Run; Belvedere, Section 2, Lots 39-41, 64, 70-72, and part of Lot 69	July 24, 2002

* This case was incorporated upstream of the pipeline, but was superseded by the restudy downstream of the pipeline.

In the 2007 revision, the flooding for Georges Creek, Georges Creek Split Flow, Georges Creek Overflow, and Coble-Bowman Ditch in Franklin County, Ohio, and the City of Pickerington, Fairfield and Franklin Counties, Ohio, was updated for the PMR based on new study information submitted by Evans, Mechwart, Hambleton and Tilton, Inc. Georges Creek was revised from its confluence with Little Walnut Creek to approximately 2,200 feet upstream of Long Road/County Highway 220. Coble-Bowman Ditch was revised from approximately 3,500 feet downstream of Bixby Road/County Highway 229 to approximately 4,500 feet upstream of Winchester Pike/County Highway 376. Due to changes in the modeling of the Shannon Road culvert, the overflow from Georges Creek to Coble-Bowman Ditch no longer occurs.

The effective data from the City of Pickerington FIS report was used to update flooding for Blacklick Creek. The hydrologic and hydraulic analysis for Blacklick Creek included in the 1991 FIS report for the Village of Pickerington was performed by the U.S. Geological Survey (USGS) for FEMA, under Inter-Agency Agreement No. EMW-88-E-2738, Project Order No. 1. The study was completed in August 1989.

The 2007 revision impacted the following communities: City of Columbus, Village of Canal Winchester, City of Groveport, and the unincorporated areas of Franklin County. Additionally, Letters of Map Change that affect the panels revised in this process were incorporated as appropriate, and are shown in the following table.

Table 5A. Previously Incorporated Letters of Map Change

Case Number	Date Issued	Project Identifier
95-05-500A	2/1/1995	Essex Place, Section 2, Lots 65 and 66, and portions of Lots 67 through 74
95-05-300A	9/27/1995	An 50.080-acre parcel of land
97-05-2662A	7/16/1997	An 8.257-acre parcel of land
98-05-5040A	7/31/1998	Farmbrook, Section 3
99-05-1346A	12/22/1998	Meadows at Winchester, Section 3, Lot 179
00-05-4422A	6/29/2000	Essex Place 5.889 acres
01-05-188A	1/24/2001	A portion of Section 1, Township 11, Range 21
01-05-3056A	8/3/2001	120.821 acres; Dominion Homes, Inc.
02-05-1883A	4/24/2002	A 20.243-acre tract of land
01-05-1827P	10/14/2002	Coble-Bowman Ditch
02-05-3971P	10/15/2002	Blacklick Creek Overflow Area
03-05-2234A	6/6/2003	Portion s of Sections 13 and 24, Township 11, Range 21; Schirm Farms Development
04-05-1327A	4/16/2004	5100 Ebright Road
04-05-3461A	7/14/2004	A portion of Section 25, Township 11, Range 21;

Table 5A. Previously Incorporated Letters of Map Change

Case Number	Date Issued	Project Identifier
		Waterloo Road
04-05-A685A	9/29/2004	A portion of Section 25, Township 11, Range 21 West, and a portion of Section 30, Township 15 North, Range 20 West
05-05-0228A	11/23/2004	A portion of Section 6, Township 15 North, Range 20 West
05-05-0974A	2/1/2005	A portion of Sections 10, 14, and 15, Township 11 North, Range 21 West, and a portion of Section 14 of the Virginia Military Survey

This countywide FIS also incorporates the determination of letters issued by FEMA resulting in map revisions LOMRs and LOMAs. LOMRs and mappable LOMAs & LOMR-Fs that were incorporated are shown in Table 6.

Table 6. Incorporated Letters of Map Revision and Letters of Map Amendment

Community	Case Number	Flooding Source(s)	Date Issued
Canal Winchester, Village of & Franklin County, Unincorporated	00-05-351P	Little Walnut Creek	3/8/2001
Canal Winchester, Village of	04-05-3461A	Tussing-Bachman Ditch	7/14/2004
Canal Winchester, Village of	04-05-A685A	Tussing-Bachman Ditch	9/29/2004
Columbus, City of	95-05-341P	Olentangy River	12/11/1995
Columbus, City of	95-05-083P	S-3A Ditch	3/14/1996
Columbus, City of	97-05-008A	Clover Groff Ditch	1/28/1997
Columbus, City of	97-05-173P	Scioto Big Run	8/5/1997
Columbus, City of	97-05-203P	Sugar Run	8/28/1997
Columbus, City of	97-05-087P	Clover Groff Ditch	9/18/1997
Columbus, City of	99-05-494A	Big Walnut Creek	11/25/1998
Columbus, City of & Reynoldsburg, City of	98-05-381P	Blacklick Creek and Utzinger Ditch	4/19/1999

Table 6. Incorporated Letters of Map Revision and Letters of Map Amendment

Community	Case Number	Flooding Source(s)	Date Issued
Columbus, City of & Franklin County, Unincorporated	00-05-319P	Blacklick Creek	8/22/2001
Columbus, City of & Franklin County, Unincorporated	04-05-3556P	Unnamed Ponding Areas associated with Columbus Floodwall Interior Drainage	10/8/2004
Columbus, City of	06-05-BD33P	Olentangy River	3/31/2006
Columbus, City of	05-05-3986P	Olentangy River	5/26/2006
Columbus, City of & Franklin County, Unincorporated	05-05-0944P	Scioto River and Scioto River - Bypass	12/28/2006
Columbus, City of & Franklin County, Unincorporated	06-05-B004P	Marsh Run	3/26/2007
Columbus, City of, Franklin County, Unincorporated & Worthington, City of	07-05-0220P	Olentangy River	5/22/2007
Dublin, City of	96-05-247P	Tributary S4 to the Scioto River	8/2/1995
Dublin, City of	97-05-5196A	South Fork Indian Run	1/9/1998
Dublin, City of	98-05-007P	Cosgray Ditch	7/22/1998
Dublin, City of	98-05-035P	North Fork Indian Run	9/26/1998
Dublin, City of	99-05-012A	Tributary 12	2/12/1999
Dublin, City of	99-05-3100A	Tributary 12	9/29/1999
Dublin, City of	00-05-267P	Tributary C1 to Cramer Ditch	10/26/2000
Dublin, City of	01-05-355A	Tributary 12	1/3/2001
Dublin, City of	01-05-1063A	Tributary 12	3/9/2001
Dublin, City of	04-05-A754A	North Fork Indian Run	9/29/2004
Dublin, City of	05-05-0757A	North Fork Indian Run	1/5/2005
Franklin County, Unincorporated & Urbancrest, Village of	00-05-139P	Marsh Run / Baumgardner Ditch	11/21/2000
Franklin County, Unincorporated & Urbancrest, Village of	01-05-1405P	Marsh Run / Baumgardner Ditch	8/14/2001

Table 6. Incorporated Letters of Map Revision and Letters of Map Amendment

Community	Case Number	Flooding Source(s)	Date Issued
Westerville, City of	02-05-2128P	Spring Run	4/8/2002

LOMAs incorporated for this study are summarized in the Summary of Map Amendment (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.

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 numerous flooding sources in the county were studied by approximate methods. Approximate analyses were used to study those areas having low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and Franklin County.

2.2 Community Description

Franklin County is located in central Ohio and is surrounded by Madison, Union, Delaware, Licking, Fairfield and Pickaway Counties. The largest city in Franklin County is Columbus, with approximately 66 percent of the county's population. Beginning about 1984, the northwestern portion of the county began growing rapidly. This growth, which is still continuing, although at a somewhat slower rate, has been largely in residential developments with some commercial and light developments. According to the 2000 census, the total county population was 1,068,978 (Reference 2).

The climate of the Franklin County area is typical of the central temperate zone, with frequent and rapid changes in weather due to alternate invasions of continental polar and maritime tropical air masses. Average annual precipitation totals 36 inches, while mean monthly temperatures range from a low of 29 degrees Fahrenheit (°F) in January to a high of 75°F in July (Reference 3).

The Scioto River basin cuts a swath through the middle of Franklin County and includes a total drainage area of 6,510 square miles. The watershed is generally rectangular in shape and has an average width of approximately 50 miles and a total length of 135 miles.

The 2000 census population for the City of Columbus was recorded at 711,470 (Reference 2). Most small streams in the fully developed areas have heavy overgrowth and are cluttered with refuse and debris, especially where these streams pass through commercial areas.

The 2000 census data recorded the population of Dublin at 31,392 (Reference 2), a significant increase from the 1990 census population of 16,366 (Reference 1). Dublin is located in northwestern Franklin County and southwestern Delaware

County, extending its western boundary into Union County. More than 85 percent of the population lies within Franklin County.

Southeastern Franklin County is still largely agricultural. Growth has been moderate and steady. It is largely residential, with single homes being built on five-acre lots in townships, resulting in construction of private structures or driveways over existing streams.

The study area lies in a glaciated, relatively low-relief portion of the Scioto River Basin. The soils of the area are a combination of Pleistocene outwash and recently deposited alluvium (Reference 4).

2.3 Principal Flood Problems

Periodic overflow of the Scioto and Olentangy Rivers and Big Walnut Creek is Franklin County's principal flood problem.

The maximum flood on record for the Scioto River at the Dublin gage (below O'Shaughnessy Dam), River Mile 147.5, occurred on March 25, 1913, when the Scioto River crested at 799.0 feet NAVD88. Another major flood occurred on January 22, 1959, and a crest elevation of 796.4 feet NAVD88 was reported at the Dublin gage. These elevations would have exceedence intervals of 400 and 120 years, respectively, under present-day conditions.

Historic floods are unique events and must be viewed as such. The January 1959 flood, for example, crested at the Columbus gaging station, River Mile 126.7, at an elevation of 706.62 feet NAVD88. This elevation has an exceedence interval of only 57 years under present day conditions. The Columbus gage was not at its present location in 1913 to record that year's March flood.

The history of flooding along the Olentangy River within Franklin County indicates that flooding could occur during any season of the year. The majority of the major floods has occurred during the period from January to March and have usually been the result of spring rains and/or rapid snowmelt. The worst floods during this century occurred March 25, 1913; January 1952; and January 21, 1959. The flood of March 1913 was the maximum flood of record on the Olentangy River and the Scioto River through Columbus and Franklin County. In January 1959, limited flooding occurred principally upstream of King Avenue where flood damages were low because of the lack of major development in this portion of the floodplain. Estimated flood damages from Henderson Road to the mouth of the Olentangy River amounted to $30,000. Above Henderson Road to Wilson Bridge Road about 600 acres were inundated with no significant damages occurring (Reference 4).

The 1952 and 1959 floods crested at the Wilson Bridge Road gage (No. 03226800) at 757.9 and 758.28 feet NAVD88, respectively (Reference 5). The discharges at this gaging station were 15,100 cubic feet per second (cfs) for the 1952 flood and 16,500 cfs for the 1959 flood. No gage records are available for the March 1913 flood of record at this gaging station. However, a comparison of its crest with that of the January 1959 flood can be made from recorded high water marks at the Henderson Road Bridge (downstream from Worthington at River Mile 6.7). Its crest was 750.4 feet NAVD88 while the 1959 flood crested at only 738.3 feet at this location. In the Worthington area, the estimated return periods for the January 1952 and January 1959 floods, as modified by Delaware Dam, would be 87 and 125 years, respectively.

The flood having the largest impact on the Big Walnut Creek flood plain during the past 65 years occurred on January 22, 1959. This flood crested at 719.6 feet NAVD88 at the Reese gaging station (River Mile 10.5). An earlier major flood occurred on March 25, 1913, when a crest elevation of 718.1 feet NAVD88 was recorded at the Reese gage. Other major floods occurred in February 1929, January 1952 and March 1945 (Reference 6).

The flood of record for Alum Creek in the Columbus area occurred on January 22, 1959. This flood crested at 752.6 feet NAVD88 at the Livingston Avenue gage, which is located on Alum Creek approximately 1/4 mile downstream of Livingston Avenue and six miles upstream from the mouth of the creek. The gage has been in operation since January 1, 1924, except for the calendar years 1936 and 1937. The drainage area at this gage is 189 square miles. Another stream gaging station on Alum Creek is located at the downstream side of Orange Township Road 109 Bridge and 0.3 mile west of Africa, Delaware County, Ohio. It was installed in June 1963. The drainage area at this gage is 122 square miles. One flood of consequence, the March 1964 flood, has occurred since installation of this gage. A maximum discharge measurement of 6,160 cfs was made near the crest stage of the 1964 flood.

A gaging station on Scioto Big Run at Briggsdale is located at the Route 62 Bridge. This station was operated as a continuously recording gage from 1947 to 1959 and as a crest gage from 1960 to the present. In the 33 years of record, the maximum flow of 3,670 cfs was observed on June 30, 1973.

A USGS gage is located on Big Darby Creek downstream of the study area at Darbyville (River Mile 12.25). It is located at the State Highway 316 Bridge, 0.4 mile northeast of Darbyville, 0.4 mile upstream from Lizard Run and 3 miles downstream from Greenbrier Creek. The gage was non-recording prior to March 17, 1940, but was recording thereafter. Datum of the gage is 713.0 feet NAVD88. The period of record for this gage was from October 1921 to December 1935 and from January 1938 to September 1970.

The highest flood that occurred at Darbyville for the period of record occurred on January 22, 1959, when Big Darby Creek crested at an elevation of 730.94 feet NAVD88 with a discharge of 49,000 cfs. If this flood were to occur today under current flow conditions, it would have a frequency of occurrence of approximately 190 years.

Major floods have occurred in the City of Reynoldsburg and the Village of Groveport, in March 1913, June 1956, January 1959 and March 1964. The maximum known flood occurred in 1956, when an estimated five to six inches of rain fell in three hours on June 21 (Reference 7). The staff gage at the Reynoldsburg sewage treatment plant measured 12 to 13 feet, the highest known stage. The floodwaters receded in less than 24 hours (Reference 8). The estimated peak discharge for Blacklick Creek near the Village of Groveport was 12,300 cfs (Reference 9). The estimated return period for that flood was greater than 100 years, based on flood discharge frequency analysis developed for a flood hazard report for Blacklick Creek (Reference 10).

The Blacklick Creek watershed sustained severe damage from floodwater on January 21, 1959. U.S. Weather Service gage records for Port Columbus Airport show 4.90 inches of rain fell on that date (Reference 7). No streamflow records on Blacklick Creek exist; however, the USGS has estimated the peak discharge near the Village of Groveport to be 10,300 cfs for the January 1959 storm. The estimated return period for that flood was greater than 75 years, based on flood discharge frequency analysis developed for a flood hazard report for Blacklick Creek (Reference 10). Floodwaters blocked storm sewer outlets, causing damage to basements. Also, open basement excavations and new construction received damage in Reynoldsburg. The flood duration was less than 24 hours.

Between September 14 and 15, 1979, rainfall from Tropical Storm Frederic ranged from three to six inches on scattered parts of the Columbus area. Floodwaters from Blacklick Creek forced the Reynoldsburg Municipal Building to close. More than 300 homes in the Blacklick Estates subdivision were affected by the overflow. Six homes on Dibble Avenue near the Village of Valleyview were also flooded by overflow from Dry Run. The Valleyview municipal building was also flooded (Reference 11).

No stream gages are located within the other detailed study watersheds. However, local residents consider the January 1959 flood the worst flood to have occurred in all but one of these basins. This exception is Mulberry Run basin, in which the worst flood is believed to have occurred in March 1913.

The most recent flooding event occurred at Turkey Run in July 1989. The county received between 1.55 to 6.6 inches of rainfall between July 27 and 28 (Reference 11). Turkey Run overflowed between State Route 315 and Olentangy River Road to a subdivision, flooding 13 homes.

2.4 Flood Protection Measures

The Scioto River has no mainstream regulation. Following the March 1913 flood, the City of Columbus began to invest in Scioto River channel improvement (Reference 4). This included widening the channel, constructing levees and revetments and increasing bridge spans. A levee was constructed along the west bank of a reach of the Scioto River. A portion of this project is a 1,200-foot long concrete wall constructed to an elevation 3 feet lower than the top of the levee. This section is designed to act as a spillway during extreme floods to prevent the downstream levees from being overtopped and damaged. It is located approximately one-half mile below the mouth of the Olentangy River, extending upstream from Broad Street to the CONRAIL Bridge.

After the 1959 flood, Dry Run levee was raised and strengthened and a levee segment along Dublin Road was constructed. However, this levee is not recognized as providing protection from the base flood.

Prior to 1951, flows on the Olentangy River were unregulated, but since that time the USACE Delaware Dam and Lake Project has had a major effect on reducing flood peaks on the Olentangy River through Columbus and Franklin County.

The dam is located in Delaware County, 164.4 miles above the mouth of the Scioto River, and 32 miles above the mouth of the Olentangy River. Its total storage capacity of 132,000 acre-feet is equal to 6.5 inches of runoff from a 381 square mile drainage area above the dam. Construction was initiated in 1946 and completed in 1951.

Alum Creek Lake, a multi-purpose reservoir on Alum Creek in Delaware County upstream of the City of Westerville and west of Africa, Ohio, was authorized by the Flood Control Act of 1962. The dam was completed in 1964 and is in operation for flood control and provides for additional water supplies for the Columbus metropolitan area, wildlife conservation and general recreation. Located 26 miles above the mouth of Alum Creek and 4.5 miles upstream of Westerville, the dam controls runoff from a drainage area of 123 square miles, providing storage of 7.2 inches of runoff and sufficient water supply storage to assure 40 million gallons per day withdrawal.

Other existing water resource projects include a small water supply intake dam at Westerville, a low water dam below the CSX Transportation railroad bridge, and a low water dam between Main and Broad Streets. These projects have a minimal effect upon flooding conditions.

A locally constructed levee which provides limited protection to the St. Charles Seminary in the City of Bexley was raised substantially following the 1959 flood. Areas behind the levee would be afforded an indeterminate amount of protection during minor flooding but these could be expected to be subject to inundation by the 1- and 0.2-percent-annual-chance floods.

Hoover Dam, a water supply project, was built by the City of Columbus in 1954. This project is located on Big Walnut Creek approximately 37 miles above the mouth. Because this is a water supply dam, it is not recognized as providing flood protection.

The USACE was authorized by the Flood Control Act of 1938 to construct the Big Darby Lake Project as a part of the general comprehensive plan for flood control in the Ohio River basin.

A high water bypass tunnel was constructed during the 1960s on South Fork Dry Run north of the CONRAIL and west of Haldy Drive. At the upstream CONRAIL culvert, the tunnel is capable of bypassing over 900 cfs of flow along the CONRAIL to the downstream CONRAIL culvert, thereby bypassing the residential area in the City of Columbus.

The USACE, Huntington District constructed a floodwall along the Scioto River as part of the West Columbus Local Protection Project, also known as the Franklinton Floodwall. This Federal project is a 7.25-mile long local protection project along the western bank of the Scioto River, composed of a linear floodwall and levees as structural features. It has a number of closures located at streets and railroads. Pump stations and related collector systems convey the storm water away from the floodwall. It has a certified completion date of April 4, 2003 and protects against the one-percent-annual-chance flood in the area of Franklinton, within Columbus.

FEMA specifies that all levees must have a minimum of 3-foot freeboard against 1-percent-annual-chance flooding to be considered a safe flood protection structure. Levees exist in the study area to provide the communities with some degree of protection against flooding. The criteria used to evaluate protection against 1-percent-annual-chance flood are: 1) adequate design, including freeboard; 2) structural stability; and 3) proper operation and maintenance. Levees that do not protect against the 1-percent-annual-chance flood are not considered in the hydraulic analysis of the 1-percent-annual-chance floodplain.

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. The floodway computations were completed using this verified model and are delineated on the best available mapping. Flood events of a magnitude that 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- or 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 that equals or exceeds the 1-percent-chance flood (1 percent chance flood) 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. In addition, the future-conditions 1-percent-annual-chance flood is reflected in this study for various streams studied by detailed methods. The future-conditions floodplain is based on land use described in community zoning ordinances and community comprehensive plans. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

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

This section is a compilation of previously published hydrologic information from earlier FIS reports where streams were studied in detail.

The flood discharge values along Coble-Bowman Ditch, Georges Creek, Georges Creek Split Flow, and Georges Creek Overflow were determined for the PMR using the Natural Resource Conservation Services' (NCRS) TR-20 hydrologic computer program (Reference 12). Flood discharges computed by the TR-20 model are based on average runoff conditions for the rainfall depth-duration data presented in U.S. Weather Bureau publication Technical Paper No. 40 (TP-40) (Reference 13). The 24-hour rainfall totals were distributed following the NRCS Type II storm. The analysis reflects the NRCS Type II distribution, 24-hour duration storm. The revised hydrologic data are shown in Table 7, Summary of Discharges.

Georges Creek Overflow to Blacklick Creek originates within the City of Pickerington, Fairfield County, upstream of a railroad culvert. The overflow was modeled using the Divert routine in the TR-20 model.

For Blacklick Creek, where cross-sections are shared with the City of Pickerington, discharges for the 1-percent-annual-chance recurrence interval were obtained from the SCS (Reference 12).

There were several methodologies used to determine peak discharge-frequency relationships for the following: the Scioto and Olentangy Rivers; Alum, Big Darby, Big Walnut, Georges, Grove City, Little Darby, Little Walnut, Rocky Fork, South Fork Georges, and Swisher Creeks; Baumgardner, Clover Groff, Faust County, Haines, McCoy, Molcomb (upstream of Lyman Court), Orders & Wallace, Patzer, and Rhodes Ditches; Big, Early, Hayden, Mulberry, Plum, Scioto Big, and Sugar Runs; Blacklick Creek Tributary C; and Plum Run Tributary.

Peak discharges for Utzinger Ditch (between its mouth and a point approximately 1.0 mile upstream) and Powell Ditch were taken from a flood hazard report for Blacklick Creek (Reference 10). The peak discharges for Utzinger Ditch and Powell Ditch were developed using the SCS Hydrology Program TR-20 (Reference 14).

Discharge-frequency relationships for rural, unregulated streams were computed using the regression equations developed for streams in Ohio by the USGS (Reference 15). These streams included: Barnes Ditch, Barbee Ditch, Cramer Ditch, Cosgray Ditch, Utzinger Ditch, Molcomb Ditch, Tudor Ditch, Dry Run, South Fork Dry Run, Turkey Run, and Snyder Run. In areas where urbanization in the basin has changed the peak flows under natural conditions, the technique presented by Sauer, et al., 1983 was used to adjust the rural discharges (Reference 16).

For Dry, Indian, North Fork Indian, and South Fork Indian Runs; and Cosgray, Billingsley, Faust County, Clover Groff, Molcomb (within Hilliard), and Tudor Ditches, discharges were determined by methods of regional analysis outlined by Webber and Bartlett (Reference 17). These base discharge figures were then adjusted for land uses in the watersheds and correlated with discharge-frequencies from nearby stream gaging stations. Peak discharges were reduced if the drainage area became significantly less upstream. Gages used in this study and their lengths of record are as follows: Scioto River below O'Shaughnessy Dam near Dublin, 57 years; Scioto River at Columbus, 56 years; Scioto Big Run at Briggsdale, 32 years; Mill Creek near Bellepoint, 36 years; O'Shaughnessy Reservoir near Dublin, 54 years; Griggs Reservoir at Columbus, 57 years; and Olentangy River near Worthington, 23 years.

For the split flows that occur along Big Run, North Fork Dry Run, Turkey Run, and Cosgray Ditch, the HEC-2 split flow routine was used to determine the flow amount leaving the main channels.

For those streams where sufficient gage data were available, discharge-frequency curves were developed on a regional basis according to the method outlined in

Statistical Methods in Hydrology by Leo R. Beard, and the U.S. Water Resources Council Bulletin No. 17 (References 18 and 19).

For those streams where gage data were limited, flood flow frequency analyses utilizing the computer program, Flood Flow Frequency Analysis, Preliminary, were performed (Reference 20). Twenty-five gaging stations were used, with periods of record ranging from 30 to 70 years, and representing drainage areas of 1.0 to 5,131 square miles (References 5 and 21). A period of 60 years was adopted as being representative and was used in computing the estimated frequency for each evaluation center.

The ODNR reviewed the Mason Run watershed and found that the drainage area had been reduced from the initial study after drainage improvements were completed at Columbus International Airport. Peak discharges for Mason Run were determined by the ODNR using techniques outlined in SCS Technical Release No. 55 (Reference 22). The ODNR computed travel time, time of concentration, lag time, runoff, routing, and storage variables for use in the model. TP-40 was used to determine rainfall amounts (Reference 13).

For Spring Run, the magnitude of the discharge for the 1-percent-annual-chance recurrence interval was determined by methods of regional analyses outlined in Bulletin No. 45 (Reference 23). These methods consist of regional regression equations that relate topographical and climatological characteristics of the basin to peak discharge with a given recurrence interval. The equations for the Westerville area used drainage area, main-channel slope, average basin elevation, and mean annual precipitation as explanatory variables. There were no stream-gage data available for Spring Run; therefore, no adjustments were made to the calculated discharges.

The peak discharge-frequency relationships for Blacklick Creek; Blacklick Creek Lateral D; Blacklick Creek Lateral K; Blacklick Creek Lateral GB; Dysar, and Martin Grove Ditches; Sycamore and French Runs; French Run (Lateral G-A); and Sycamore Run Overflow were determined at specific locations in the watershed through application of the SCS TR-20 computer program for the 10-, 25-, 50-, and 100- year floods (Reference 14). The 0.2-percent-annual-chance precipitation was determined by straight line projection of the 10-, 50-, and 1 percent-annual-chance precipitation on log probability paper.

Within Gahanna, discharge-frequency data for Sycamore Run were based on the SCS approach contained in TR-55 (Reference 22). For this method, flood hydrographs are developed from rainfall data obtained from TP-40, runoff numbers and time of concentrations (Reference 13).

There are no recorded streamflow data for the detailed study reach of Beem Ditch through Gahanna. The 10-, 50-, and 1-percent-annual-chance frequency discharges were determined from estimating equations developed by the USGS as presented in Bulletin No. 45 (Reference 23). The 0.2-percent-annual-chance frequency discharges were determined from extrapolation of the referenced estimating equations.

Although the drainage area for Lisle Ditch is less than one square mile, detailed study for Lisle Ditch was performed because Big Run overflows to Lisle Ditch during a 1-percent-annual-chance event.

The drainage area for Hayden Run above CONRAIL was redelineated using the Franklin County topographic maps. Peak discharges for Faust County Ditch and Hayden Run above CONRAIL were computed using the most recent regression equations (Reference 15). Drainage areas for Blacklick Creek above Central College Road were verified using USGS quadrangle maps. Peak discharges for Blacklick Creek above CONRAIL were also computed using the regression equations. For Blacklick Creek, Faust County Ditch, and Hayden Run, peak discharges for the study reaches computed using the regression equations were lower than the previously published flows.

The hydrologic analyses for Tussing-Bachman Ditch, Bush Ditch, and Georges Creek Overland Flow were prepared using the USACE HEC-1 flood hydrograph program (Reference 24). The HEC-1 model was prepared using rainfall depths from the National Weather Service Technical Paper No. 40 and Within Storm Precipitation Frequency Values (References 13 and 25).

The crossings of the Ohio and Erie Canal Traction Line and the Chesapeake and Ohio Railroad severely constrict flow on Tussing-Bachman Ditch during floods, causing water to be stored between these two crossings and in the area between the railroad and Gender Road. During the 1-percent-annual-chance flood, storage in the latter area reaches a stage sufficient for flow to be discharged overland along the railroad to Georges Creek. The presence of the storage areas and the occurrence of overland flow were accounted for in the hydrologic model of the stream.

Rating curves for the traction line and railroad crossings and the overland flow path were developed using the USACE HEC-2 water surface profile program (Reference 26). These rating curves, along with a floodplain stage-storage relationship determined from available topographic mapping, were used to develop stage storage-discharge relationships (Reference 27). These relationships were incorporated into the HEC-1 model to define the reduction in discharges caused by the storage and overland flow characteristics of the floodplain.

A second HEC-1 model for those streams was developed to reflect the reduction in storage that would occur for a floodway between the traction line crossing and Gender Road (Reference 24). The floodplain stage-storage relationship was revised using the boundaries of the floodway, and the resultant HEC-1 model was compared to the original HEC-1 model to ensure that stage elevations did not differ by more than 1 foot.

Flood flow estimates for the Olentangy River were computed based on a log Pearson Type III analysis for 30 years of annual peak flow data available at the USGS gaging station near Worthington, downstream of the Delaware/Franklin County line. The computer program "Flood Frequency Analysis" was utilized to compute these peak discharges (Reference 28). The 30 years of annual peak flow data were obtained from the USGS Water Resources Division district office, and reflect actual flow regulation at the Delaware Dam. Flow changes upstream of the gage, into Delaware County, were based on a discharge/drainage area relationship between the Worthington gage and the outlet gage at the Delaware Reservoir.

For the March 2004, revision, discharges for the North Fork Indian Run above Tributary I2 used updated hydrologic information from a study prepared by the USGS in May 1978 and published in December 1979.

A summary of the drainage area-peak discharge relationships for all streams studied by detailed methods, except West Water Run, McCoy Ditch, and Baumgardner Ditch, is shown in Table 7.

Table 7. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cfs)			
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Alum Creek					
At confluence with Big Walnut Creek	199.0	4,200	6,500	8,100	13,600
At Columbus gage at Livingston Avenue	189.0	3,650	5,800	7,150	11,250
At Morse Road	167.4	3,650	5,800	7,150	11,250
At Schrock Road	167.4	2,650	2,650	6,300	10,200
At Park Road	142.0	2,300	4,400	5,500	9,100
Approximately 2.6 miles US of Park Road	131.9	1,800	2,800	3,600	6,200
At Interstate Route 71	127.0	1,800	1,800	2,360	4,200
At Africa Gage, approximately 0.5 mile US of Interstate Route 71	122.0	1,800	1,800	2,360	4,200
Barbee Ditch					
At confluence with Barnes Ditch	3.6	902	1,358	1,579	2,244
At Trabue Road	3.1	867	1,289	1,497	2,105
Barnes Ditch					
At confluence with the Scioto River	7.0	1,648	2,457	2,872	4,012
At confluence of Barbee Ditch	6.4	1,532	2,283	2,665	3,725
At confluence of Synder Run	2.7	796	1,187	1,379	1,949
At Wilson Road	1.5	568	834	964	1,353
Beem Ditch					
At confluence with Big Walnut Creek	1.5	480	775	910	1,200
At Hamilton Road	1.1	330	530	630	830
Big Darby Creek					
Just US of confluence of Hellbranch Run	457	17,800	30,800	38,000	58,000
DS of confluence of Little Darby Creek	253	16,000	27,900	34,200	52,500
Big Darby Creek (continued)					
Just US of West Broad Street Bridge	247	10,400	17,400	20,900	31,200
At county boundary	200	8,500	14,100	16,900	25,300
Big Run					
At confluence with Little Walnut Creek	8.40	911	1,217	1,374	1,958

Table 7. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cfs)			
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
At confluence of Sugar Run	10.4	1,220	2,210	2,760	4,520
Scioto Big Run					
At confluence with Scioto River	24.9	3,200	5,800	7,300	12,000
Approximately 4.35 miles US of confluence	16.2	2,380	3,910	4,750	7,320
Approximately 6.25 miles US of	13.3	1,025	1,875	2,300	6,000
Approximately 8.83 miles US of confluence	2.8	325	610	720	1,300
Scioto River					
Just DS of Big Walnut Creek	2,266.0	47,600	74,500	86,600	122,500
Just US of mouth of Big Walnut Creek	1,709.0	39,000	63,500	76,600	110,500
At gaging station at Columbus	1,629.0	37,000	60,400	72,900	108,500
Just US of confluence of Olentangy River	1,076.0	29,600	48,500	58,300	85,500
At gaging station below O'Shaughnessy Dam near Dublin	980.0	27,000	43,400	52,300	77,900
Synder Run					
At confluence with Barnes Ditch	1.1	405	605	698	999
South Fork Dry Run					
At Hague Avenue	3.30	1,443	2,043	2,376	3,295
AT CONRAIL	2.73	1,072	1,542	1,789	2,443
South Fork Georges Creek					
At confluence with Georges Creek	5.2	1,200	2,225	2,800	4,900
South Fork Indian Run					
At confluence with Indian Run	5.69	950	1,490	1,750	2,370
At confluence of Tri-County Ditch	4.27	566	861	991	1,422
Just US of Tri-County Ditch	2.40	364	557	611	925
Spring Run					
Just US of Dempsey Road	6.97	*	*	1,850	*
Just US of confluence of unnamed tributary	5.04	*	*	1,410	*
Just US of Walnut Street	4.04	*	*	1,410	*
Just US of Countyline Road	3.32	*	*	1,020	*
Sugar Run					
At confluence with Rocky Fork, Creek	4.69	960	1,770	2,240	3,700
Swisher Creek					
At confluence with Blacklick Creek	2.0	*	*	1,020	*
Sycamore Run					
At confluence with Rocky Fork Creek	1.7	590	960	1,100	1,260
At Larry Lane	1.3	310	540	620	770

Table 7. Summary of Discharges

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cfs)			
		10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
Sycamore Run Overflow					
Just DS of divergence from Sycamore Run	*	*	*	933	*
Tri-County Ditch					
At confluence with South Fork Indian Run	1.87	309	474	547	793
At U.S. Route 33	1.19	195	296	340	488
Tudor Ditch					
At confluence with the Scioto River	3.06	893	1,337	1,555	1,970
At confluence of Molcomb Ditch	2.68	781	1,162	1,343	1,730
At Interstate Route 270	1.17	460	660	740	880
At Parkway Lane	1.14	460	650	740	860
At CONRAIL	1.07	440	620	700	820
Turkey Run					
At Olentangy River Road	2.58	669	996	1,152	1,490
Approximately 2,000 feet DS of Kenny Road	1.91	503	746	859	1,100
Tussing-Bachman Ditch					
At confluence with Little Walnut Creek	5.17	851	930	940	972
At C&O Railroad (Chessie System)[2]	4.86	890	975	985	1,010
DS of County Road 222 (Gender Road)[2]	*	895	1,340	1,465	1,875
US of County Road 222 (Gender Road)	4.21	1,180	1,685	1,790	2,155
Utzinger Ditch					
At confluence with Blacklick Creek	1.90	536	819	950	1,380
At Conrail	1.20	332	541	634	980

* Data not available

[1] 25-year peak discharge

[2] Discharge values do not decrease with respect to decreases in drainage area because of the storage and overland flow characteristics of the floodplain

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams studied were carried out to provide estimated water surface elevations (WSELs) for each stream at selected flood recurrence intervals.

This section is a compilation of previously published hydraulic information from earlier FIS reports where streams were studied in detail.

Information on the methods used to determine WSELs for the streams studied by detailed methods is shown below.

Cross-sectional data for the Scioto and Olentangy Rivers; Beem, Billingsley, Bush, Coble-Bowman, Clover Groff, Cosgray, Faust County, Orders & Wallace, Haines, McCoy, Molcomb, Powell, Rhodes, Tussing-Bachman, and Utzinger Ditches; Big, Early, Brown, Grant, Hellbranch, Indian, Marsh, Patzer, Mason, Mulberry, North Fork Indian, Plum, West Water, Scioto Big, and South Fork Indian Runs; Big Darby, Georges, Little Darby, Little Walnut, South Fork Georges, and Swisher Creeks; Blacklick Creek Lateral K; Blacklick Creek Tributary C; Grove City Creek 2; Grove City Creek 1; Plum Run Tributary; and Rocky Fork Creek were obtained photogrammetrically from aerial photographs taken in 1976 and 1989 (References 29, 30, and 31). The below water sections were obtained by field measurements.

Cross-sectional data for Alum Creek and Big Walnut Creek were obtained from Scioto Conservancy District contour maps at a scale of 1:4,800, with a contour interval of 2 feet (Reference 32). Columbus-Franklin County orthophoto mapping also provided information (Reference 33). Cross-sections were located at close intervals upstream and downstream of bridges in order to compute the backwater effects of these structures. It was assumed that bridge openings would remain unobstructed. Some bridge opening geometries were obtained from bridge plans and profiles supplied by the Ohio Department of Highways (Reference 34).

WSELs for floods of selected recurrence intervals were calculated by using the USACE HEC-2 step-backwater computer program for the following flooding sources (Reference 26): Alum, Big Darby, Big Walnut, Georges, Little Darby, Little Walnut and South Fork Georges Creeks; Beem, Coble-Bowman, Clover Groff, Faust County (within Columbus), Bush, Orders & Wallace, Haines, Hamilton, McCoy and Tussing-Bachman Ditches; Big, Hellbranch, Patzer, Brown, Early, Grant, Marsh, Mason, Mulberry, Plum, Scioto Big and Turkey Runs; Grove City Creek 1; Rocky Fork Creek; and the Scioto and Olentangy Rivers (Reference 26).

Starting WSELs for Alum Creek, Big Walnut Creek, Big Darby Creek, and Little Walnut Creek were obtained by using established ratings at the appropriate gaging stations.

Starting WSELs for the Olentangy River; Georges, Little Darby, and South Fork Georges Creeks; Indian, North Fork Indian, South Fork Indian, Early, Grant, Marsh, Mason, Mulberry, West Water, Hellbranch, Plum, Scioto Big, and Brown Runs; Billingsley, Clover Groff, Faust County, McCoy, Orders & Wallace, Bush, Beem, and Tussing-Bachman Ditches; Grove City Creek 1; Grove City Creek 2; and Plum Run Tributary were calculated using the slope/area method.

Starting WSELs for the Scioto River were obtained by using established ratings at Griggs Dam, approximately 5 miles downstream of the Dublin corporate limits, based on elevations at the dam and discharges at the gaging station on the Scioto River below O'Shaughnessy Dam near Dublin, with 57 years of record (References 22 and 35).

From the hydraulic analysis of the 1-percent-annual-chance flooding for Sycamore Run, it was determined that approximately 22 percent of the flow escapes the confines of the main channel just upstream of the CONRAIL bridge, creating an overflow channel. The flow in the overflow channel follows a path roughly parallel to the railroad tracks to the northwest of the CONRAIL bridge. The overflow rejoins the main channel through a culvert beneath the railroad embankment and as flow over the railroad embankment. The culvert is located approximately 2,500 feet northwest along the railroad from the CONRAIL bridge and the low point in the railroad is approximately 900 feet northwest of the culvert.

Cross-sectional data for Blacklick Creek; Blacklick Creek Lateral D; Blacklick Creek Lateral G-B; Blacklick Creek Lateral K; Blau, Clover Groff, Dysar, Faust County, Martin Grove, Molcomb, and Tudor Ditches; Dry, French, and Sycamore Runs; French Run (Lateral G-A); Georges Creek; and Sycamore Run Overflow were obtained from field surveys and topographic and aerial maps (References 10, 36, and 37).

Flood profiles for Coble-Bowman Ditch, Blacklick Creek Tributary C, Rhodes Ditch, Swisher Creek, Haines Ditch, Utzinger Ditch, and Powell Ditch were taken from a flood hazard analyses report for Blacklick Creek (Reference 10). The profiles in this report were developed using the SCS step backwater program, WSP-2 (Reference 38). Water surface profiles for Blacklick Creek (within Reynoldsburg), Georges Creek, Sycamore Run, Sycamore Run Overflow, Blacklick Creek Lateral D, Blacklick Creek Lateral G B, Blacklick Creek Lateral K, Dysar Ditch, French Run, French Run (Lateral G-A), and Martin Grove Ditch were computed using WSP-2 (Reference 38).

Starting water surface elevations for Blacklick Creek, Coble-Bowman Ditch, Rhodes Ditch, and Swisher Creek were taken from a flood hazard report for Blacklick Creek (Reference 10). Starting water surface elevations for Blacklick Creek Lateral D, Blacklick Creek Lateral G-B, Blacklick Creek Lateral K, Dysar Ditch, French Run, and French Run (Lateral G-A) were taken from profiles of Blacklick Creek at their confluences with Blacklick Creek.

The floodplain and floodway for Blacklick Creek from north of Central College Road to the county boundary were revised based on new computed flows. Existing WSP-2 model data were converted into HEC-2 model data (Reference 38). Bridges over Blacklick Creek were field surveyed. The starting water surface elevations of Blacklick Creek were obtained by using a rating curve developed for Central College Road bridge.

Starting water surface elevations for Powell and Haines Ditches were computed using the SCS step-backwater program, WSP-2 (Reference 38).

Starting water surface elevations for Martin Grove Ditch (within Reynoldsburg) were derived from normal depth calculations.

Starting water surface elevations for Spring Run were computed by means of standard slope/conveyance techniques using WSPRO (Reference 39).

Starting water surface elevations for Coble-Bowman Ditch within Groveport were derived from the elevations of the parent streams.

In Reynoldsburg, the shallow flooding area in the southwest corner of the community, near Birchview Drive, has been changed based on field investigations and more accurate topographic maps (Reference 30).

Cross-sectional data for the backwater analyses were obtained from Franklin County topographic maps with a contour interval of 2 feet (Reference 27). For Molcomb Ditch, Big Run, and Lisle Ditch, additional valley cross-sections were also obtained from field surveys. Cross-sectional elevations for the overbank areas for Little Walnut Creek were taken from the Franklin County topographic maps. Underwater channel section geometry was obtained from field surveys. For those bridges and structures for which construction plans were not available, elevation data and structural geometry were obtained from field surveys.

Numerous wooden foot bridges were found in the study area. Some of these structures were not included in the hydraulic models because they did not appear to be able to sustain the force of flood flows nor have any significant effect on flood stages.

The USACE HEC-2 step-backwater computer program was used to determine water surface elevations. For Barnes Ditch, Big Run, Bishop Run, Cosgray Ditch, Cramer Ditch, Blau Ditch, Dry Run, Lisle Ditch, Utzinger Ditch, Tudor Ditch, and Turkey Run, starting water surface elevations were based on normal depth. For Barbee Ditch, Molcomb Ditch, Snyder Run, South Fork Dry Run, and Tri-County Ditch, peak flows were expected to be coincident with peak flows occurring in the parent streams; therefore, main stream flood elevations were used for starting water surface elevations.

For Little Walnut Creek, the HEC-2 model was extended approximately one mile downstream and normal depth was used as a starting condition. This procedure ensured that realistic backwater elevations were established at the beginning of the detailed study. The hydraulic model was extended approximately 1.5 miles upstream to where the backwater no longer has any effect.

The floodplain and floodway for Hayden Run and Faust County Ditch west of the CONRAIL were revised based on new computed flows. The following modifications were also made to the HEC-2 model: remodeled the new Hayden Run Road bridge east of Leppert Road, which was replaced in 1991; added a new driveway culvert, which replaced the existing culvert; and added a driveway culvert that was not modeled in the previous FIS report. The starting water surface elevations downstream of the CONRAIL were taken from the existing FIS report.

Several unique flooding situations exist in the FIS report area. Each situation is described in the following paragraphs:

Special Flood Situation, Blau Ditch

Flows above the 10-year event will start to overtop the Dry Run Levee just west of Interstate Route 70. Flows downstream of Interstate Route 70 and over the levee are based on the HEC-2 split flow calculation. The split flow analysis assumes that the levee will not breach.

Special Flood Situation, Georges Creek, Mile 0.62

The FIS report includes detailed analyses for two Georges Creek cross flow areas above the CONRAIL. Since there were several large storage areas existing throughout the overflow area, a hydrologic model was developed using the TR20 model to consider these storage areas.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. The 1989 aerial photographs prepared by the Mid Ohio Regional Planning Commission (Reference 40) were used in conjunction with field observations to characterize the floodplain conditions for determination of Manning's "n" for each area of the FIS report (Reference 41). For the channel and overbank "n" values of the detailed studied streams, see Table 8.

Table 8. Summary of Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Alum Creek	0.036-0.050	0.042-0.140
Barbee Ditch	0.035-0.055	0.080-0.150
Barnes Ditch	0.035-0.050	0.060-0.200
Baumgardner Ditch	0.030-0.048	0.030-0.080
Beem Ditch	0.035-0.040	0.030-0.110
Big Darby Creek	0039-0.064	0.043-0.068
Big Run	0035-0.040	0.045-0.300
Big Walnut Creek	0.035-0.050	0.020-0.085
Billingsley Ditch	0.040-0.050	0.550-0.070
Bishop Run	0.030-0.035	0.040-0.080
Blacklick Creek	0.025-0.062	0.035-0.100
Blacklick Creek Lateral D	0.045-0.072	0.042-0.091
Blacklick Creek Lateral G-B	0.075	0.092
Blacklick Creek Lateral K	0.049-0.078	0.032-0.083
Blacklick Creek Tributary C	0.075	0.083-0.090
Blau Ditch	0.040-0.055	0.080-0.160
Brown Run	0.030-0.060	0.035-0.110
Clover Groff Ditch	0.028-0.036	0.045-0.070
Coble-Bowman Ditch	0.058-0.073	0.090-0.105
Cosgray Ditch	0.030-0.060	0.080-0.200
Cramer Ditch	0.035-0.055	0.060-0.120
Dry Run	0.040-0.060	0.080-0.160
Dysar Ditch	0.036-0.063	0.060-0.095
Early Run	0.045-0.050	0.050-0.075
French Run	0.048-0.061	0.065-0.085
French Run (Lateral G-A)	0.028-0.059	0.034-0.090
Georges Creek	030-0.050	0.030-0.100
Grant Run	0.012-0.048	0.060-0.078
Grove City Creek 1	0.040-0.075	0.030-0.075
Grove City Creek 2	0.020-0.045	0.040-0.080
Haines Ditch	0.050	0.085-0.090
Hamilton Ditch	0.035-0.045	0.050-0.075
Hayden Run	0.030-0.050	0.040-0.075
Faust County Ditch	0.030-0.050	0.040-0.150

Table 8. Summary of Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Hellbranch Run	0.035-0.040	0.045-0.065
McCoy Ditch	0.035-0.040	0.045-0.065
Indian Run	0.025-0.050	0.055-0.100
North Fork Indian Run	0.025-0.050	0.055-0.100
Lisle Ditch	0.035-0.040	0.060-0.070
Little Darby Creek	0.045-0.060	0.053-0.079
Little Walnut Creek	0.030-0.050	0.030-0.080
Marsh Run	0.030-0.048	0.030-0.080
Martin Grove Ditch	0.042-0.083	0.041-0.076
Mason Run	0.035-0.054	0.043-0.090
Molcomb Ditch	0.035-0.050	0.045-0.150
Mulberry Run	0.040-0.075	0.030-0.075
West Water Run	0.020-0.045	0.004-0.080
Olentangy River	0.032-0.062	0.025-0.138
Orders & Wallace Ditch	0.012-0.048	0.060-0.078
Patzer Ditch	0.040-0.045	0.050-0.065
Plum Run	0.040	0.045-0.080
Plum Run Tributary	0.040	0.045-0.080
Powell Ditch	0.045-0.050	0.070-0.075
Rhodes Ditch	0.040-0.051	0.080-0.100
Rocky Fork Creek	0.020-0.040	0.045-0.080
Scioto Big Run	0.027-0.071	0.031-0.127
Scioto River	0.018-0.062	0.040-0.118
Scioto River		
Divided Flow Reach	*	0.040-0.118
Snyder Run	0.030-0.055	0.080-0.120
South Fork Dry Run	0.015-0.060	0.080-0.120
South Fork Georges Creek	0.015-0.030	0.040-0.050
South Fork Indian Run	0.035-0.055	0.060-0.100
Spring Run	0.030-0.065	0.028-0.100
Sugar Run	0.035-0.045	0.040-0.080
Swisher Creek	0.065	0.095
Sycamore Run	0.030-0.065	0.030-0.100
Tri-County Ditch	0.040-0.055	0.065-0.150
Tudor Ditch	0.020-0.060	0.060-0.120
Turkey Run	0.004-0.055	0.055-0.150
Tussing-Bachman Ditch	0.030-0.050	0.030-0.100
Bush Ditch	0.013-0.080	0.030-0.100
Utzinger Ditch	0.040-0.060	0.070-0.120
Georges Greek Overland Flow	0.045-0.050	0.045-0.050

* Data not available

Cross-sections for Tussing-Bachman Ditch and Bush Ditch were field surveyed by the ODNR. Cross-sections for Georges Creek Overland Flow were determined using topographic maps (Reference 27).

Water surface elevations of floods of the selected recurrence intervals were determined using the USACE HEC-2 step-backwater computer program

(Reference 26). Starting water surface elevations for Tussing-Bachman Ditch and Bush Ditch were determined using the slope/area method. Starting water surface elevations for Georges Creek Overland Flow were determined using critical depth.

Roughness factors for Tussing-Bachman Ditch and Bush Ditch were chosen by engineering judgment and were based on field inspection of the channel and floodplain areas. Roughness factors for Georges Creek Overland Flow were determined by photographs of the channel and floodplain areas.

In the City of Dublin, cross-sections for Indian Run, North Fork Indian Run, South Fork Indian Run, Cosgray Ditch, and Billingsley Ditch were obtained from aerial photographs and photogrammetric methods (Reference 35).

The USGS step-backwater computer programs E431 or J635 were used to determine water surface profiles for Indian, North Fork Indian, and South Fork Indian Runs and Billingsley, Clover Groff, Cosgray, Faust County (within Hilliard), and Molcomb Ditches (References 39 and 42). Topographic information provided by Evans, Mechwart, Hambleton & Tilton, Inc., was included in the hydraulic analyses for North Fork Indian Run at several cross-sections (Reference 43).

Burgess & Niple, Ltd., reviewed and revised the hydraulic analysis for the Scioto River to correct several inconsistencies in the initial HEC-2 step-backwater computer program to reflect actual field conditions. Burgess & Niple, Ltd., reviewed city records and field surveys for the Water Works Intake Dam and found that the crest elevation of 714.0 feet modeled in the initial HEC-2 model was incorrect. They revised the cross-section for the dam in the HEC-2 model to reflect the correct crest elevation of 709.8 feet. In addition, Burgess & Niple, Ltd., revised several cross-sections to alter channel bank stations to reflect actual field conditions.

For the March 2004, revision, the Scioto River analysis converted the previous HEC-2 model for the Scioto River to HEC-RAS, updated the structures in the previous model, and calculated the floodway and floodplain limits for the 1 percent-annual-chance flood. The goal of the HEC-RAS model conversion and development was to update the structures within the model and to evaluate the impact of the new floodwall constructed for the West Columbus Local Protection Project. Where possible, structure data were updated with construction plans or other data obtained from the Ohio Department of Transportation (References 44 and 45). Hydraulic parameters for the HEC-RAS model were derived from the previous HEC-2 model.

The North Fork Indian Run analysis converted the previous E431 data to HEC-2 and HEC-RAS, updated the structures in the previous models, and updated the topography used to delineate the flood boundaries.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. Table 5 shows the ranges of the channel and overbank roughness factors (Manning's "n") used in the hydraulic computations for all streams studied by detailed methods.

For the 2007 revision, Channel and valley cross-section data for Blacklick, Georges Creek; Georges Creek Overflow and Georges Creek Split Flow, were obtained from aerial photographs and field surveys (References 46 and 47). For Coble-Bowman Ditch, field survey information along with topographic information from the Franklin County Auditor's GIS was used to revise the cross section information in the overbanks (Reference 47).

The hydraulic analyses for the 2007 revision of Coble-Bowman Ditch were performed by converting the original WSP-2 model for the watercourse to a HEC-2 model (Reference 48). For Georges Creek, Georges Creek Overflow, and Georges Creek Split Flow, the U.S. Army Corps of Engineer's HEC-RAS (Reference 49) computer program was used to establish the revised flood elevations and floodway extents. Reach lengths and some bridge modeling were modified to reflect more recent topography and field surveys. A separate HEC-RAS model was created to establish a flood profile for the overflow from Georges Creek to Blacklick Creek, which was labeled Georges Creek Overflow. This overflow occurs upstream of a railroad embankment, within Fairfield County. Water backs up at this location because of an undersized culvert, and escapes from Georges Creek to the west along the north side to the railroad embankment and eventually reaches Blacklick Creek. No floodway has been established in this area.

Whims Ditch is located behind the Franklinton Floodwall and is subject to interior flooding. Whims Ditch was modeled by the Army Corps of Engineers (Reference 50).

Starting water surface elevations for Blacklick Creek were obtained from the 1991 FIS report for the Village of Pickerington (Reference 46). Starting water surface elevations for Coble-Bowman Ditch, Georges Creek, Georges Creek Overflow and Georges Creek Split Flow were determined by using known water surface elevations.

Field reconnaissance was preformed to estimate Manning's 'n' values. The revised Manning's 'n' values for Coble-Bowman Ditch ranged from 0.022 to 0.07 for the channel, and from 0.06 to 0.5 for the overbanks. The revised Manning's 'n' values for Georges Creek and Georges Creek Split Flow ranged from 0.022 to 0.070 for the channel, and from 0.060 to 0.500 for the overbanks. Roughness coefficients (Manning's "n") for Blacklick Creek range from 0.025 to 0.06 for the main channel and from 0.035 to 0.10 for the overbank areas (Reference 46).

Locations of selected cross-sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed, selected cross-section locations are also shown on the FIRM. Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this FIS report were based on unobstructed flow. The flood elevations shown on the Flood Profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail. All elevations are referenced to NAVD88. Elevation reference marks used in this FIS report, and their descriptions, are shown on the maps.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the NGVD29. With the finalization of the NAVD88, many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between communities.

For more information on NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring, Maryland 20910 (internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the TSDN associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program (NFIP) encourages the State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures.

For this study, in response to a request by the community, the future-conditions 1-percent-annual-chance floodplain boundary was delineated on the FIRM (published separately) for various streams studied by detailed methods in addition to the existing 0.2-percent annual-chance floodplain boundary. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Tables and Summary of Stillwater Elevations Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross-section. Between cross-sections, the boundaries were interpolated using aerial photography and topographic maps (References 10, 29-33, 35-37, 40, 41, 51 and 52).

For the July 16, 1997, revision, the boundaries were interpolated between cross-sections using topographic maps at a scale of 1 inch = 100 feet, with a contour interval of 2 feet (Reference 27).

For the April 21, 1999, revision, the boundaries were interpolated using aerial based topographic maps at a scale of 1 inch = 500 feet, with a contour interval of 2 feet, supplied by the Franklin County auditor (Reference 27).

For the March 16, 2004, revision, the boundaries were interpolated between cross-sections using aerial-based topographic maps at a scale of 1 inch = 100 feet, with a contour interval of 2 feet for the North and South Fork Indian Run (Reference 53), and a scale of 1 inch = 500 feet for the Scioto River (Reference 54), all obtained from the Franklin County Auditor's Geographic Information System.

For the PMR (the 2007 revision), the boundaries between cross-sections were interpolated using topographic maps at a scale of 1:3,600, with a contour interval of 1 foot (Reference 47).

For information on topographic mapping that was used in the Letters of Map Change (LOMCs) that are included in this countywide FIS report (Table 5), refer to the LOMCs themselves, which can be obtained from each community's map repository.

For the flooding sources studied by approximate methods, the boundaries of the 1-percent-annual-chance floodplain were delineated using the Flood Hazard Boundary Maps for the Cities of Hilliard, Gahanna, and Grove City; and the Villages of Canal Winchester and Groveport (References 55-59). In addition, several reports and topographic maps were used to delineate the 1-percent-annual-chance floodplains of the flooding sources studied by approximate methods (References 16, 30, 33, 42, 43 and 60).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AO); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance 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 existing-conditions 1-percent-annual-chance 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 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum standards of FEMA limit such increases in flood heights 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 following communities observe the 0.5-foot limit as suggested by the ODNR: Bexley, Columbus, Grandview Heights, Grove City, Hilliard, Lockbourne, Obetz, Reynoldsburg, Upper Arlington, Valleyview, Westerville, Worthington and the unincorporated areas of Franklin County.

The floodways presented in this FIS and on the FIRMs were directly obtained from the previous FIS reports in the Floodway Data Tables. They 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 boundaries were interpolated. The results of the floodway computations were tabulated at selected cross-sections in Table 9. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown. In addition to the existing-conditions 1-percent-annual-chance flood elevations and floodway, the future-conditions 1-percent-annual-chance elevations without the floodway are shown in Table 9, where applicable.

Because the floodway was not recalculated, there were areas where the previous floodway did not fit within the boundaries of the 1-percent-annual-chance floodplain. Therefore, in these areas, the floodway was reduced. Table 8 lists the water surface elevations, with and without a floodway, the mean velocity in the floodway, and the location and area at each surveyed cross section as determined by hydraulic methods. The width of the floodway depicted by the FIRM panels and the amount of reduction to fit the floodway inside the 100-year floodplain, if necessary, is also listed.

A storage floodway was delineated for the reach of Tussing-Bachman Ditch between the Ohio and Erie Traction Line crossing and Gender Road, and for Georges Creek Overland Flow upstream of cross-section D. Floodway boundaries were based on the limits of the storage area used for the floodway HEC-1 model. The equal conveyance reduction method was used to define the encroachment stations for the remainder of Tussing-Bachman Ditch and Georges Creek Overland Flow.

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 9. 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.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the parent stream. "Without Floodway" elevations presented in Table 9 for certain downstream cross-sections of Alum Creek, Big Run, Barnes Ditch, Big Walnut Creek, Bishop Run, Early Run, Georges Creek, Grant Run, Grove City Creek 1, Hayden Run, Indian Run, Lisle Ditch, Marsh Run, the Olentangy River, Patzer Ditch, Plum Run, Plum Run Tributary, Rocky Fork Creek, Scioto Big Run, South Fork Georges Creek, Tussing-Bachman Ditch, Utzinger Ditch and Georges Creek Overland Flow reflect WSELs without consideration of backwater from parent streams and are lower than the regulatory flood elevations in that area that must take into account the 1-percent-annual-chance flooding due to backwater.

The area between the floodway and the 1-percent-annual-chance 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 1-percent-annual-chance 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 1.

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

In the redelineation efforts, the floodway was not recalculated. As a result, there were areas where the previous floodway did not fit within the boundaries of the 1-percent-annual-chance floodplain. Therefore, in these areas, the floodway was reduced. Table 9, the Floodway Data table, lists the water surface elevations, with and without a floodway, the mean velocity in the floodway, and the location and area at each surveyed cross-section as determined by hydraulic methods. The width of the floodway depicted by the FIRM panels and the amount of reduction to fit the floodway inside the 1-percent-annual-chance floodplain, if necessary, is also listed.

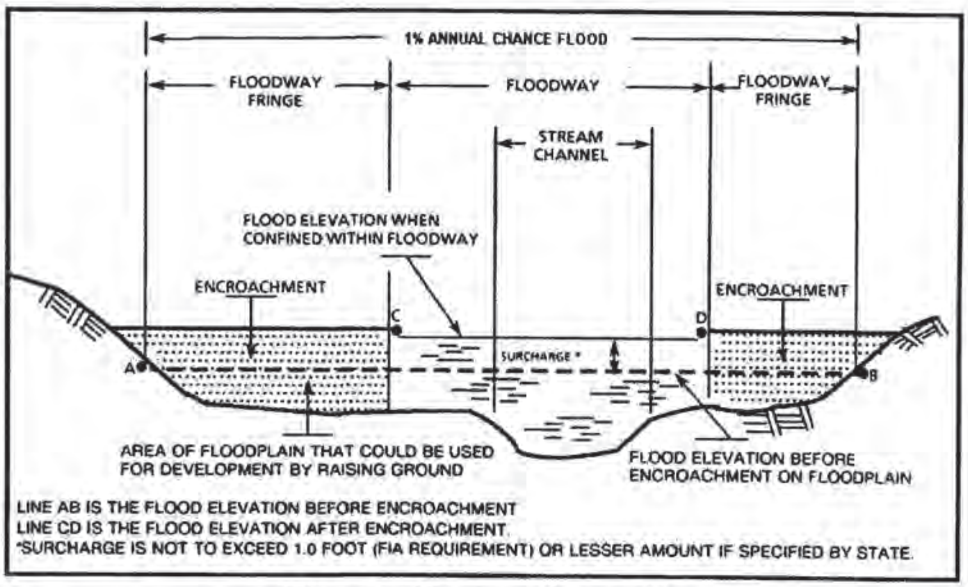


Figure 1. Floodway Schematic

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 shown in Table 10.

Table 10. Flood Insurance Zones

Zone A	The flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.
Zone AE	The flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs 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-depths derived from the detailed hydraulic analyses are shown within this zone.
Zone X	The flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP (FIRM)

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

The FIRM for Franklin County 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. BFE lines show the locations of the expected whole-foot water-surface elevations of the base flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by FEMA.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the existing conditions 1-percent-annual-chance 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 for existing conditions 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 existing and future 1- and 0.2-percent-chance-annual floodplains. Floodways for the existing conditions 1-percent-annual-chance flood extent and the locations of selected cross-sections used in the hydraulic analyses and floodway computations are shown where applicable. This FIRM included flood hazard information that was presented separately on the Flood Boundary and Floodway Maps in previously printed FISs in Franklin County, Ohio.

The current FIRM presents flooding information for the entire geographic area of Franklin County. Previously, separate FIRMs were prepared for each identified floodprone incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 11.

Table 11. Community Map History

Community Name	Initial Identification	Flood Hazard Boundary Map Revisions Date	FIRM Effective Date	FIRM Revisions Date
Bexley, City of	May 17, 1974	None	November 15, 1978	August 2, 1995 March 16, 2004 June 17, 2008
Brice, Village	August 2, 1995	None	August 2, 1995	September 19, 2007 June 17, 2008
Canal Winchester, Village of	February 1, 1974	August 30, 1975 May 21, 1976	June 4, 1980	August 2, 1975 July 16, 1997 September 19, 2007 June 17, 2008
Columbus, City of	August 9, 1974	February 3, 1978	July 5, 1983 March 16, 2004	January 16, 1987 August 2, 1995 July 16, 1997 April 21, 1999 March 16, 2004 September 19, 2007 June 17, 2008
Dublin, City of	January 3, 1975	November 3, 1978	June 4, 1980	September 4, 1985 October 17, 1989 August 2, 1995 April 21, 1999 March 16, 2004 June 17, 2008
Franklin County (Unincorporated Areas)	April 7, 1978	None	July 5, 1983	January 16, 1987 August 2, 1995 July 16, 1997 April 21, 1999 March 16, 2004 September 19, 2007 June 17, 2008

Table 11. Community Map History (Continued)

Community Name	Initial Identification	Flood Hazard Boundary Map Revisions Date	FIRM Effective Date	FIRM Revisions Date
Gahanna, City of	May 17, 1974	August 6, 1976	August 1, 1983	August 2, 1995 June 17, 2008
Grandview Heights, City of	May 17, 1974	August 20, 1976	August 15, 1980	August 2, 1995 March 16, 2004 June 17, 2008
Grove City, City of	May 17, 1974	March 26, 1976	May 1, 1984	August 2, 1995 March 16, 2004 June 17, 2008
Groveport, Village of	May 31, 1974	June 11, 1976 August 31, 1979	September 1, 1983	August 4, 1987 August 2, 1995 July 16, 1997 September 19, 2007 June 17, 2008
Harrisburg, Village of	August 2, 1995	None	August 2, 1995	June 17, 2008
Hilliard, City of	June 7, 1974	May 21, 1976	August 1, 1979	January 6, 1988 August 2, 1995 June 17, 2008
Lockbourne, Village of	January 31, 1975	None	May 1, 1980	August 2, 1995 June 17, 2008
Marble Cliff, Village of	August 2, 1995	None	August 2, 1995	March 16, 2004 June 17, 2008
Minerva Park, Village of*	N/A	None	N/A	None
New Albany, Village of	August 2, 1995	None	August 2, 1995	June 17, 2008
Obetz, Village of	February 15, 1974	May 21, 1976	January 16, 1981	August 2, 1995 March 16, 2004 June 17, 2008

*No Special Flood Hazard Areas

Table 11. Community Map History (Continued)

Community Name	Initial Identification	Flood Hazard Boundary Map Revisions Date	FIRM Effective Date	FIRM Revisions Date
Reynoldsburg, City of	November 23, 1973	June 18, 1976	September 1, 1978	November 20, 1991 August 2, 1995 September 19, 2007 June 17, 2008
Riverlea, Village of	January 31, 1975	None	August 2, 1995	April 21, 1999 June 17, 2008
Upper Arlington, City of	May 17, 1974	August 6, 1976	April 15, 1980	August 2, 1995 April 21, 1999 March 16, 2004 June 17, 2008
Urbancrest, Village of	August 2, 1995	None	August 2, 1995	June 17, 2008
Valleyview, City of	July 11, 1975	None	June 15, 1970	August 2, 1995 June 17, 2008
Westerville, City of	November 2, 1973	August 20, 1976	September 29, 1978	August 7, 1981 February 15, 1985 August 2, 1995 April 21, 1999 June 17, 2008
Whitehall, City of	February 15, 1974	June 4, 1976	July 18, 1985	January 16, 1987 August 2, 1995 June 17, 2008
Worthington, City of	February 1, 1974	None	August 1, 1980	August 2, 1995 April 21, 1999 June 17, 2008

7.0 OTHER STUDIES

FIS reports have been prepared for the unincorporated areas of Delaware, Fairfield, Licking, Madison, Pickaway and Union Counties (References 61-66).

Because it is based on more up-to-date analyses, this countywide FIS report supersedes the previously printed FIS report for the unincorporated areas of Franklin County and incorporated areas (Reference 67).

This is a multivolume FIS report. Each volume may be revised separately, in which case it supersedes the previously printed volume. Users should refer to the Table of Contents in Volume I for the current effective date of each volume; volumes bearing these dates contain the most-up-to-date flood hazard data.

The ODNR prepared a FIS report for Big Run (Reference 68). In the report, it is recognized that Big Run's flow splits, but the amount of split flow was not determined.

Upper Arlington prepared a master storm-water drainage plan for the Turkey Run basin area (Reference 69). This report includes the 1-percent-annual-chance floodplain delineation for Turkey Run within the corporate limits. At the downstream corporate limits, the city reports a 1-percent-annual-chance elevation of 776 feet NAVD88 as compared to 779 feet NAVD88 by this FIS report for the same location. The difference in the 1-percent-annual-chance elevation can be attributed to the fact that this FIS report was developed by the backwater analysis while the flood elevation in the city report was developed using normal depth. Downstream of Kenny Road, the results of this FIS report agree with the Upper Arlington report.

A floodplain information report on Alum Creek was prepared by the USACE in 1967 (Reference 70). In that report, the profiles for Alum Creek show 1-percent-annual-chance flood elevations within Bexley up to 7.0 feet higher than BFEs used in the 1978 FIS report for Bexley. Benefits resulting from the completion of the USACE Alum Creek Lake Project in 1975 are the major reasons for the drop in 1-percent-annual-chance flood heights. Because profiles in the 1978 FIS report reflect 1976 conditions, they supersede those in the floodplain information report.

Another report, entitled Flood Hazard Information, Alum Creek, Ohio, Designated Floodway Map Folio, was prepared by the USACE in March 1972 (Reference 71). It reflects reductions due to the Alum Creek Lake Project and contains a 1-percent-annual chance flood profile and a designated floodway.

The Huntington USACE prepared a report, entitled Flood Plain Information, Big Walnut Creek, Vicinity of Columbus, Ohio, in May 1968 (Reference 6). The profiles contained in this floodplain information report were not calculated through the use of computer backwater programs. This factor accounts for the differences in that and this FIS report.

Two flood hazard information reports were also prepared by the Huntington District USACE: Big Walnut Creek, Franklin County, Ohio, December 1973; and Alum Creek, Ohio, March 1975 (References 72 and 73). Backwater analyses were used in preparing these reports; however, only the 1-percent-annual-chance frequency interval flood profile was computed. A floodway based on a 0.5-foot surcharge was also computed. In the case of Big Walnut Creek, a shorter reach of only three miles was included.

The ODNR has performed a detailed FIS report on Sycamore Run (Reference 74). Subsequently, specific alternatives for reducing flooding on a portion of Sycamore Run were investigated (Reference 75). The two resulting reports are compatible, taking into account the subsequent channel improvement and detention basin work and current watershed urbanization.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the FEMA, Mitigation Division, 536 South Clark Street, Sixth Floor, Chicago, Illinois 60605.

Future revisions may be made that do not result in the republishing of the FIS Report. To ensure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Delaware County, Ohio and Incorporated Areas, Washington, D.C., April 21, 1999.

2. Census 2000 Redistricting Data Summary File, Retrieved November 19, 2003.

3. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climatological Data – Ohio, Asheville, North Carolina, 1878 – 1978.

4. U.S. Army Corps of Engineers, Huntington District, Flood Plain Information, Scioto and Olentangy Rivers, Ohio, October 1966.

5. U.S. Department of the Interior, Geological Survey, Surface Water Supply of the United States, 1913-1974.

6. U.S. Army Corps of Engineers, Huntington District, Flood Plain Information, Big Walnut Creek, Vicinity of Columbus, Ohio, May 1968.

7. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Hourly Precipitation Data – Ohio, January 1959 and March 1964.

8. Recorded but unpublished data on file with the Reynoldsburg Wastewater Plant and the Ohio Environmental Protection Agency, Columbus, Ohio.

9. U.S. Army Corps of Engineers, Huntington District, Flood Plain Information, Blacklick Creek, Franklin County, Ohio, June 1962.

10. U.S. Department of Agriculture, Soil Conservation Service, Flood Hazard Analysis for Blacklick Creek, Columbus, Ohio, October 1975.

11. The Columbus Dispatch, 1979-1991.

12. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 20, Computer Program of Project Formulation-Hydrology, May 1975.

13. U.S. Department of Commerce, U.S. Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington D.C., January 1963.

14. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 20, Computer Program, Project Formulation Hydrology, May 1982.

15. U.S. Department of the Interior, Geological Survey, Water Investigations Report 89-4126, Techniques for Estimating Flood Peak Discharges of Rural Unregulated Streams in Ohio, by G. F. Koltun, and J. W. Roberts, 1990.

16. U.S. Department of the Interior, Geological Survey, Water-Supply Paper 2207, Flood Characteristics of Urban Watersheds in the United States, by V. B. Sauer, W. O Thomas, Jr., V.A. Stricker, and K.V. Wilson, 1983.

17. U.S. Department of the Interior, Geological Survey, Open-File Report No. 76768, Floods in Ohio, Magnitude and Frequency, by E. E. Webber and W. P. Bartlett, Jr., December 1976.

18. Beard, Leo R., Statistical Methods in Hydrology, January 1962.

19. Water Resources Council, Bulletin No. 17, "Guidelines for Determining Flood Flow Frequency," Washington, D.C., March 1976.

20. Water Resources Council, Computer Program, Flood Flow Frequency Analysis, Preliminary, October 1976.

21. U.S. Army Corps of Engineers, Huntington District, Surface Water Supply and Records, 1913-1976.

22. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 55, Urban Hydrology for Small Watersheds, Washington, D.C., January 1975.

23. State of Ohio, Department of Natural Resources, Division of Water, Bulletin No. 45, Floods in Ohio, Magnitude and Frequency, U.S. Geological Survey, May 1977.

24. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package, Davis, California, January 1984.

25. U.S. Department of Commerce, National Weather Service, Within Storm Precipitation Frequency Values, by John F. Miller, January 1971.

26. U.S. Department of the Army, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, May 1991.

27. Franklin County Auditor's Office, Division of Automated Mapping, Topographic Maps, Scale 1:1,200, Contour Interval 2 feet, 1992.

28. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Flood Frequency Analysis Computer Program (HEC-FFA), Davis, California, Version 3.1, February 1995.

29. Berger Associates, Aerial Photography, Scale 1:2,400, Contour Interval 5 feet: Columbus, Ohio, 1976.

30. Henderson Aerial Surveys, Inc., Topographic Maps, Scale 1:4,800, Contour Interval 2 feet: City of Reynoldsburg, Ohio, May 1989.

31. Berger Associates, Aerial Photography, Scale 1: 12,000, Contour Interval 5 feet: Columbus, Ohio, April 1976.

32. Scioto Conservancy District, Topographic Mapping, Scale 1:4,800, Contour Interval 2 feet: Columbus, Ohio, April 1962.

33. U.S. Army Corps of Engineers, Orthophoto Mapping, Scale 1:2,400, Contour Interval 5 feet: Columbus-Franklin County, Ohio, June 1976.

34. Ohio Department of Highways, Schematic Layout Plans for Bridges in Franklin County, 1967.

35. Kucera and Associates, Inc., Mentor, Ohio, Aerial Photogrammetric Map, Scale 1:4,800, Dublin, Ohio, March 1977.

36. U.S. Department of Agriculture, Soil Conservation Service, Topographic Maps of Blacklick Creek, Scale 1:12,000, Contour Interval 2 feet, 1974.

37. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:12,000, Contour Interval 10 feet: Southeast Columbus, Ohio, 1973; Reynoldsburg, Ohio, 1973; Canal Winchester, Ohio, 1966; Lockbourne, Ohio, 1974; Scale 1:24,000, Contour Interval 10 feet: Hilliard, Ohio, (photorevised) 1973; Northwest Columbus, Ohio, (photorevised) 1973; Powell, Ohio, 1973; Shawnee Hills, Ohio, 1973; Southeast Columbus, Ohio, 1973; Southwest Columbus, Ohio, 1965; Scale 1:24,000, enlarged to 1:9,600, Contour Interval 10 feet: Reynoldsburg, Ohio, 1964, photorevised 1973.

38. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 61, WSP-2 Computer Program, Washington, D.C., May 1976.

39. U.S. Department of the Interior, Geological Survey, Open-File Report 76-499, Computer Program E431, User's Manual, Computer Applications for Step Backwater and Floodway Analyses, by J.O. Shearman, 1976.

40. Mid-Ohio Regional Planning Commission, Aerial Photographic Maps, Scale 1:4,800, December 1989.

41. U.S. Army Corps of Engineers, Strip Mapping, Scale 1:2,400, Contour Interval 5 feet: Franklin County, Ohio, December 1978.

42. U.S. Department of the Interior, Geological Survey, Computer Program J635, Provisional, User's Guide, Step-Backwater and Floodway Analyses, by J.O. Shearman, May 1977.

43. Evans, Mechwart, Hambleton & Tilton, Inc., untitled topographic map of Brandon Residential Development, Scale 1:600, Contour Interval 1 foot: revised July 21, 1988.

44. State of Ohio, Department of Transportation, Federal Highway Administration, Reconstruction of Existing Separated Crossing with the Consolidated Rail Corporation; Franklin County Spring-Sandusky Interchange, FRA-315-0.93, certified January 15, 1998.

45. State of Ohio, Department of Transportation, Federal Highway Administration, I-670 Connection Construction, FRA-670-1.02 (A-1), certified November 16, 1998.

46. Federal Emergency Management Agency, Flood Insurance Study, Village of Pickerington, Ohio (Fairfield and Franklin Counties), Washington D.C., August 5, 1991.

47. Evans, Mechwart, Hambleton, and Tilton Incorporated, City of Columbus, City of Pickerington, Village of Canal Winchester, Village of Groveport, and Franklin County, Ohio, Topographic Maps. Scale 1:3,600, Contour Interval 1 foot: November 2002; Scale 1:3,600, Contour Interval 1 foot: November 2005; Scale 1:3,600, Contour Interval 1 foot: November 2002, revised January 2006; Scale 1:1,200, Contour Interval 1 foot: January 2006.

48. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program Version 4.6.2, Davis, California, May 1991.

49. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System, Davis, California, May 2003.

50. U.S. Army Corps of Engineers, West Columbus Local Protection Project Betterment Study of Interior Flood Control Whims Ditch, March 2006.

51. Berger Associates, Ltd., Consulting Engineers, Detailed Orthophoto Mapping, Scale 1:2,400, Contour Interval 5 feet: Worthington, Ohio, April 1976.

52. City of Dublin, Topographic Mapping, Scale 1:1,200, Contour Interval 2 feet: Kucera and Associates, Inc.

53. Franklin County Auditor's Office, Division of Automated Mapping, Aerial-Based Topographic Maps, Scale 1:1200, Contour Interval 2 feet, 2003.

54. Franklin County Auditor's Office, Division of Automated Mapping, Aerial-Based Topographic Maps, Scale 1:1200, Contour Interval 2 feet, 2000.

55. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Hilliard, Franklin County, Ohio, Washington, D.C., May 21, 1976.

56. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Gahanna, Franklin County, Ohio, Washington, D.C., August 6, 1976.

57. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Grove City, Franklin County, Ohio, Washington, D.C., March 26, 1976.

58. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Canal Winchester, Franklin and Fairfield Counties, Ohio, Washington, D.C., May 21, 1976.

59. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Groveport, Franklin County, Ohio, Washington, D.C., August 31, 1979.

60. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Bexley, Franklin County, Ohio, Washington, D.C., Flood Insurance Study report dated May 1978, Flood Insurance Rate Map dated November 15, 1978.

61. Federal Emergency Management Agency, Flood Insurance Study, Delaware County, Ohio (Unincorporated Areas), Washington, D.C., October 18, 1983.

62. Federal Emergency Management Agency, Flood Insurance Study, Fairfield County, Ohio (Unincorporated Areas), Washington, D.C., April 17, 1989.

63. Federal Emergency Management Agency, Flood Insurance Study, Licking County, Ohio (Unincorporated Areas), Washington, D.C., December 1, 1983.

64. Federal Emergency Management Agency, Flood Insurance Study, Madison County, Ohio (Unincorporated Areas), Washington, D.C., February 6, 1991.

65. Federal Emergency Management Agency, Flood Insurance Study, Pickaway County, Ohio (Unincorporated Areas), Washington, D.C., September 27, 1991.

66. Federal Emergency Management Agency, Flood Insurance Study, Union County, Ohio (Unincorporated Areas), Washington, D.C., September 27, 1991.

67. Federal Emergency Management Agency, Flood Insurance Study, Franklin County, Ohio and Incorporated Areas, Washington, D.C., March 16, 2004

68. Ohio Department of Natural Resources, Flood Plain Management Section, Division of Planning, Flood Plain Information Study, Big Run, Franklin County, Ohio, February 1975.

69. Burgess & Niple, Ltd., City of Upper Arlington, Stormwater Drainage Plan Turkey Run Basin, City of Upper Arlington, Ohio, May 1992.

70. U.S. Department of the Army, Corps of Engineers, Flood Plain Information, Alum Creek, Ohio, Columbus and Vicinity, May 1967.

71. U.S. Department of the Army, Corps of Engineers, Huntington District, Flood Hazard Information, Alum Creek, Ohio, Designated Floodway Map Folio, March 1972.

72. U.S. Department of the Army, Corps of Engineers, Huntington District, Flood Hazard Information, Big Walnut Creek, Franklin County, Ohio, December 1973.

73. U.S. Department of the Army, Corps of Engineers, Huntington District, Flood Hazard Information, Alum Creek, Ohio, March 1975.

74. Ohio Department of Natural Resources, Flood Plain Management Section, Division of Planning, Flood Plain Information Study, Rocky Fork Creek and Tributaries, Gahanna, Ohio, February 1975.

75. Burgess & Niple, Ltd., Gahanna Major Waterway Study, Sycamore Run Investigations, November 1979.