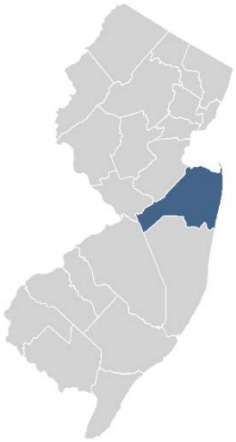
FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 3



MONMOUTH COUNTY, NEW JERSEY

ALLJURISDICTIONS

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
ABERDEEN, TOWNSHIP OF	340312	HIGHLANDS, BOROUGH OF	345297	NEPTUNE, TOWNSHIP OF	340317
ALLENHURST, BOROUGH OF	340283	HOLMDEL, TOWNSHIP OF	340300	OCEAN, TOWNSHIP OF	340319
ALLENTOWN, BOROUGH OF	340284	HOWELL, TOWNSHIP OF	340301	OCEANPORT, BOROUGH OF	340320
ASBURY PARK, CITY OF	340285	INTERLAKEN, BOROUGH OF	340302	RED BANK, BOROUGH OF	340321
ATLANTIC HIGHLANDS, BOROUGH OF	340286	KEANSBURG, BOROUGH OF	340303	ROOSEVELT, BOROUGH OF	340322
AVON-BY-THE-SEA, BOROUGH OF	340287	KEYPORT, BOROUGH OF	340304	RUMSON, BOROUGH OF	345316
BELMAR, BOROUGH OF	345283	LAKE COMO, BOROUGH OF	340328	SEA BRIGHT, BOROUGH OF	345317
BRADLEY BEACH, BOROUGH OF	340289	LITTLE SILVER, BOROUGH OF	340305	SEA GIRT, BOROUGH OF	340325
BRIELLE, BOROUGH OF	340290	LOCH ARBOUR, VILLAGE OF	340306	SHREWSBURY, BOROUGH OF	340326
COLTS NECK, TOWNSHIP OF	340291	LONG BRANCH, CITY OF	340307	*SHREWSBURY, TOWNSHIP OF	340002
DEAL, BOROUGH OF	340292	MANALAPAN, TOWNSHIP OF	340308	SPRING LAKE HEIGHTS, BOROUGH OF	340330
EATONTOWN, BOROUGH OF	340293	MANASQUAN, BOROUGH OF	345303	SPRING LAKE, BOROUGH OF	340329
ENGLISHTOWN, BOROUGH OF	340294	MARLBORO, TOWNSHIP OF	340310	TINTON FALLS, BOROUGH OF	340318
FAIR HAVEN, BOROUGH OF	340295	MATAWAN, BOROUGH OF	340311	UNION BEACH, BOROUGH OF	340331
FARMINGDALE, BOROUGH OF	340296	MIDDLETOWN, TOWNSHIP OF	340313	UPPER FREEHOLD, TOWNSHIP OF	340332
FREEHOLD, BOROUGH OF	345536	MILLSTONE, TOWNSHIP OF	340314	WALL, TOWNSHIP OF	340333
FREEHOLD, TOWNSHIP OF	340297	MONMOUTH BEACH, BOROUGH OF	340315	WEST LONG BRANCH, BOROUGH OF	340334
HAZLET, TOWNSHIP OF	340298	NEPTUNE CITY, BOROUGH OF	340316		

*No Special Flood Hazard Areas Identified

REVISED:

JUNE 20, 2018

FLOOD INSURANCE STUDY NUMBER 34025CV001B

Version Number 2.3.3.2

FEMA

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) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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

Initial Countywide FIS Effective Date: September 25, 2009

Revised Countywide FIS Date: June 20, 2018 – to incorporate new detailed coastal flood hazard analyses, to add Base Flood Elevations, and Special Flood Hazard Areas; to change zone designations and Special Flood Hazard Areas; to update corporate limits, and to reflect updated topographic information.

TABLE OF CONTENTS – Volume 1 – June 20, 2018

FIGURES

TABLES

TABLE OF CONTENTS – Volume 2 – September 25, 2009

EXHIBITS

FLOOD INSURANCE STUDY
MONMOUTH COUNTY, NEW JERSEY (ALL JURISDICTIONS)

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises and updates previous FISs/Flood Insurance Rate Maps (FIRMs) for the geographic area of Monmouth County, New Jersey, including: the Boroughs of Allenhurst, Allentown, Atlantic Highlands, Avon-by-the-Sea, Belmar, Bradley Beach, Brielle, Deal, Eatontown, Englishtown, Fair Haven, Farmingdale, Freehold, Highlands, Interlaken, Keansburg, Keyport, Lake Como, Little Silver, Manasquan, Matawan, Monmouth Beach, Neptune City, Oceanport, Red Bank, Roosevelt, Rumson, Sea Bright, Sea Girt, Shrewsbury, Spring Lake, Spring Lake Heights, Tinton Falls, Union Beach and West Long Branch; the Cities of Asbury Park and Long Branch; the Townships of Aberdeen, Colts Neck, Freehold, Hazlet, Holmdel, Howell, Manalapan, Marlboro, Middletown, Millstone, Neptune, Ocean, Shrewsbury, Upper Freehold and Wall; and the Village of Loch Arbour (hereinafter referred to collectively as Monmouth County). The Borough of Freehold and the Township of Shrewsbury are non-floodprone.

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood risk data for various areas of the county that will be used to establish actuarial flood insurance rates. This information will also be used by Monmouth County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and will also be used 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.

1.2 Authority and Acknowledgments

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

This FIS was prepared to include all communities within Monmouth County in a countywide format. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Aberdeen, Township of:	the hydrologic and hydraulic analyses in the FIS report dated September 18, 1984, were prepared by Richard Browne Associates, for the Federal Emergency Management Agency (FEMA), under Contract No. H-6809. This work was completed in November 1982. The wave height analysis was performed by Dewberry & Davis for FEMA, under Contract No. EMW-C-0543. This work was completed in July 1983.
Allenhurst, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated September 1978 were performed by Tetra Tech, Inc., for the Federal Insurance Administration (FIA) under Contract No. H-3830. This work was completed in September 1977
Allentown, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated March 16, 1981, were conducted by Gannett Fleming Corddry and Carpenter, Inc., under subcontract to the State of New Jersey, Department of Environmental Protection (NJDEP), Division of Water Resources, for the FIA under Contract No. H-4623. This work was completed in March 1980.
Asbury Park, City of:	the hydrologic and hydraulic analyses in the FIS report dated March 15, 1983, represent a revision of the original analyses by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated analyses were also prepared by Tetra Tech, Inc., under agreement with FEMA. This work was completed in August 1981.
Atlantic Highlands, Borough of:	the wave height analysis in the FIS report dated January 5, 1984, was prepared by Dewberry & Davis for FEMA, under Contract No. EMW-C-0543. This work was completed in May 1983.
Avon-by-the-Sea, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated January 5, 1983, were prepared by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was prepared by Tetra Tech, Inc. as well, for FEMA under Contract No. H-3830. This work was completed in August 1981.
Belmar, Borough of:	the wave height analysis in the FIS report dated September 1, 1983, was prepared by Dewberry &

Davis for FEMA, under Contract No. EMW-C-0543. This work was completed in December 1982.

Bradley Beach, Borough of: the hydrologic and hydraulic analyses in the FIS report dated December 15, 1982, represent a revision of the original analyses performed by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was prepared by Tetra Tech, Inc. for FEMA under Contract No. H-3830. This work was completed in August 1981.

Brielle, Borough of: the hydrologic and hydraulic analyses in the FIS report dated March 30, 1983, represent a revision of the original analyses performed by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was also prepared by Tetra Tech, Inc., under agreement with FEMA. This work was completed in August 1981.

Colts Neck, Township of: the hydrologic and hydraulic analyses in the FIS report dated October 15, 1981, were conducted by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources for FEMA, under Inter-Agency Agreement M-3959. This work was completed in May 1978.

Deal, Borough of: the hydrologic and hydraulic analyses in the revised FIS report dated August 6, 2002, were prepared by Leonard Jackson Associates, for FEMA, under Contract No. EMN-96-CO-0026. This work was completed in December, 2000. The wave height analysis in the same FIS report was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in December 1982.

Eatontown, Borough of: the hydrologic and hydraulic analyses in the FIS report dated March 16, 1981, were prepared by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources for the FIA under Contract No. H-3959. This work was completed in January 1978.

Englishtown, Borough of: the hydrologic and hydraulic analyses in the FIS report dated September 16, 1980, represent a revision of the original analysis. The analyses for this study were conducted by Justin and Courtney, Inc., under subcontract NJDEP for the FIA under Contract No.

	H-3959. This work was completed in December 1979.
Fair Haven, Borough of:	the hydrologic and hydraulic analyses for the FIS report dated April 1979 were conducted by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources, Bureau of Flood Plain Management, for the FIA under Contract No. H-3959. This work was completed in November 1977.
Freehold, Township of:	the hydrologic and hydraulic analyses for the FIS report dated October 4, 1982, were performed by T & M Associates under subcontract to NJDEP for FEMA, under Contract No. H-4759. This work was completed in August 1980.
Hazlet, Township of:	the hydrologic and hydraulic analyses in the FIS report dated June 1, 1982, represent a revision of the original analyses completed in September 1977 by Tetra Tech, Inc., for FEMA under Contract No. H-3830. This updated version was prepared by Dewberry & Davis under agreement with FEMA, and was completed in October 1981.
Highlands, Borough of:	the hydrologic and hydraulic analyses in the revised FIS report dated December 22, 1998, were prepared by the U.S. Army Corps of Engineers (USACE), Philadelphia District, for FEMA under Inter-Agency Agreement No. EMW-94-E-4432, Project Order Nos. 1 and 1A. This work was completed in April 1996.
Holmdel, Township of:	the hydrologic and hydraulic analyses in the FIS report dated September 1, 1981, were prepared by Tippetts-Abbett-McCarthy-Stratton for FEMA under Contract No. H-3959. This work was completed in May 1978.
Howell, Township of:	the hydrologic and hydraulic analyses in the FIS report dated July 6, 1982, were prepared by T & M Associates under subcontract to NJDEP for FEMA, under Contract No.. A14516. This work was completed in August 1980.
Keansburg, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated November 16, 1982, were prepared by Tetra Tech, Inc., for FEMA under Contract No. H-3830. This work was completed in August 1981.

Keyport, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated October 18, 1982, represents a revision of the original analyses by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was also prepared by Tetra Tech, Inc., under agreement with FEMA. This work was completed in August 1981.
Little Silver, Borough of:	the wave height analysis in the FIS report dated June 15, 1982, was prepared by Dewberry & Davis for FEMA.
Loch Arbour, Village of:	the hydrologic and hydraulic analyses in the FIS report dated March 15, 1983, represent a revision of the original analyses by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was also prepared by Tetra Tech, Inc., under agreement with FEMA. This work was completed in August 1981.
Long Branch, City of:	the wave height analysis in the FIS report dated July 5, 1983, was prepared by Dewberry & Davis for FEMA, under Contract No. EMW-C-0543. This work was completed in December 1982.
Manalapan, Township of:	the hydrologic and hydraulic analyses in the FIS report dated September 15, 1977 were performed by Anderson-Nichols & Co., Inc., for the FIA under Contract No. H-3715. The work was completed in May 1976.
Manasquan, Borough of:	the wave height analysis in the FIS report dated June 15, 1983, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in December 1982.
Marlboro, Township of:	the hydrologic and hydraulic analyses in the FIS report revised April 1982 was performed by Anderson-Nichols & Co., Inc., for the FIA under Contract No. H-3715. This work was completed in May 1976.
Matawan, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated March 30, 1981, was conducted by T & M Associates under subcontract to NJDEP for the FIA, under Contract No A14516. This work was completed in November 1979.

Middletown, Township of:	the hydrologic and hydraulic analyses in the FIS report dated August 15, 1983, represent a revision of the original analyses performed by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The updated version was prepared by Dewberry & Davis under agreement with FEMA. The wave height analysis was prepared by Tetra Tech, Inc., for FEMA under Contract No. H-3830. This work was completed in August 1981.
Millstone, Township of:	the hydrologic and hydraulic analyses in the FIS report dated July 20, 1981, was conducted by Anderson-Nichols & Co., Inc., under subcontract to NJDEP for FEMA under Contract No. H-4546. This work was completed in February 1979.
Monmouth Beach, Borough of:	the wave height analysis in the FIS report dated October 16, 1984, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in January 1982.
Neptune, Township of:	the wave height analysis in the FIS report dated September 1, 1983, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in February 1983.
Ocean, Township of:	the hydrologic and hydraulic analyses in the FIS report revised July 2, 2003, represent a revision of the original analyses performed by Edward Schnitzer, Consulting Engineers for USACE for the FIA under Inter-Agency Agreement Nos. IAA-H-2-73 and IAA-H-19-74, Project Order Nos. 14 and 15, respectively. That work was completed in August 1975. The revised analyses were prepared by Leonard Jackson Associates for FEMA under Contract No. EMN-96-CO-0026. This work was completed in December 2000.
Oceanport, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated August 1976 was conducted by Tippetts-Abbett-McCarthy-Stratton for the FIA under Contract No. H-3733.
Red Bank, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated November 19, 1980, were prepared by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources, Bureau of Flood Plain Management

	under Contract No. H-3959. This work was completed in November 1977.
Rumson, Borough of	the wave height analysis in FIS report dated June 15, 1982, was prepared by Dewberry & Davis for FEMA.
Sea Bright, Borough of:	the wave height analysis in the FIS report dated May 16, 1983, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in November 1982.
Sea Girt, Borough of:	the wave height analysis in the FIS report dated July 5, 1983, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in December 1982.
Shrewsbury, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated February 1979 was performed by NJDEP for the FIA under Contract No. H-3959. This work was completed in March 1978.
Spring Lake, Borough of:	the wave height analysis in the FIS report dated September 1, 1983, was prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in December 1982.
Spring Lake Heights, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated June 15, 1981, was prepared by T & M Associates under subcontract to NJDEP for FEMA under Contract No. H-4546. This work was completed in November 1979.
Tinton Falls, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated October 15, 1981, was conducted by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources under Inter-Agency Agreement No. H-3959. The hydrologic and hydraulic analyses for the Swimming River were conducted By Dewberry, Nealon & Davis as the Technical Evaluation Contractor (TEC). This work was completed in February 1978.
Union Beach, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated September 2, 1982, represent a revision of the original analyses performed by Tetra Tech, Inc., for FEMA under Contract No. H-3830. The

	updated version was prepared by Tetra Tech, Inc., under agreement with FEMA. This work was completed in August 1981.
Wall, Township of:	the hydrologic and hydraulic analyses in the FIS report dated August 1976 were conducted by Tippetts-Abbett-McCarthy-Stratton for the FIA under Contract No. H-3733.
West Long Branch, Borough of:	the hydrologic and hydraulic analyses in the FIS report dated July 16, 1980, were conducted by Tippetts-Abbett-McCarthy-Stratton under subcontract to NJDEP, Division of Water Resources under Contract No. H-3959. This work was completed in January 1978.

The authority and acknowledgements for the Boroughs of Farmingdale, Interlaken, Lake Como, Neptune City, Roosevelt and the Township of Upper Freehold are not available because no FIS reports were published for those communities

For this countywide FIS, revised hydrologic and hydraulic analyses for Manalapan Brook from the confluence with South River at the county line (Township of Manalapan and Middlesex County) to a location approximately 10 miles upstream at Moonlight Court in the Township of Millstone, were prepared for FEMA by Medina Consultants, P.C. under Contract No. EMN-2003-CO-0005. This work was completed in September 2007.

The remaining flooding sources studied in detail have been redelineated using updated topographic data provided to FEMA by Monmouth County.

Base map information shown on this FIRM was provided in digital format by the State of New Jersey Office of Information Technology. This information was derived from color infrared (CIR) orthophotos produced at a scale of 1:2400 (1"=200') with a 1 foot pixel resolution from photography captured during February-April, 2002. The projection used for the production of this FIRM is New Jersey State Plane, FIPSZONE 2900. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection, or State Plane zones 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 the FIRM.

1.3 Coordination

Consultation Coordination Officer's (CCO) meetings may be held for each jurisdiction in this countywide FIS. An initial CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to explain the nature and purpose of a FIS and to identify the streams to be studied by detailed

methods. A final CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to review the results of the study.

The dates of the initial and final CCO meetings held for Monmouth County and the incorporated communities within its boundaries are shown in Table 1, "Initial and Final CCO Meetings."

TABLE 1 – INITIAL AND FINAL CCO MEETINGS

Community	Initial CCO Date	Final CCO Date
Aberdeen, Township of	June 15, 1979	February 29, 1984
Allenhurst, Borough of	*	January 23, 1978
Allentown, Borough of	February, 1978	September 29, 1980
Asbury Park, City of	*	October 28, 1982
Atlantic Highlands, Borough of	*	August 2, 1983
Avon-by-the-Sea, Borough of	*	January 27, 1982
Belmar, Borough of	*	January 21, 1983
Bradley Beach, Borough of	*	February 8, 1982
Brielle, Borough of	*	September 22, 1982
Colts Neck, Township of	May 18, 1976	December 10, 1980
Deal, Borough of	*	January 4, 1983
	*	July 20, 2001
Eatontown, Borough of	May 18, 1976	April 29, 1980
Englishtown, Borough of	March 15, 1976	April 29, 1980
Fair Haven, Borough of	May 18, 1976	November 29, 1978
Freehold, Township of	June 6, 1977	May 20, 1982
Hazlet, Township of	August 26, 1976	January 7, 1982
Highlands, Borough of	August 1, 1996	April 28, 1997
Holmdel, Township of	May 18, 1976	February 26, 1981
Howell, Township of	June 3, 1977	February 2, 1982
Keansburg, Borough of	*	June 30, 1982
Keyport, Borough of	*	April 13, 1982
Little Silver, Borough of	*	October 26, 1981
Loch Arbour, Village of	*	October 28, 1982
Long Branch, City of	*	February 2, 1983
Manalapan, Township of	December 16, 1974	July 20, 1976
Manasquan, Borough of	*	January 21, 1983
Marlboro, Township of	December 17, 1974	September 15, 1976
Matawan, Borough of	*	September 9, 1980
Middletown, Township of	August 26, 1976	April 30, 1982
Millstone, Township of	June 1977	November 25, 1980
Monmouth Beach, Borough of	*	October 26, 1981
Neptune, Township of	*	April 13, 1983
Ocean, Township of	October 2, 1973	January 15, 1976
	*	October 29, 2001

*Data not available

TABLE 1 – INITIAL AND FINAL CCO MEETINGS – continued

Community	Initial CCO Date	Final CCO Date
Oceanport, Borough of	*	October 29, 1975
Red Bank, Borough of	May 18, 1976	April 4, 1980
Rumson, Borough of	*	October 27, 1981
Sea Bright, Borough of	*	January 10, 1983
Sea Girt, Borough of	*	January 21, 1983
Shrewsbury, Borough of	May 18, 1976	August 14, 1978
Spring Lake, Borough of	*	January 24, 1983
Spring Lake Heights, Borough of	July 14, 1978 *	December 2, 1980 *
Tinton Falls, Borough of	May 18, 1976	January 22, 1981
Union Beach, Borough of	*	April 22, 1982
Wall, Township of	May 7, 1975	March 4, 1976
West Long Branch, Borough of	May 18, 1976	January 23, 1980

*Data not available

The initial scoping meetings were held on October 18, 20, and 25, 2005.

The final CCO meeting was held on March 17-19, 2008. Representatives of FEMA, the County of Monmouth, New Jersey Department of Environmental Protection, Dewberry & Davis, and various communities in Monmouth County were present.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Monmouth County, New Jersey.

All or portions of the flooding sources listed in Table 2, "Flooding Sources Studied by Detailed Methods," 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 - FLOODING SOURCES STUDIED BY DETAILED METHODS

Applegates Creek	Big Brook (Downstream Reach)
Ardena Brook	Big Brook Tributary H
Atlantic Ocean	Burkes Creek
Big Brook (Upstream Reach)	Claypit Creek
Bannen Meadow Brook	Comptons Creek
Barclay Brook	Cranberry Brook
Barren Neck Creek	Deal Lake
Betty Brook	Deal Tributary 1

TABLE 2 - FLOODING SOURCES STUDIED BY DETAILED METHODS - continued

Deal Tributary 2
Deal Tributary 3
Deal Tributary 3A
Deal Tributary 4
Deal Tributary 4A
Debois Creek
Debois Creek Tributary
Deep Run
Deep Run Tributary A
Deep Run Tributary B
Deep Run Tributary C
Doctors Creek
East Creek
Flat Creek
Fletcher Lake
Gander Brook
Gravelly Brook
Gravelly Run
Groundhog Brook
Hannabrand Brook
Haystack Brook
Heroys Pond Creek
Hockhockson Brook
Hog Swamp Brook
Hollow Brook
Indian Run
Judas Creek (Downstream Reach)
Judas Creek (Upstream Reach)
Jumping Brook 1
Jumping Brook 2
Little Silver Creek
Little Silver Creek Tributary 1
Little Silver Creek Tributary 2
Little Silver Creek Tributary 2A
Little Silver Creek Tributary 2B
Little Silver Creek Tributary A
Long Brook
Mac's Brook
Mahoras Brook
Manalapan Brook
Manalapan Brook Tributary A
Manalapan Brook Tributary B
Manasquan River
Manasquan River Tributary A
Marl Brook
Matawan Creek
Matchaponix Brook
McClees Creek
McGellairds Brook
Metedeconk River North Branch
Milford Brook
Millstone River
Mine Brook
Miry Bog Brook
Mohingson Brook
Monascunk Creek
Musquash Brook
Navesink River
Nut Swamp Brook
Parkers Creek
Parkers Creek North Branch
Perrineville Lake
Pine Brook 1
Pine Brook 2
Pine Brook Tributary C
Poly Pond Brook
Polypod Brook
Poplar Brook
Poplar Brook Tributary 1
Poplar Brook Tributary 2
Poplar Brook Tributary 3
Poricy Brook
Ramanessin Brook
Raritan Bay
Roberts Swamp Brook (Downstream Reach)
Roberts Swamp Brook (Upstream Reach)
Rocky Brook (Downstream Reach)
Rocky Brook (Upstream Reach)
Sandy Hook Bay
Shark River
Shark River Tributary D
Shark River Tributary E
Shrewsbury River
South Shrewsbury River
Still House Brook
Swimming River
Sylvan Lake
Tepehemus Brook
Tepehemus Brook, South Branch
Toms River
Town Brook
Town Neck Creek
Turtle Mill Brook

TABLE 2 - FLOODING SOURCES STUDIED BY DETAILED METHODS - continued

Waackaack Creek
Wampum Brook
Watson Creek
Weamaconk Creek
Weamaconk Creek Tributary
Wells Brook
Wemrock Brook
Whale Creek
Whale Pond Brook
Whale Pond Brook Tributary 1
Whale Pond Brook Tributary 2
Willow Brook
Willow Brook Tributary F
Willow Brook Tributary G
Willow Brook East Branch
Wreck Pond Brook
Wreck Pond Brook, East Branch
Yellow Brook
Yellow Brook 2
Yellow Brook 2 Tributary
Yellow Brook Tributary K
Yellow Brook Tributary L

Table 3, "Stream Name Changes," lists streams that have names in this county wide FIS other than those used in previously printed FISs for the communities in which they are located.

TABLE 3 – STREAM NAME CHANGES

Community	Old Name	New Name
Township of Holmdel	East Branch Willow Brook	Willow Brook East Branch
Township of Wall	East Branch Wreck Pond Brook	Wreck Pond Brook East Branch
Township of Aberdeen	Gravelly Run	Gravelly Brook
Borough of Matawan	Gravelly Run	Gravelly Brook
Township of Wall	Judas Creek	Judas Creek (Upstream Reach)
Township of Middletown	Jumping Brook	Jumping Brook 1
Township of Neptune	Jumping Brook	Jumping Brook 2
Borough of Tinton Falls	Jumping Brook	Jumping Brook 2
Township of Howell	North Branch Metedeconk River	Metedeconk River North Branch
Borough of Shrewsbury	North Branch Parkers Creek	Parkers Creek North Branch
Township of Colts Neck	Pine Brook	Pine Brook 1
Township of Manalapan	Pine Brook	Pine Brook 2
Township of Marlboro	Pine Brook	Pine Brook 2
Borough of Tinton Falls	Pine Brook	Pine Brook 1
Borough of Spring Lake Heights	Polly Pod Brook	Poly Pond Brook
Township of Wall	Polly Pod Brook	Poly Pond Brook
Township of Freehold	South Branch Tepehemus Brook	Tepehemus Brook South Branch
Borough of Brielle	Roberts Swamp Brook	Roberts Swamp Brook (Downstream Reach)
Borough of Manasquan	Roberts Swamp Brook	Roberts Swamp Brook (Downstream Reach)
Township of Wall	Roberts Swamp Brook	Roberts Swamp Brook (Upstream Reach)
Township of Manalapan	South Branch Tepehemus Brook	Tepehemus Brook South Branch

TABLE 3 – STREAM NAME CHANGES - continued

Community	Old Name	New Name
Township of Marlboro	South Branch Tepehemus Brook	Tepehemus Brook South Branch
Township of Manalapan	Tributary A	Manalapan Brook Tributary A
Township of Marlboro	Tributary A	Deep Run Tributary A
Township of Freehold	Tributary A to Manasquan River	Manasquan River Tributary A
Township of Manalapan	Tributary B	Manalapan Brook Tributary B
Township of Marlboro	Tributary B	Deep Run Tributary B
Township of Freehold	Tributary B to Manasquan River	Manasquan River Tributary B
Township of Manalapan	Tributary C	Pine Brook 2 Tributary C
Township of Marlboro	Tributary C	Deep Run Tributary C
Township of Freehold	Tributary C to Manasquan River	Manasquan River Tributary C
Township of Wall	Tributary D	Shark River Tributary D
Township of Wall	Tributary E	Shark River Tributary E
Township of Marlboro	Tributary F	Willow Brook Tributary F
Township of Marlboro	Tributary G	Willow Brook Tributary G
Township of Marlboro	Tributary H	Big Brook Tributary H
Township of Marlboro	Tributary K	Yellow Brook Tributary K
Township of Marlboro	Tributary L	Yellow Brook Tributary L
Township of Freehold	Tributary to Debois Creek	Debois Creek Tributary
Borough of Englishtown	Tributary to Weamaconk Creek	Weamaconk Creek Tributary
Township of Colts Neck	Tributary to Yellow Brook	Miry Bog Brook
Township of Freehold	Tributary to Yellow Brook	Yellow Brook 2 Tributary
Borough of Manasquan	Watson Creek	Mac's Brook
Township of Freehold	Yellow Brook	Yellow Brook 2

For this countywide FIS, Manalapan Brook has been restudied using detailed methods. The revised hydrologic analysis includes the entire basin area of Manalapan Brook (drainage area 17.53 square miles). The revised hydraulic analysis extends from its confluence with the South River at the border of Monmouth and Middlesex Counties in the Township of Manalapan to Moonlight Court in the Township of Millstone.

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.

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

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letter of Map Revision [LOMR], Letter of Map Revision - based

on Fill [LOMR-F], and Letter of Map Amendment [LOMA], as shown in Table 4, "Letters of Map Correction."

TABLE 4 – LETTERS OF MAP CORRECTION

Community	Flooding Source(s) Project Identifier	Date Issued	Type
Aberdeen, Township of	Raritan Bay / Removal of VE Zone designation	June 11, 1987	LOMR
Aberdeen, Township of	Mohingson Brook / Updated hydrologic analysis	April 17, 1995	LOMR
Colts Neck, Township of	Correction of corporate limits discrepancy	October 7, 1997	LOMR
Freehold, Township of	Correction of corporate limits discrepancy	October 7, 1997	LOMR
Hazlet, Township of	Flat Creek / Correction of street locations	April 12, 1994	LOMR
Manalapan, Township of	Pine Brook / Revised to include updated hydrologic and hydraulic info	June 11, 1987	LOMR
Manalapan, Township of	Still House Brook / Revised to include more detailed topographic data	November 1, 1999	LOMR
Marlboro, Township of	Big Brook Tributaries I and J / Revised to include updated hydrologic info	October 10, 1995	LOMR
Monmouth Beach, Borough of	Atlantic Ocean and Shrewsbury River / Revision of BFE, Designation from VE to AE Zones	May 12, 2005	LOMR
Neptune, Township of	Atlantic Ocean / Revision of Zones based on more detailed topographic data	January 14, 1991	LOMR
Neptune, Township of	Atlantic Ocean/ Revised to include updated hydrologic info	November 28, 2007	LOMR
Sea Bright, Borough of	Atlantic Ocean / Revision of Zones based on more detailed topographic data	January 14, 1991	LOMR

2.2 Community Description

Monmouth County is located in the central part of New Jersey, extending west to east across nearly the entire state, and is the northernmost county along the area known as the Jersey Shore. Monmouth County is bordered by Middlesex County to the north, Ocean County to the south, Burlington County to the southwest, Mercer County to the west and the Atlantic Ocean to the east. Monmouth County also borders the New York City Borough of Staten Island, on the other side of the Raritan Bay. Monmouth County spans 665 square miles and according to the 2000 census, the population in 2000 was 615,301. The County seat is the Borough of Freehold. Several major highways span Monmouth County, including the Garden State Parkway, New Jersey Turnpike, Interstate 195, and State Roads 9, 18, 34, 35, 36 and 70. Monmouth County is also home to the United States Naval Reservation, Naval Weapons Station Earle. Several rail lines and bus lines also pass through the County, including the New Jersey Transit North Jersey Coast Line.

The eastern part of Monmouth County is a significant portion of the Jersey Shore, a very popular tourist destination, particularly in summer months. The western part of Monmouth County is far more residential and not as densely populated. The lowest points in Monmouth County occur at the Atlantic Ocean, while the highest point is atop Crawford Hill in the Township of Holmdel, which lies 391 feet above sea level.

Monmouth County has a temperate climate with warm summers and moderate winters. The average annual temperature is approximately 53 degrees Fahrenheit (°F), with January being the coldest month, averaging 31.3°F and July the warmest month averaging 74.5°F. The average annual precipitation is approximately 45 inches (U.S. Department of Commerce, 1961).

2.3 Principal Flood Problems

Flooding in Monmouth County is attributed mainly to tropical storms, extratropical cyclones (also known as northeasters) and to a lesser extent, severe thunderstorms. Near the Atlantic Ocean, Raritan Bay, Navesink River, Sandy Hook Bay, Shark River and Shrewsbury River, serious flooding problems are the result of high tidal surge and associated wave activity caused primarily by tropical storms, especially hurricanes. Usually occurring during late summer and early autumn, these storms can result in severe damage to coastal areas. Although extratropical cyclones can develop at almost any time of the year, they are more likely to occur during winter and spring. Thunderstorms are a common occurrence during the warm summer months.

Other low-lying areas throughout Monmouth County are vulnerable to severe flooding and flood-related damage, due to the periodic flooding caused by the overflow of streams and lakes. Heavy rainfall can result in higher than normal stages of Deal Lake, affecting the Borough of Allenhurst, the City of Asbury Park, the Borough of Deal and the Village of Loch Arbour, which frequently experiences property damage. Additional flooding in the Township of Aberdeen is attributed to tidal inundation and backwater from inadequate culverts. Due to high tidal stages on the Raritan Bay, the northern area of Aberdeen in the tidal plains of Matawan Creek, Mohingson Brook and Whale Creek is prone to flooding that affects Route 35 and properties near the shoreline. Areas adjacent to Mohingson Brook, Gravelly Run and Matawan Creek are prone to flooding due to inadequate culverts.

In the Borough of Deal, the lower portion of Poplar Brook is within the tidal range of the Atlantic Ocean. Runoff from severe rain periodically can cause the upper reach of Poplar Brook to overflow its banks. Residential properties will be affected by flooding on both stretches of Poplar Brook.

In the Borough of Eatontown, at times blockage by debris and refuse on Wampum Brook, Parkers Creek, Whale Pond Brook, Husky Brook, Crystal Book and Turtle Mill Brook can cause severe restrictions of culverts and contribute to local flooding. Most local flooding occurs upstream of State Route 35 on Parkers Creek, upstream of State Route 35 near Clinton Avenue, upstream of State Route

71 on Husky Brook at the twin 48-inch culverts under the Duncan Thecker Associates Service Road, and along the Lewis Street Bridge over Wampum Brook.

In the Township of Freehold, flooding has occurred along Manasquan River Tributary B upstream of Elton Adelphia Road, to a distance of 100 feet beyond normal channel bank. During severe conditions, Coventry Drive, which parallels the stream, has become impassable due to flooding. Debois Creek causes localized flooding where roadways cross the stream. The Strickland Road crossing has been flooded to a depth of two feet above the road surface during severe storms. The adjacent floodplain has been inundated, but with no extensive property damage. Debois Creek Tributary has experienced flooding during storm conditions due to constricted channel areas in the downstream portions of the stream. Extensive erosion in the channel of the tributary has been reported.

In the Township of Holmdel, flooding occurs upstream of State Route 34 and along South Street by Willow Brook, as well as near Middle Road by Waackaack Creek.

In the Township of Howell, localized flooding problems have occurred in the area of Long Brook and Bannen Meadow Brook. Long Brook has caused flooding of adjacent property near Wyckoff Road and the State Route 33 crossing. Howell Road is prone to flooding during severe conditions. Bannen Meadow Brook has caused flooding of adjacent property near Fort Plains Road and Casino Drive. The Fort Plains Road crossing is also flooded during severe flooding conditions.

In the Township of Manalapan considerable flooding occurs along Matchaponix Brook in the area of the corporate limits and at its junction with Pine Brook 2. Flood elevations along the lower reach of Pine Brook 2 are affected by backwater from the main branch of Matchaponix Brook. Flooding occurs along Pension Road near Clarks Mills. The housing development along Birmingham Drive, Terrytown Road and Winthrop Drive is subject to flooding from Pine Brook 2. The area along Pine Brook Road and Pease Road is flooded regularly when Pine Brook 2 Tributary C overflows its banks. Flooding problems also exist along Milford Brook in the area of Commack Lane, Pease Road and Tennant Road. Additional problems along Milford Brook arise during heavy rains in the area of Lafayette Mills and Lafayette Mills Road.

In the Borough of Matawan, flood gates are maintained by the community on Matawan Creek at the Lake Lefferts Dam. At times when the flood gates were not opened quickly enough during severe storm conditions, Ravine Drive was flooded to a depth of eight inches. Gravelly Brook has flooded Mill Road to a depth of six inches. The Municipal Garage, located on the floodplain of Gravelly Brook upstream of Church Street, has been flooded to a depth of eight inches, and the Church Street crossing has been flooded by Gravelly Brook to a depth of four inches. Downstream of the confluence of Gravelly Brook with Matawan Creek, the triple culvert at the Railroad Bridge causes backwater flooding of Aberdeen Road to a depth of five feet.

In the Township of Marlboro, considerable flooding occurs along Deep Run in the area of the corporate limits and Old Texas Road, a relatively flat region. A wide floodplain also occurs at Deep Run's junction with Deep Run Tributary B. Additionally, backwater effects of the culvert on Milford Brook at State Route 18 cause flooding upstream of that structure.

In the Township of Middletown, the bayshore portion of the township lies in a poorly drained floodplain with abundant swamp and marshland. The low banks of the stream and the low relief of the surrounding terrain render this region extremely vulnerable to flooding. During periods of heavy precipitation, the creeks overtop their banks and spread their floodwaters over the broad floodplain.

In the Township of Ocean, inland flow of the ocean tidal surges in restricted by weirs in the streams flowing to the ocean, as well as by lake storage. Flooding in the township is caused mostly by local rainstorms.

In the Borough of Spring Lake Heights, flooding occurs along Wreck Pond Brook, Wreck Pond North Branch and Poly Pond Brook. In general, localized flooding may occur under severe storm conditions due to poor surface drainage.

In the Borough of Tinton Falls, low-lying areas are subject to periodic flooding caused by the overflow of Swimming River, Pine Brook 1 and Jumping Brook 2. The most severe flooding occurs at the junction of Pine Brook 1 and Swimming River.

The Borough of Union Beach lies in a poorly drained floodplain with abundant swamps and marshland. The flat gradient of the streams and low relief of the surrounding terrain makes the area extremely vulnerable to flooding. During periods of heavy rainfall, streams within the Borough can overtop and spread floodwaters across the broad floodplain.

In the Township of Wall, flooding in the eastern section and remaining parts of the Township is caused by streams overflowing their banks. The non-tidal sections of Shark River, Manasquan River and Wreck Pond flow in wide, meandering channels. Urbanization in the areas of Watson Creek, Judas Creek (Upstream Reach), Roberts Swamp Brook (Upstream Reach), Poly Pond Brook and Heroys Pond Brook increase the runoff to these streams. Flooding can be aggravated by the accumulation of debris at culverts and bridges.

Several severe storms have struck Monmouth County in the past. The most severe of these storms are described below.

> On September 14-15 of 1944, the entire coast of New Jersey was struck by hurricane-force winds. Wind velocity ranged from 90 miles per hour at Atlantic City to over 100 miles per hour at New York City. The storm produced a maximum tidal elevation of 7.4 feet recorded at a gage in Sandy Hook, located in the Township of Middletown (USACE, 1960; USACE, 1972).

On November 25, 1950, a nor'easter brought gale-force winds and more than three inches of rainfall to the entire coastline of Monmouth County. A wind velocity of 70 miles per hour was recorded in the City of Long Branch. The gage at Sandy Hook recorded a maximum tidal elevation of 7.2 feet (USACE, 1960; USACE, 1972).

On November 6-7 of 1953, a strong storm passed through Monmouth County. The City of Long Branch recorded a wind velocity of 78 miles per hour. The gage at Sandy Hook recorded a maximum tidal elevation of 7.9 feet.

On September 12, 1960, Hurricane Donna struck the coast of Monmouth County with wind gusts to nearly 70 miles per hour. The concurrence of the hurricane tidal surge and mean high tide resulted in a maximum tidal elevation of 8.6 feet at the gage at Sandy Hook (U.S. Department of Commerce, 1971).

On March 6-8 of 1962, a strong storm passed through Monmouth County with sustained winds of 45 miles per hour and gusts to 70 miles per hour. The storm remained in the region for 60 hours. This usually long duration coincided with five successive spring high tides. The combination produced a maximum tidal elevation of 7.8 feet at the gage at Sandy Hook (USACE, 1960; USACE, 1972).

On August 26-28 of 1971, Tropical Storm Doria resulted in peak flows greater than any other recorded at 41 streams throughout New Jersey (State of New Jersey, 1972).

On August 9, 1976, Hurricane Belle struck the New Jersey coastline with winds of up to 100 miles per hour. In Asbury Park, 2.56 inches of rain fell in a 24-hour period. At Beach Haven, a tidal surge combined with high tide levels produced a tidal height six feet above normal stage (FEMA, 1985).

2.4 Flood Protection Measures

Development and use of land within floodplains and the floodway are regulated by the New Jersey Department of Environmental Protection, Division of Land Use Regulation. Additionally, several municipalities within Monmouth County have adopted stream cleanup programs, which clear debris near bridges and culverts to prevent backwater flooding during large storm events.

Several structural flood protection measures have been furnished throughout Monmouth County as well. Small dams are located on Conines Mill Pond and Indian Run in the Borough of Allentown, on Swimming River in the Township of Middletown, on Pine Brook near Tinton Avenue in the Borough of Tinton Falls, and scattered elsewhere throughout the County. Small weirs restrict the passage of

tidal surges into inland areas on Whale Pond Brook and Poplar Brook in the Township of Ocean, and small erosion control structures have been placed along the streams in the Township of Holmdel. The Township of Wall has also placed small stone wave protection measures near roads and other critical infrastructure. A bulkhead was constructed along Marine Park in the Borough of Red Bank.

3.0 ENGINEERING METHODS

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

3.1 Riverine Hydrologic Analyses

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

Precountywide Analyses

Each incorporated community within, and the unincorporated areas of, Monmouth County, with the exceptions of the Boroughs of Farmingdale, Interlaken, Lake Como, Neptune City and Roosevelt, as well as the Township of Upper Freehold, has a previously printed FIS report. The hydrologic and hydraulic analyses described in those reports have been compiled and are summarized below.

For the Township of Wall, total Tide-Frequency Curves for the Atlantic Ocean, Shark River and Manasquan River were developed by the USACE (U.S. Department of Housing and Urban Development, 1973). In the Boroughs of Oceanport and Shrewsbury, peak storm-tide levels on the Shrewsbury River, South Shrewsbury River and its tributaries, as well as Parkers Creek were previously estimated by the USACE (U.S. Department of Housing and Urban Development: April, 1973; June, 1973; USACE, 1972). These values were adjusted to reflect tide levels in the South Shrewsbury River. Additionally, in the Borough of Highlands, stillwater elevations for Sandy Hook Bay were obtained from a stage-frequency stillwater level graph in a USACE report.

For inland areas surrounding Deal Lake, Fletcher Lake and Sylvan Lake, temporary ponding was found to result from heavy rainfall. A hydrologic budget was used to estimate this ponding, and rainfall information for the calculations was obtained from the U.S. Weather Bureau (U.S. Department of Commerce, 1963).

For streams studies by detailed methods in Monmouth County, several methods were used for hydrologic analyses. Special Report 38, developed by the NJDEP in cooperation with the USGS, uses a series of mathematical and graphical relationships to estimate discharge frequency data (U.S. Department of the Interior, 1974). Various parameters such as drainage area, main channel slope, surface storage area and an index of manmade impervious cover based on basin population and development conditions are used in this type of analysis.

A log-Pearson Type III analysis is a statistical technique for fitting frequency distribution data to a curve for the purpose of predicting design floods at a specific site (Water Resources Council, 1976). Probabilities of floods of various sizes can be extracted from this curve. This allows development of a drainage discharge ratio between a known discharge at a known point (gaging station) and the discharge at the area in question. The following equation was used at several streams in Monmouth County to determine this relationship:

$$Q_1 / Q_2 = (A_1 / A_2)^T$$

Where Q_1 and A_1 are the known discharge from a gaging station and the associated drainage area; Q_2 and A_2 are the discharge to be calculated and the associated drainage area, and T is the transfer exponent. This method is outlined by the Water Resources Council in Bulletins 15, 17, 17A and 17B (Water Resource Council, 1977; 1976; 1967).

The last common hydrologic analysis method used in this study is the Rational Method, used for streams with a drainage area less than approximately one square mile. The equation for the Rational Method is:

$$Q = CIA$$

Where Q is the discharge to be calculated, C is the runoff coefficient (dependent on land use), I is the rainfall intensity for the design storm and A is the drainage area.

Peak discharges for Big Brook (Downstream Reach) in the Townships of Colts Neck and Big Brook (Upstream Reach) in the Townships of Marlboro were determined using Special Report 38.

Gravelly Brook, in the Township of Aberdeen was studied using a log-Pearson Type III analysis. In the Township of Howell, it was studied by the Rational Method. In the Borough of Matawan and Township of Marlboro, peak discharges for Gravelly Brook were determined using Special Report 38.

In the Township of Middletown, Jumping Brook 1 was studied using Special Report 38, and the Borough of Tinton Falls and Township of Wall used drainage area disposition to determine peak flows, then verified the results using Special Report 38.

Peak discharges for Matawan Creek in the Township of Aberdeen were determined using a log-Pearson Type III analysis, and were determined using Special Report 38 in the Township of Marlboro and Borough of Matawan.

In the Borough of Englishtown and Townships of Freehold and Manalapan, peak discharges for McGellairds Brook were determined using Special Report 38.

In the Townships of Manalapan and Marlboro, Milford Brook was studied using Special Report 38.

In the Boroughs of Eatontown, Shrewsbury and Tinton Falls, peak discharges for Parkers Creek were determined using Special Report 38.

In the Township of Colts Neck and the Borough of Tinton Falls, peak discharges for Pine Brook 1 were determined using Special Report 38.

In the Townships of Manalapan and Marlboro, peak discharges for Pine Brook 2 were calculated using Special Report 38.

In the Township of Howell, peak flows for Polypod Brook were determined using the Rational Method.

In the Township of Wall, peak discharges for Poly Pond Brook were determined during an overall basin study using drainage area disposition.

In the Borough of Deal and Township of Ocean, peak discharges for Poplar Brook were determined using a log-Pearson Type III analysis, using gage information obtained from Matawan Creek, and then verified using the Rational Method.

Peak discharges for the Shark River in the Borough of Tinton Falls and Township of Wall were determined using a log-Pearson Type III analysis, for which gage records were obtained for Manasquan River located in Squankum, New Jersey to determine a discharge-frequency relationship (U.S. Geological Survey, published annually).

In the Townships of Colts Neck, Middletown and Ocean, and the Borough of Tinton Falls, peak discharges for the Swimming River were determined using a log-Pearson Type III analysis.

Tepehemus Brook, in the Townships of Manalapan and Marlboro, was studied using Special Report 38.

In the Townships of Colts Neck and Freehold, peak discharges for Yellow Brook 2 Tributary were determined using Special Report 38.

In the Townships of Hazlet and Middletown, as well as the Borough of Keansburg and Union Beach, peak discharges for Waackaack Creek were derived from a previous USACE study (USACE, 1968). However, in the Township of Holmdel, Special Report 38 was used to study this stream.

In the Townships of Freehold and Manalapan, as well as the Borough of Englishtown, peak discharges for Weamaconk Creek were determined by Special Report 38. Peak discharges for Wemrock Brook in the Townships of Freehold and Manalapan were determined from Special Report 38 as well.

In the Borough of Eatontown, peak flows for Whale Pond Brook were derived from a USACE study (U.S. Department of Housing and Urban Development, 1977). However, in the Township of Ocean, peak flows were calculated from an overall basin study using drainage area disposition.

In the Townships of Colts Neck, Holmdel and Marlboro, peak discharges for Willow Brook were determined using Special Report 38.

In the Townships of Colts Neck and Freehold, peak discharges for Yellow Brook were determined using Special Report 38.

In the Township of Aberdeen, peak discharges for Mohingson Brook and Whale Creek were determined using a gage analysis based on data obtained from gages on Matawan Creek.

In the Borough of Allentown, peak discharges for Doctors Creek were determined using a gage analysis. Flows for Indian Run were obtained using the Soil Conservation Service (SCS) Computer Program TR20 (U.S. Department of Agriculture, 1976).

In the Township of Colts Neck, peak discharges for Barren Neck Creek, Hockhockson Brook and Marl Brook were obtained using Special Report 38.

In the Township of Freehold, peak discharges for Applegates Creek, Burkes Creek, Debois Creek, Manasquan River Tributary A, Manasquan River Tributary B, Manasquan River Tributary C and Debois Creek Tributary were determined using Special Report 38. Peak flows for Manasquan River were determined using a log-Pearson Type III analysis.

In the Township of Hazlet, peak flows for East Creek, Flat Creek and Monascunk Creek were determined using Special Report 38.

In the Township of Holmdel, peak flows for Willow Brook, East Branch, Mahoras Brook and Ramanessin Brook were determined using Special Report 38.

In the Township of Howell, peak flows for Ardena Brook, Bannen Meadow Brook, Groundhog Brook, Haystack Brook and Long Brook were determined using Special Report 38. Peak flows for Manasquan River and Metedeconk River North Branch

were determined using a log-Pearson Type III analysis, while Polypod Brook was studied using the Rational Method.

In the Township of Manalapan, peak discharges for Gander Brook, Matchaponix Brook, Still House Brook, Manalapan Brook Tributary A, Manalapan Brook Tributary B and Pine Brook 2 Tributary C were determined using Special Report 38.

In the Township of Marlboro, Barclay Brook, Deep Run, Deep Run Tributary A, Deep Run Tributary B, Deep Run Tributary C, Willow Brook Tributary F, Willow Brook Tributary G, Big Brook Tributary H, Yellow Brook Tributary K and Yellow Brook Tributary L were determined using Special Report 38.

In the Township of Middletown, peak discharges for Claypit Creek, Comptons Creek, Mahoras Creek, McClees Creek, Nut Swamp Brook, Poricy Brook and Town Brook were determined using Special Report 38.

In the Township of Millstone, peak discharges for Millstone River, Toms River and Rocky Brook (Upstream Reach) were determined using Special Report 38. Flows for Rocky Brook (Downstream Reach) were derived from the Flood Insurance Study for the Township of East Windsor, Middlesex County, New Jersey.

In the Township of Ocean, a basin study was conducted and a drainage area disposition was used to determine the peak discharges for Deal Tributary 1, Deal Tributary 2, Deal Tributary 3, Deal Tributary 3A, Deal Tributary 4, Deal Tributary 4A, Poplar Brook Tributary 1, Poplar Brook Tributary 2, Poplar Brook Tributary 3, Whale Pond Brook Tributary 1 and Whale Brook Tributary 2. Hog Swamp Brook was studied using the Rational Method, and Hollow Brook was studied using Special Report 38.

Peak flows for Turtle Mill Brook in the Borough of Oceanport were derived from a USACE study (USACE, 1969).

Peak flows for Parkers Creek North Branch in the Borough of Shrewsbury were determined using Special Report 38.

Peak flows for Wreck Pond Brook in the Borough of Spring Lake Heights were derived from the FIS for the Township of Wall (U.S. Department of Housing and Urban Development, 1976).

In the Township of Wall, a basin study was conducted and a drainage area disposition was used to determine the peak discharges for Wreck Pond Brook East Branch, Hannabrand Brook, Heroys Pond Creek, Judas Creek (Upstream Reach), Laurel Gully, Poly Pond Brook (Wall), Roberts Swamp Brook (Upstream Reach), Shark River Tributary D, Shark River Tributary E, Watson Creek and Wreck Pond Brook. Calculated flows were verified using Special Report 38.

In the Borough of Little Silver, streams were divided into two basic systems. The first included Little Silver Creek, Little Silver Tributary A and Little Silver

Tributary 1. The second included Little Silver Tributary 2, Little Silver Tributary 2A and Little Silver Tributary 2B. The watershed contributing to each system was defined and converted to a standard model using parameters that allow the selection of a similar gaged watershed, necessary because no gages exist on these streams. For gage data, Swimming River in the Borough of Red Bank was used, with records since 1923. Using a standard log-Pearson Type III analysis, peak discharge-frequency curves were developed for the two watersheds and applied uniformly.

In the Borough of Manasquan peak discharge-drainage area relationships were determined by high water marks for Mac's Brook, Roberts Swamp Brook (Downstream Reach) and Judas Creek (Downstream Reach).

Revised Analyses

Information on the methods used to determine peak discharge-frequency relationships for the stream restudied as part of this countywide FIS is shown below.

All discharges shown below for Manalapan Brook were calculated in accordance with procedures outlined in the publication by the USGS entitled "Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, 1993", also referred to as Water Resources Investigation (WRI) Report 94-4002 (U.S. Department of the Interior, 1982).

Flow locations were selected at various points along the reaches of this brook. Locations were first selected based on prior documented FEMA flow locations for prior studies of the drainage basin (FEMA, 1981; U.S. Department of Housing and Urban Development, 1977) and on USGS gage locations (U.S. Department of the Interior, retrieved 2006: USGS 01405303, 04105310, 01405330, 01405335, 01405400). Additional flow locations were added along the brook to provide a uniform drainage analysis of the study area.

Based on WRI Report 94-4002, the variables governing the peak stream flows for each of the flow locations are Drainage Area, Main Channel Slope, Population Density and Surface Storage Index. With the flow locations selected, the drainage area to each of the locations was delineated based on the Monmouth County GIS 2-foot contour topography (State of New Jersey, Provided 2006).

The Main Channel Slope was measured between points which are 10 percent and 85 percent of the main channel length upstream from the study site. This was also measured based on the Monmouth County GIS 2-foot contour topography. The Population Density was based on Census 2000 Data obtained form the New Jersey Department of Labor and Workforce Development (State of New Jersey, 2001). First the Population density was calculated for each overall community area. A weighted value was then calculated for each incremental drainage area based on estimated community coverage.

The Surface Storage Index is the percentage of the drainage area occupied by lakes and swamps. This was measured based on the New Jersey 2002 digital orthoimagery (New Jersey Image Warehouse, Retrieved 2006). There are two reservoirs, Millhurst Pond and Bulks Lake located along Manalapan Brook. Neither reservoir has significant surcharge capacity or serves as a flood control structure. Therefore, this study neglects any detention effects of these ponds. Their areas, however, are reflected in the Surface Storage Index.

There are four USGS gages located within Manalapan Brook's limit of detailed study. These gages contain no peak flow records; however they are utilized for drainage area checks. USGS 01405400 is located in Middlesex County downstream of the limit of detailed study. This gage contains 49 years of record but does not satisfy the allowable drainage area weighting limit of 50 percent. As such, this gage was not utilized in this study.

A regression analysis was performed at each of the flow locations in accordance with WRI Report 94-4002 to calculate flood discharges. The regression analysis was performed utilizing the National Flood Frequency Program (NFF) (U.S. Department of the Interior, 2002). This program employs the New Jersey regional regression equations established in Special Report 38 (U.S. Department of the Interior, 1974) to calculate discharges for the 2-, 5-, 10-, 25-, 50- and 100-year flood. These equations are applicable to rural and urbanized areas because they account for basin development through the Population Density variable. The discharges for the 500-year flood are extrapolated by the NFF. This involves fitting a log-Pearson Type III curve to the 2- and 100-year flood discharges and extrapolates the curve to the 500-year flood discharge.

The governing variables were input into the NFF program and regression flows output by the program were used as the discharge at the selected flow locations.

A summary of the drainage area-peak discharge relationships for all streams studied by detailed methods is shown in Table 5, "Summary of Discharges" and in Figure 1, "Frequency Discharge, Drainage Area Curves."

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
APPLEGATES CREEK					
Upstream of confluence with Debois Creek	1.68	246	425	536	872
ARDENA BROOK					
Upstream of confluence with Manasquan River	1.22	170	293	369	590

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
BANNEN MEADOW BROOK					
Upstream of confluence with Manasquan River	2.00	327	551	690	1,094
BARREN NECK CREEK					
At limit of detailed study	1.22	230	390	500	800
BIG BROOK (DOWNSTREAM REACH)					
Upstream of Willow Brook	10.11	770	1,280	1,590	2,550
At limit of detailed study	8.22	750	1,250	1,550	2,500
BURKES CREEK					
Upstream of confluence with Debois Creek	1.43	175	307	388	631
CLAYPIT CREEK					
At Locust Avenue	1.54	285	480	605	1,000
At Lakeside Avenue	0.91	185	315	425	720
COMPTONS CREEK					
At Campbell Avenue	5.86	682	1,093	1,326	2,120
DEAL LAKE TRIBUTARIES					
*	3.00	330	570	750	*
*	1.00	120	350	520	900
*	0.70	10.70	35	45	90
*	0.01	1.10	4.40	6.50	20.20
DEBOIS CREEK					
Upstream of confluence with Manasquan River	7.70	530	910	1,110	1,640
Upstream of confluence of Applegates Creek and Debois Creek Tributary	5.50	450	745	920	1,370
Approximately 800 feet upstream of Jones Siding Road	2.08	163	282	348	518
DEBOIS CREEK TRIBUTARY					
Upstream of confluence with Debois Creek	1.17	218	366	453	699

*Data not available

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
DOCTORS CREEK					
At Fowlers Bridge Road	17.20	1,180	1,830	2,170	3,150
At upstream corporate limits	16.30	1,150	1,785	2,115	3,065
EAST CREEK					
At SR 36	2.31	463	771	947	1,385
At Middle Road	1.41	367	608	747	1,090
At SR 35	0.58	213	351	432	630
FLAT CREEK					
At SR 36	2.08	644	1,070	1,320	1,823
Upstream of confluence of Monascunk Creek	0.86	334	559	692	910
Upstream of SR 36	0.67	198	325	401	575
GRAVELLY RUN					
At Lake Matawan Dam	2.57	589	1,107	1,413	2,405
Upstream of confluence with Metedeconk River North Branch	0.92	113	199	250	403
GROUNDHOG BROOK					
Upstream of confluence with Haystack Brook	1.56	178	306	382	606
Upstream of confluence of Polypod Brook	0.75	140	220	300	500
HAYSTACK BROOK					
Upstream of confluence with the Metedeconk River North Branch	11.40	485	830	1,020	1,550
Approximately 3,000 feet upstream of Ramtown Greenville Road	6.30	402	675	832	1,292
Approximately 1,700 feet from the Glenn Road crossing	4.34	348	587	725	1,135
HOCKHOCKSON BROOK					
Upstream of junction with Pine Brook 1	6.86	590	990	1,230	2,100
Approximately 700 feet upstream of Water Street	4.88	540	910	1,140	1,500
Upstream of Roller Road	0.52	303	385	443	516

*Data not available

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
HOLLOW BROOK					
*	1.00	480	560	650	900
*	0.70	55	85	90	160
*	0.10	65	95	140	240
*	0.01	14	24	32	40
INDIAN RUN					
At confluence with Doctors Creek	1.80	630	900	1,045	1,550
At upstream corporate limits	1.60	615	875	1,025	1,500
JUMPING BROOK 1					
At Neptune corporate limits	3.70	970	1,500	1,760	2,490
Upstream of tributary, 800 feet upstream of corporate limits	2.47	680	1,090	1,270	1,800
At bridge at Shadow Lake	2.11	425	685	835	1,300
At Middletown-Lincroft Road	1.10	280	455	555	820
LONG BROOK					
Upstream of confluence with Manasquan River	2.40	281	476	596	951
Upstream of Adelphia-Farmingdale Road	1.46	242	413	517	829
Upstream of Varnderveer Road	0.96	167	289	363	588
MAHORAS BROOK					
At downstream corporate limits	3.06	645	965	1,115	1,505
At NY & Long Branch Railroad	2.74	597	896	1,035	1,393
At Holland Road	1.37	366	549	635	855
Upstream of confluence with Waackaack Creek	1.30	825	1,245	1,425	1,920
MANASQUAN RIVER					
Downstream of Southard Avenue	33.46	1,380	1,963	2,239	2,932
Approximately 3,500 feet downstream of West Farms Road	28.65	1,200	1,736	1,980	2,590

*Data not available

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MANASQUAN RIVER (continued)					
Upstream of confluence of Ardena Brook	25.18	1,099	1,566	1,786	2,335
Upstream of confluence of Barren Meadow Brook	21.80	980	1,395	1,591	2,081
Upstream of confluence of Long Brook	19.40	893	1,271	1,450	1,896
Upstream of confluence of Debois Creek	10.41	544	774	883	1,155
Upstream of Jackson Mills Road	8.46	459	653	745	975
Upstream of confluence of Manasquan River Tributary B	6.87	391	557	635	830
MANASQUAN RIVER TRIBUTARY A					
Upstream of confluence with Manasquan River	2.10	325	545	685	1,085
MANASQUAN RIVER TRIBUTARY B					
Upstream of confluence with Manasquan River	1.42	214	366	458	727
MANASQUAN RIVER TRIBUTARY C					
Upstream of confluence with Manasquan River	1.80	312	527	657	1,043
MARL BROOK					
Upstream of Mine Brook	1.54	270	460	580	980
At limit of detailed study	1.04	210	370	470	800
MATAWAN CREEK					
At mouth with Raritan Bay	13.19	1,850	3,480	4,440	7,560
Upstream of Mohingson Brook	9.94	1,520	2,855	3,640	6,200
At USGS gaging station at Lake Lefferts Dam	6.11	1,080	2,030	2,590	4,410
At New Brunswick Road	4.18	830	1,555	1,990	3,380
At upstream corporate limits	1.16	340	635	810	1,380

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MCCLEES CREEK					
At Navesink River Road	4.56	690	1,100	1,380	1,900
At Whipporwill Valley Road	2.95	430	700	865	1,280
At Sleepy Hollow Road	1.56	260	430	535	790
MCGELLAIRDS BROOK					
At downstream corporate limits	14.99	760	1,240	1,510	2,490
Upstream of Freehold/ Manalapan corporate limits	2.46	143	272	334	601
METEDECONK RIVER NORTH BRANCH					
Upstream of Howell-Lakewood corporate limits	34.90	671	998	1,160	1,612
Upstream of confluence of Gravelly Run	32.79	658	979	1,137	1,581
Upstream of confluence of Haystack Brook	21.39	535	797	926	1,287
Upstream of Ramtown-Greenville Road	20.78	528	786	913	1,235
Upstream of Lakewood-Farmingdale Road	20.30	522	777	902	1,254
Approximately 4,500 feet upstream of Lakewood-Farmingdale Road	19.69	514	765	889	1,235
Approximately 755 feet upstream of Kent Road	18.08	490	730	847	1,178
Upstream of Church Road	15.40	452	672	781	1,085
Approximately 600 feet downstream of Aldrich Road	11.26	387	576	669	930
Upstream of Farmingdale Road	10.80	348	518	602	837
Approximately 1,800 feet upstream of Hulse's Road	7.20	323	480	558	775
MILLSTONE RIVER					
At Millstone/Monroe corporate limits	7.47	705	1,095	1,305	1,870
At Sweetmans Lane	2.52	249	441	561	730

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
MINE BROOK					
Upstream of Yellow Brook	5.63	740	1,230	1,540	2,500
Downstream of Marl Brook	5.28	670	1,120	1,400	2,300
Upstream of Marl Brook	3.74	500	850	1,060	1,800
At limit of detailed study	2.40	350	600	760	1,220
MIRY BOG BROOK					
Upstream of Yellow Brook	1.08	170	300	380	625
MOHINGSON BROOK					
At confluence with Matawan Creek	2.44	570	1,070	1,360	2,320
Upstream of GSP	2.17	525	985	1,255	2,140
Upstream of Church Street	1.74	450	845	1,075	1,830
At upstream corporate limits	0.65	225	425	540	920
MONASCUNK CREEK					
At confluence with Flat Creek	0.96	285	469	577	835
At SR 35	0.75	255	416	511	730
NUT SWAMP BROOK					
At bridge at Shadow Lake	2.93	425	690	840	1,310
At GSP	2.40	375	620	760	1,130
At Middletown-Lincroft Road	1.55	255	425	525	785
PARKERS CREEK					
At Sunnybank Drive	6.12	700	1,110	1,350	2,050
Downstream of confluences with Parkers Creek North Branch and Wampum Brook	5.47	740	1,190	1,440	2,300
Upstream of confluences with Parkers Creek North Branch and Wampum Brook	1.58	290	480	580	920
At Main Street	1.24	250	410	500	810
At Railroad crossing	1.24	250	410	500	810

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
PARKERS CREEK NORTH BRANCH					
Upstream of confluence with Parkers Creek	1.03	180	310	380	600
At limit of detailed study	0.83	150	250	310	510
PINE BROOK 1					
Upstream of confluence with Swimming River	13.20	900	1,480	1,830	2,900
Upstream of Tinton Avenue	11.04	950	1,560	1,930	3,100
Upstream of junction with Hockhockson Brook	4.18	430	730	900	1,950
POLYPOD BROOK					
Upstream of confluence with Groundhog Brook	0.72	174	220	255	413
POPLAR BROOK					
At confluence with Atlantic Ocean	3.74	593	1,044	1,292	1,990
Upstream of Monmouth Road	2.93	441	777	962	1,481
Upstream of confluence with Poplar Brook Tributary 2	1.70	531	676	762	864
Upstream of Willow Drive	1.15	405	515	589	685
PORICY BROOK					
At confluence with Navesink River	2.86	425	690	845	1,330
At Normandy Road	1.31	290	480	590	900
At Middletown-Lincroft Road	1.21	275	460	570	845
RAMANESSIN BROOK					
Upstream of confluence with Willow Brook	6.49	1,000	1,700	200	2,900
Approximately 1,200 feet northwest of Middletown and Stillwell Avenue, downstream	5.06	950	1,620	1,900	2,700
Approximately 1,200 feet northwest of Middletown and Stillwell Avenue, upstream	3.83	760	1,399	1,599	2,199

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
RAMANESSIN BROOK (continued)					
Approximately 1,400 feet downstream of Robert Road	2.43	510	830	1,000	1,460
Upstream of Longstreet Road	1.03	300	500	620	960
ROCKY BROOK (DOWNSTREAM REACH)					
At Disbrow Road	6.10	410	690	870	1,310
ROCKY BROOK (UPSTREAM REACH)					
Approximately 2,240 feet downstream of Perrineville Road	3.19	327	562	705	1,128
SHARK RIVER					
At Neptune corporate limits	7.99	440	670	790	1,140
At Shark River Road	2.37	130	200	230	330
SWIMMING RIVER					
At Hubbards Avenue	61.70	3,844	8,253	11,176	21,970
USGS gage near Red Bank	48.50	3,280	7,060	9,630	18,000
At Swimming River Road	48.50	3,248	6,973	9,443	18,563
TEPEHEMUS BROOK SOUTH BRANCH					
Upstream of Freehold/ Manalapan corporate limits	1.74	200	340	430	790
TOMS RIVER					
At Millstone-Jackson corporate limits	3.39	191	342	433	717
At upstream study limit	2.92	219	390	495	808
TOWN BROOK					
At Park Avenue	2.69	385	629	769	1,220
At SR 35	1.33	219	366	450	715
TURTLE MILL BROOK					
*	4.20	600	900	1,100	2,600
*	0.64	200	250	320	650

*Data not available

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
WAACKAACK CREEK					
At downstream corporate limits	7.44	1,200	1,800	2,080	2,800
At SR 36	6.77	1,125	1,685	1,950	2,620
At downstream corporate limits	5.64	1,125	1,685	1,950	2,620
Upstream of confluence with Mahoras Brook	4.34	355	530	615	825
WAMPUM BROOK					
At Main Street	2.86	390	630	760	1,200
At Lewis Street	2.01	360	580	710	1,110
WEAMACONK CREEK					
At downstream corporate limits	7.66	410	650	790	1,360
Upstream of Freehold/ Manalapan corporate limits	1.49	146	230	300	494
Upstream of US Route 9	1.02	106	167	219	360
WEAMACONK CREEK TRIBUTARY					
At confluence with Weamaconk Creek	0.34	120	185	220	320
At upstream corporate limits	0.19	90	135	160	215
WEMROCK BROOK (within the Township of Freehold)					
Upstream of Freehold/ Manalapan corporate limits	2.58	215	401	423	694
WHALE POND BROOK					
At Whale Pond Road	3.94	320	730	1,080	2,700
Downstream of Neptune Highway	2.64	240	560	850	2,000
Upstream of Neptune Highway	1.81	180	410	680	1,500
WHALE POND BROOK AND TRIBUTARIES					
*	4.50	480	875	1,450	4,200
*	0.70	75	260	350	610
*	0.10	10	34	48	140

*Data not available

TABLE 5 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
WILLOW BROOK					
Downstream of confluence of Ramanessin Brook	14.07	1,700	2,800	3,400	5,200
Upstream of confluence of Ramanessin Brook	7.58	1,065	1,790	2,735	3,275
Downstream of CR 520	5.00	1,100	1,850	2,250	3,100
Upstream of CR 520	2.25	700	1,200	1,500	2,400
Upstream of confluence of East Branch Willow Brook	1.75	400	700	900	1,450
At limit of detailed study	1.30	320	550	700	1,100
WILLOW BROOK, EAST BRANCH					
At confluence with Willow Brook	0.50	130	210	250	400
WRECK POND BROOK					
Upstream of Old Mill Road	7.20	1,600	2,450	2,940	4,200
YELLOW BROOK					
Downstream of Mine Brook	15.45	1,580	2,580	3,180	5,000
Upstream of Mine Brook	9.82	1,020	1,680	2,090	3,350
Downstream of Tributary to Yellow Brook	8.80	920	1,520	1,880	3,000
Upstream of Tributary to Yellow Brook	7.72	820	1,380	1,710	2,800
Junction North and South Branch	6.03	790	1,330	1,650	2,640
Upstream of South Branch	2.02	370	630	790	1,300
At limit of detailed study	1.76	350	590	750	1,220
Upstream of confluence of Tributary to Yellow Brook	1.18	258	438	549	873
YELLOW BROOK 2					
Upstream of the Township of Freehold/Township of Colts Neck corporate limits	1.76	360	610	770	1,220
Upstream of the confluence of Tributary to Yellow Brook	1.18	258	438	549	873
YELLOW BROOK 2 TRIBUTARY					
Upstream of confluence with Yellow Brook 2	0.66	176	301	377	599

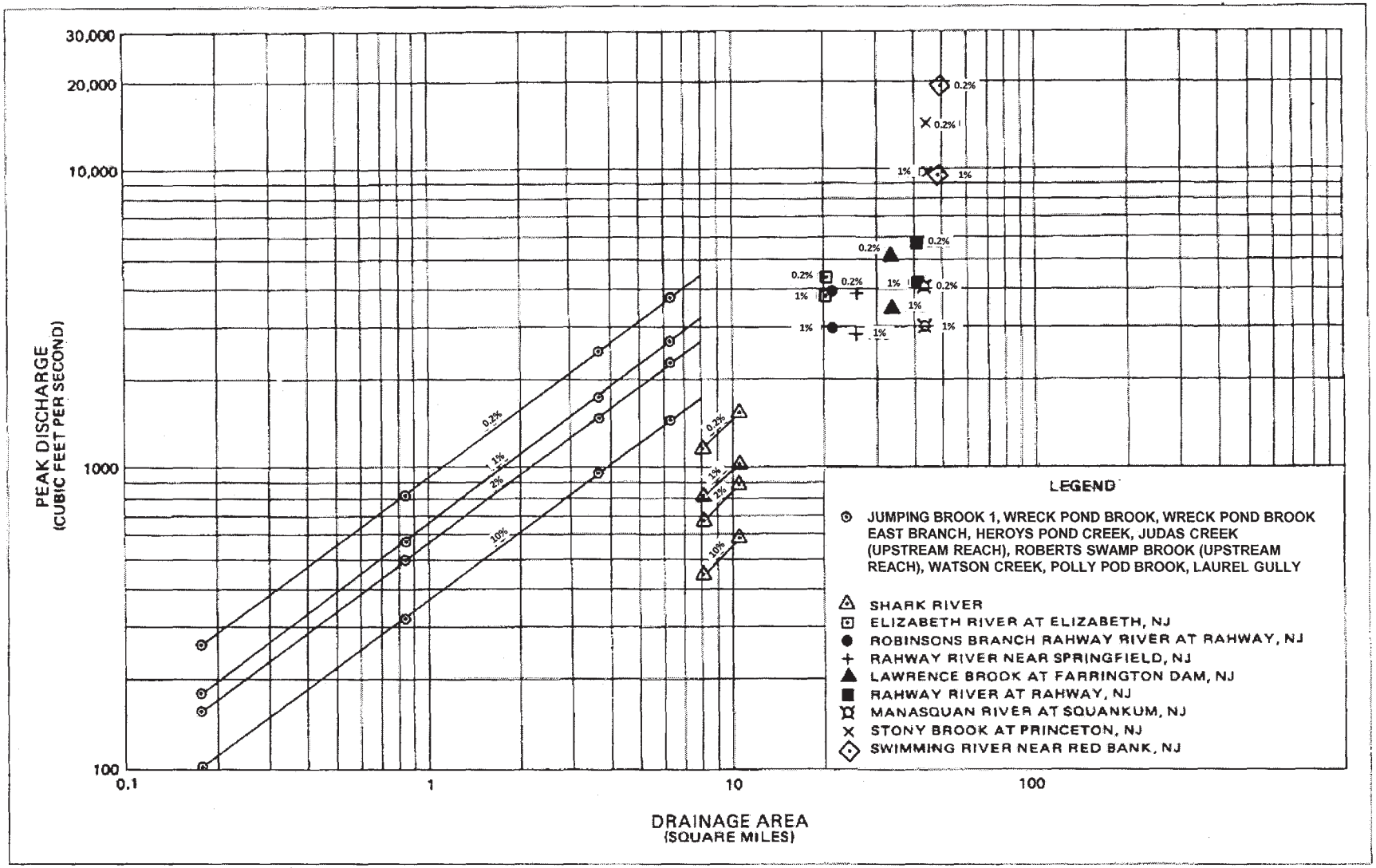


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

WALL TOWNSHIP STREAMS

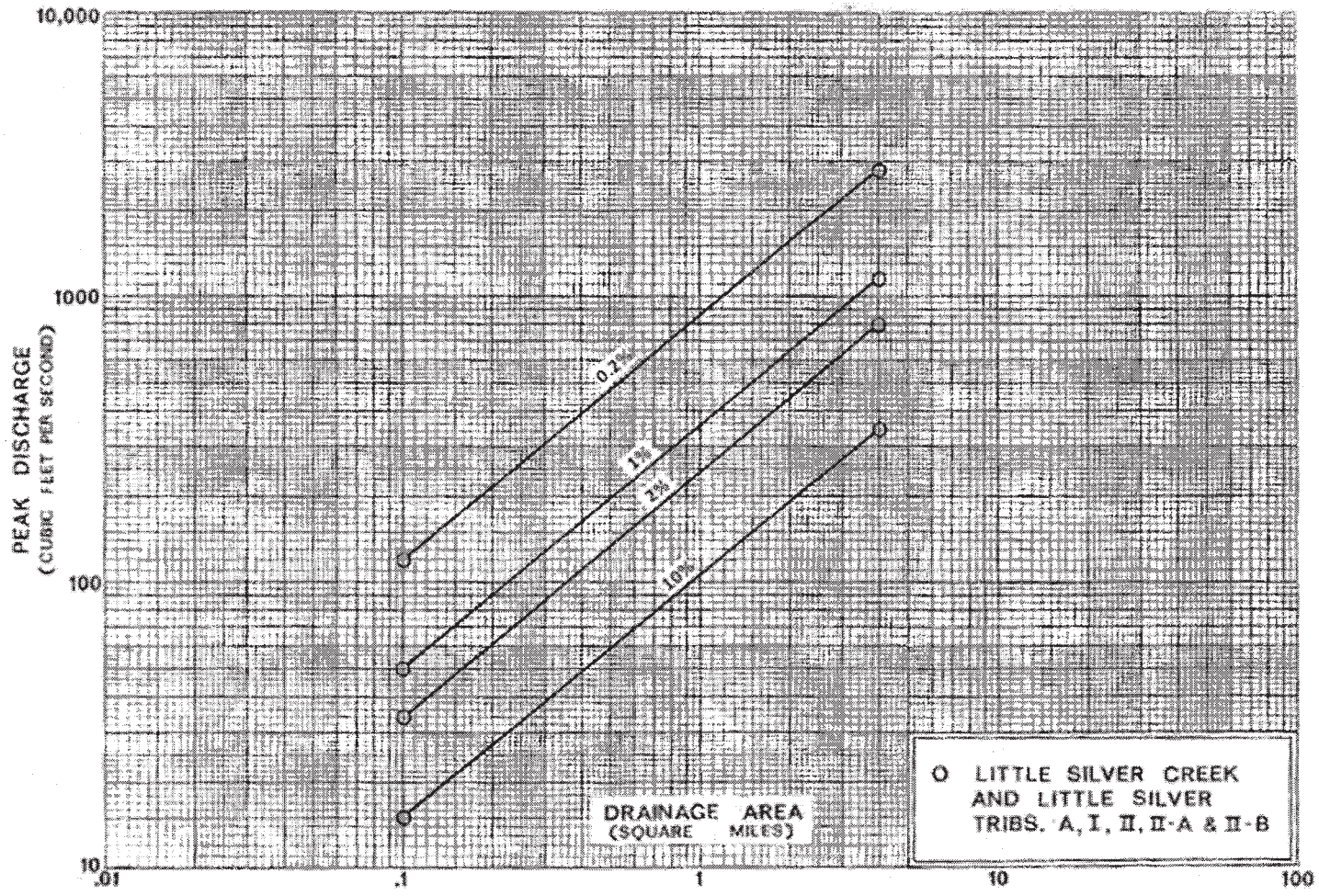


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

LITTLE SILVER CREEK AND TRIBUTARIES

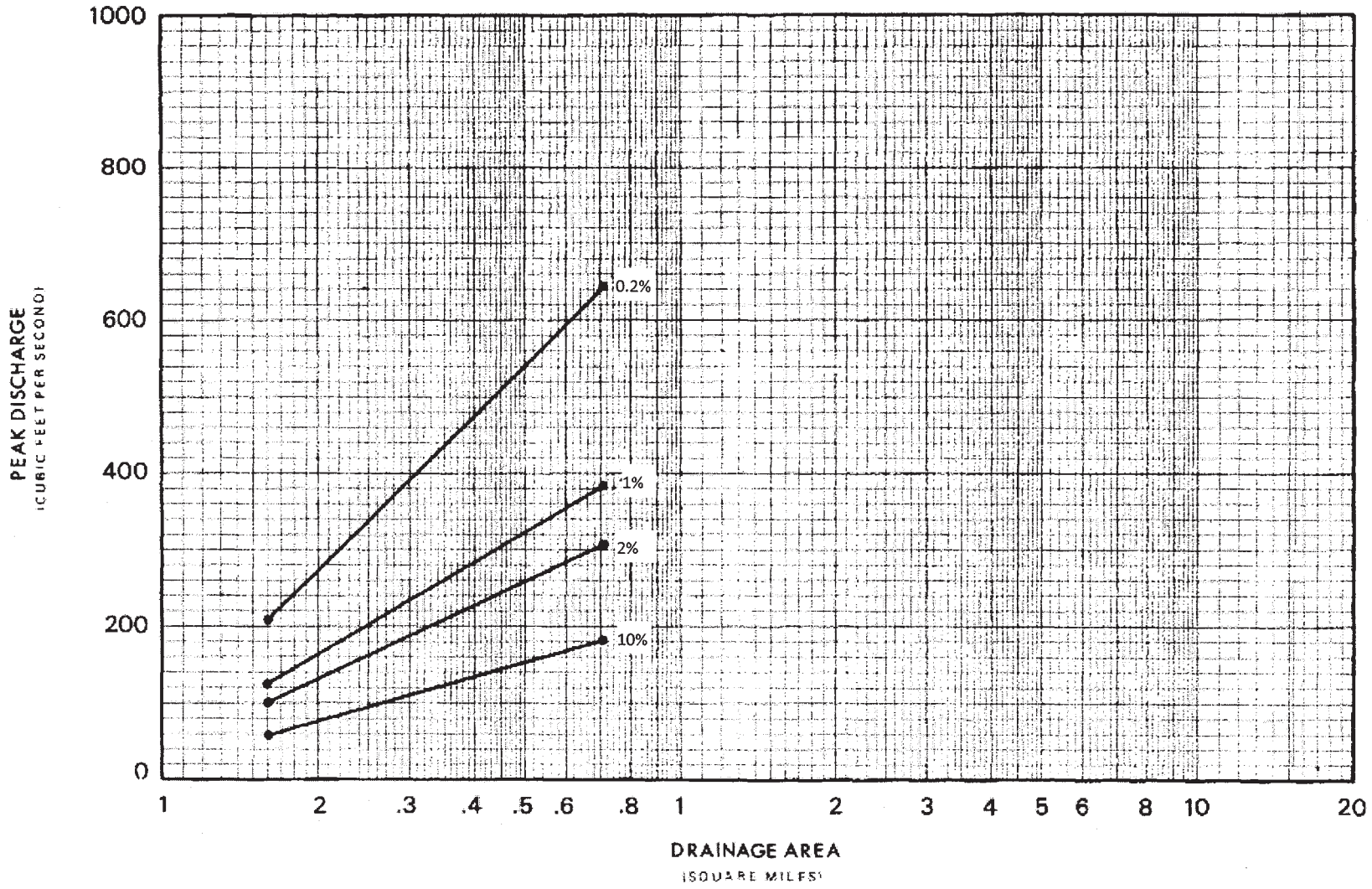


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

BARCLAY BROOK

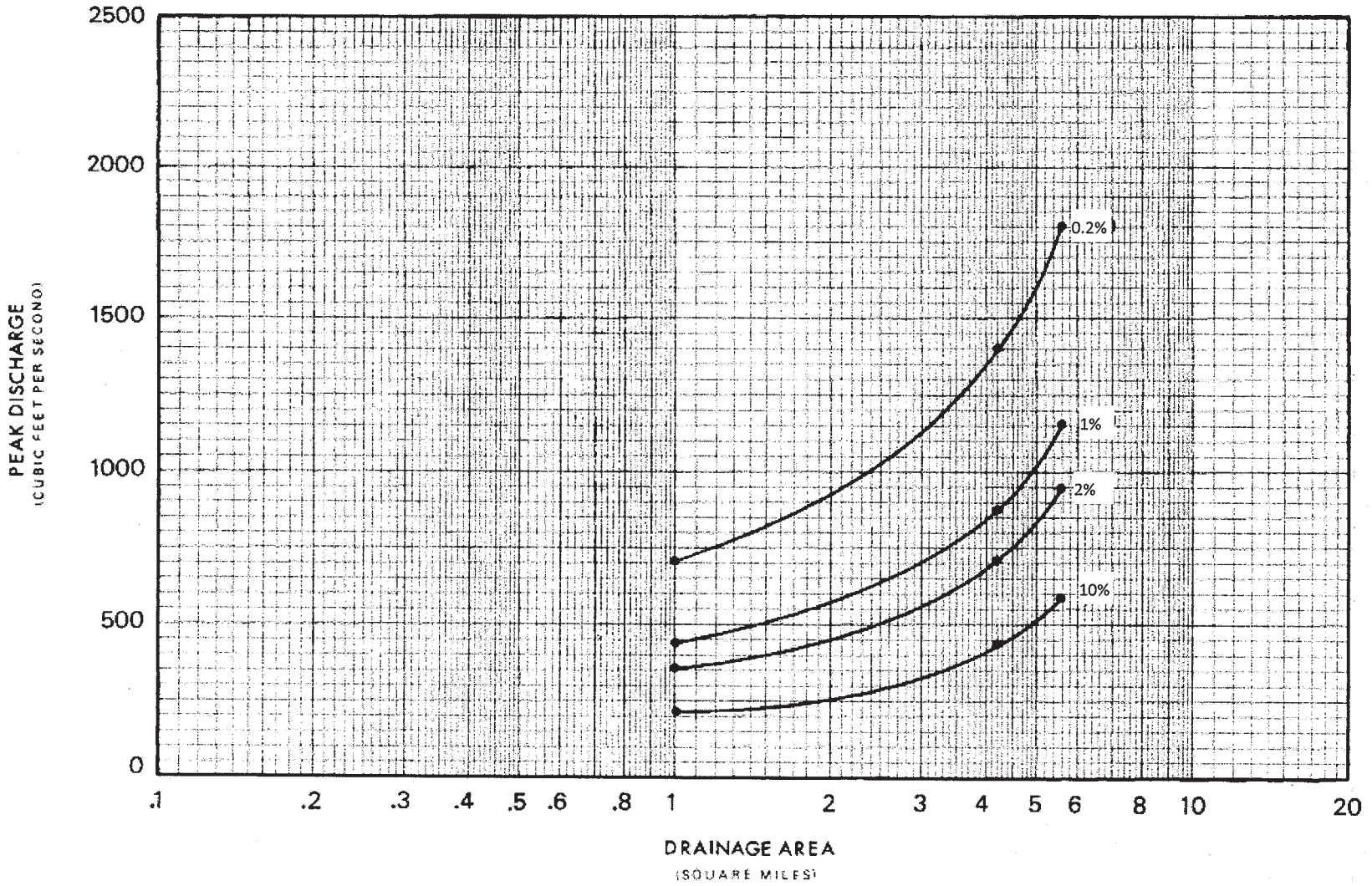


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

BIG BROOK UPSTREAM REACH AND BIG BROOK TRIBUTARY H

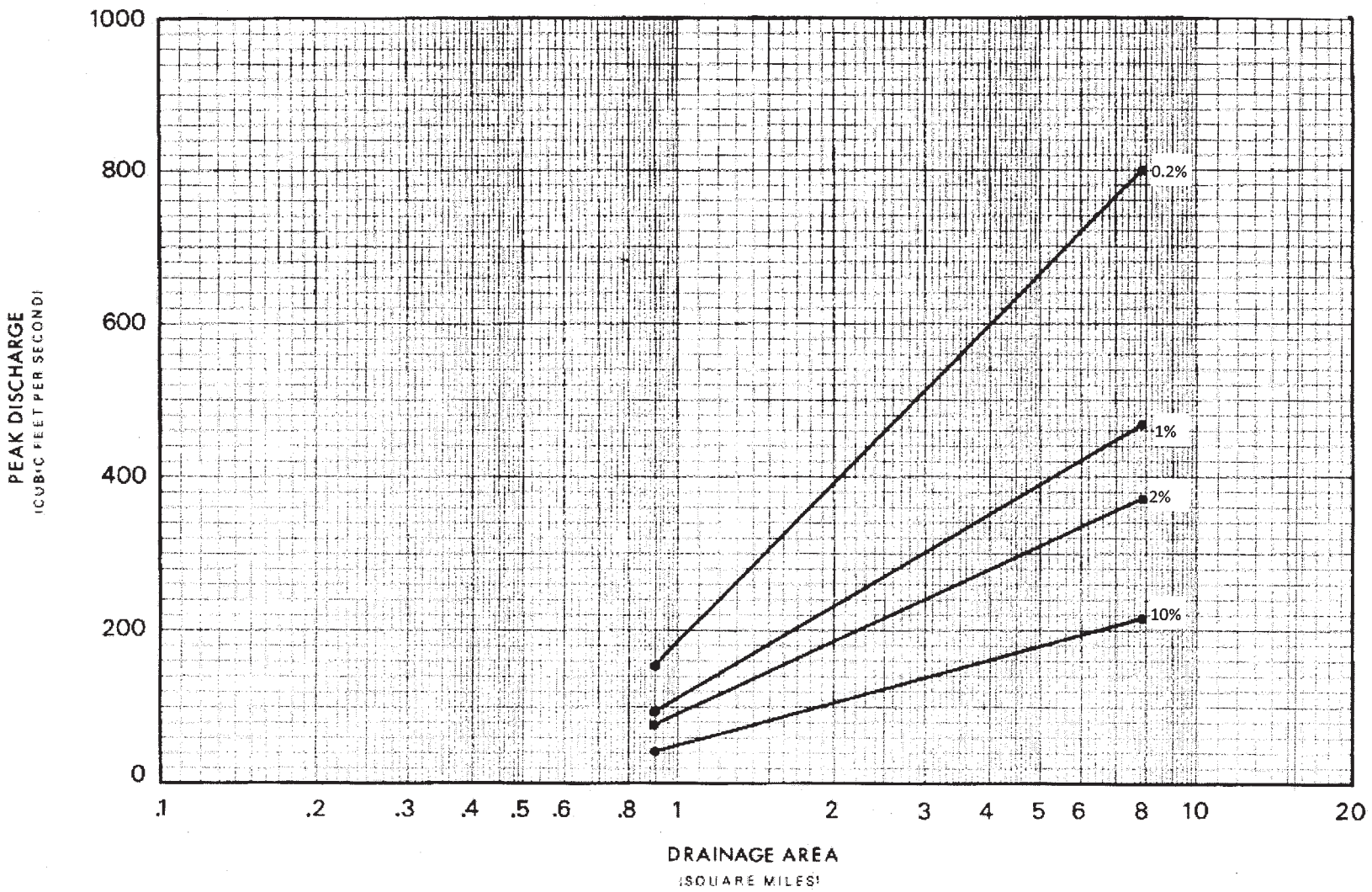


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

GRAVELLY BROOK

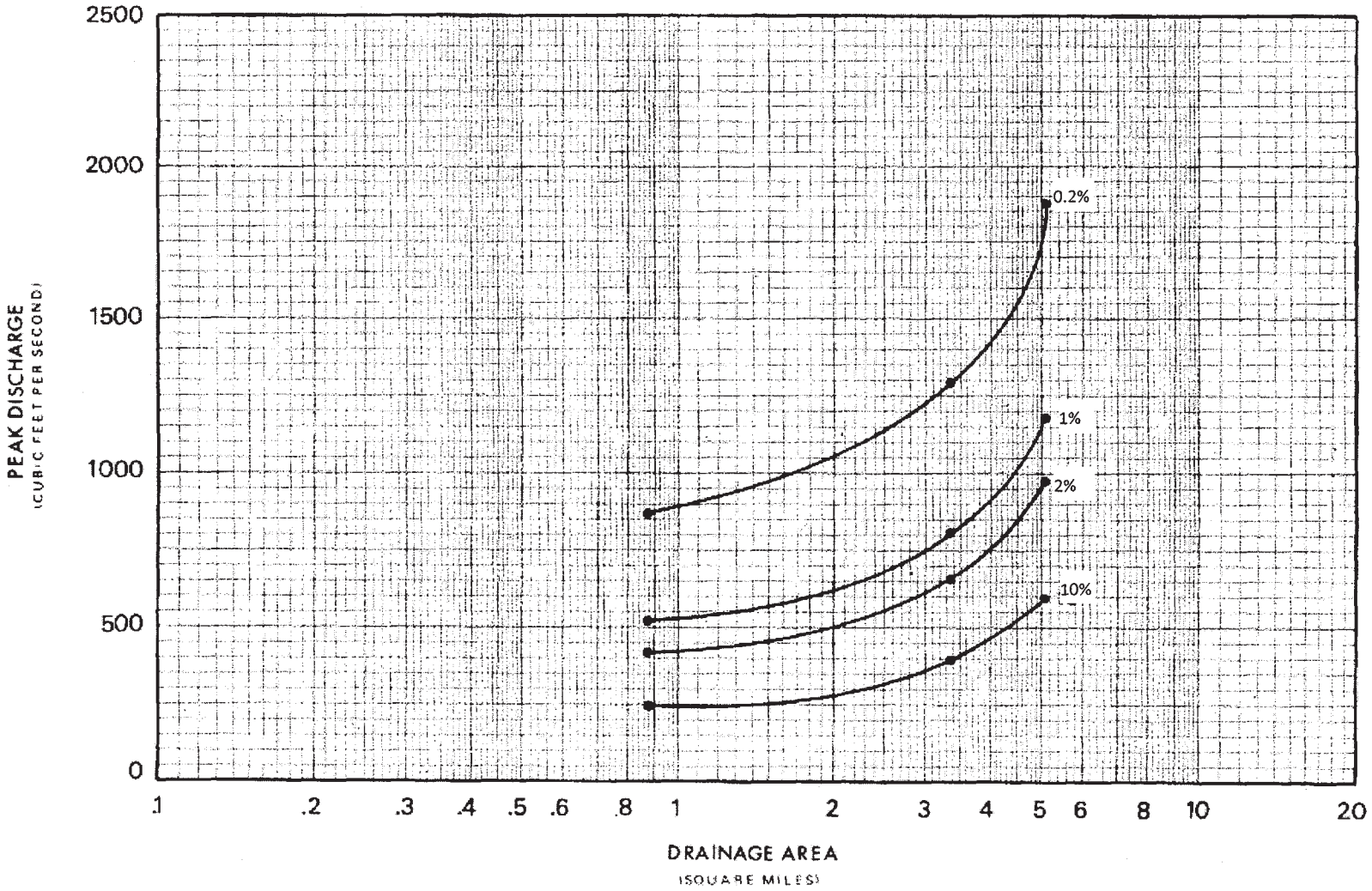


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

PINE BROOK 2

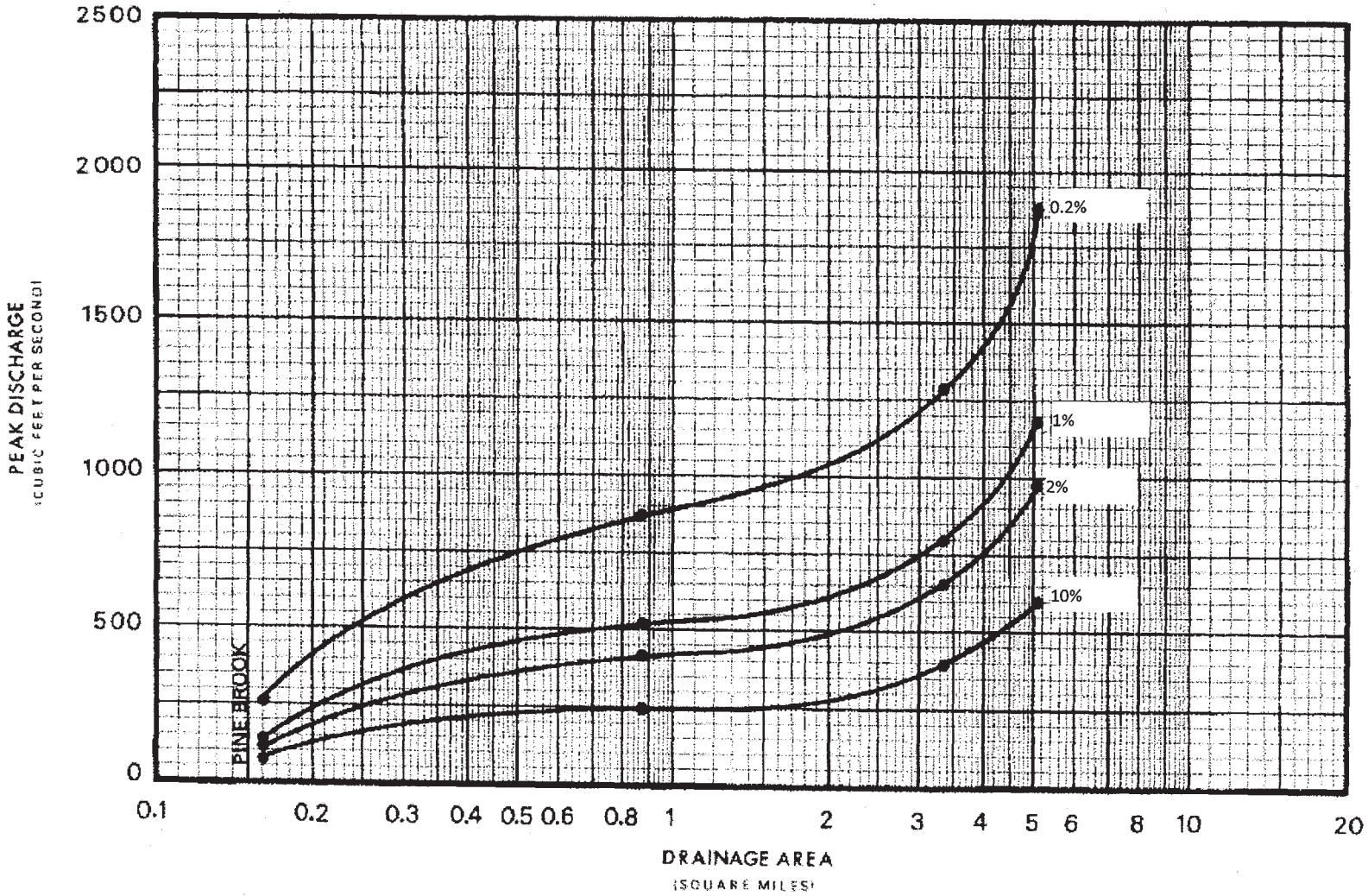


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

PINE BROOK TRIBUTARY C

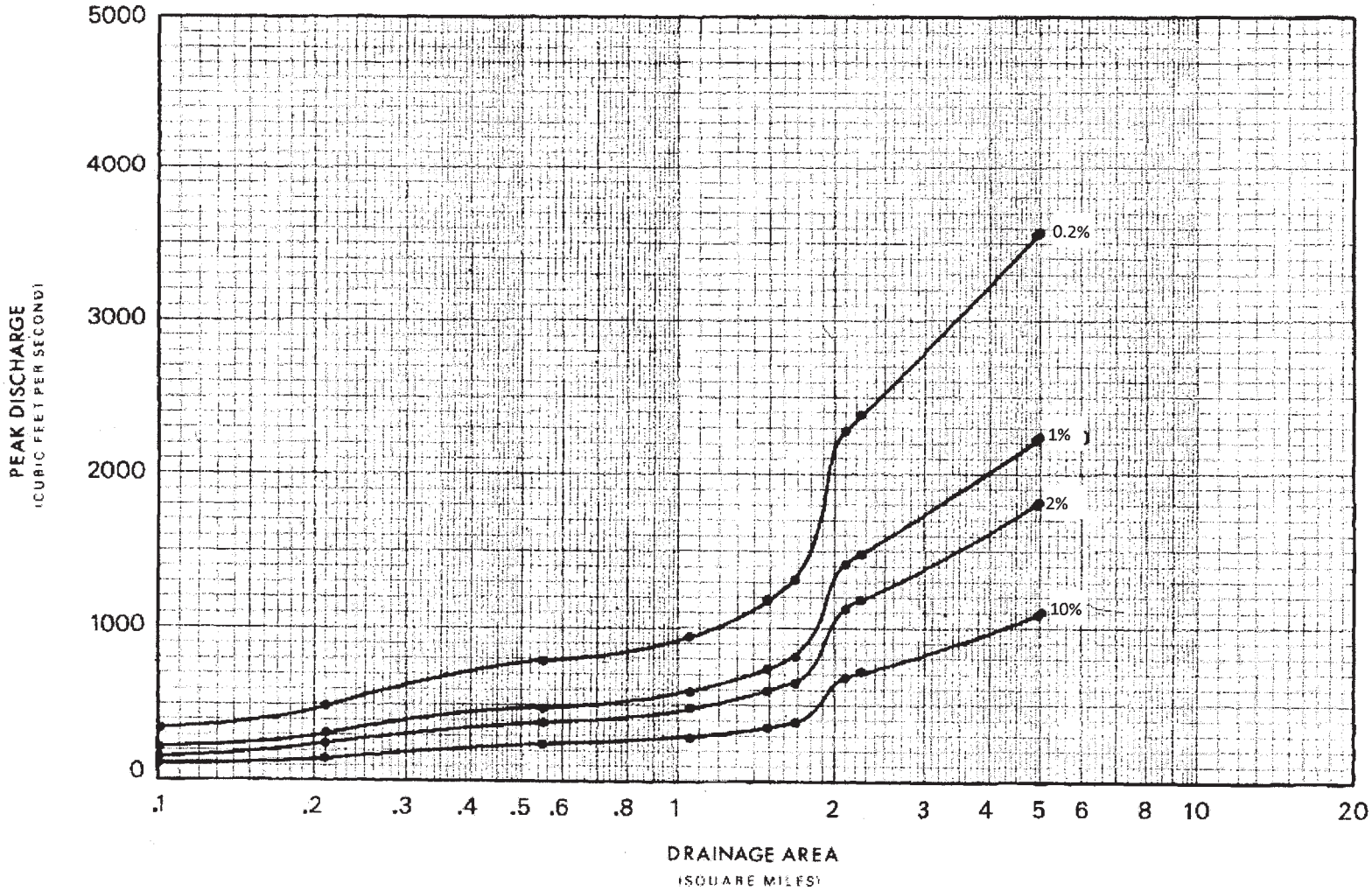


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

WILLOW BROOK

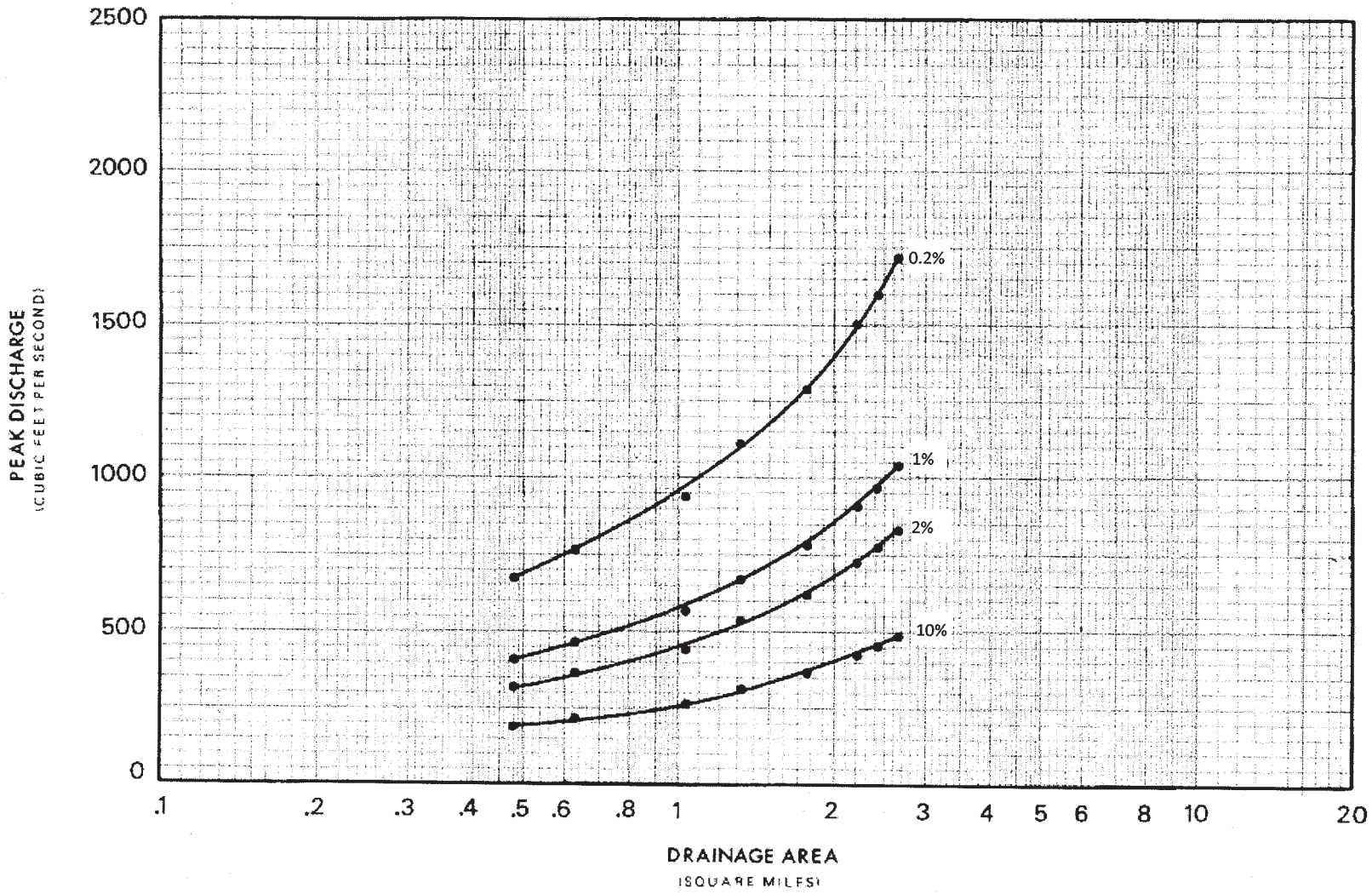


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

WILLOW BROOK TRIBUTARY F

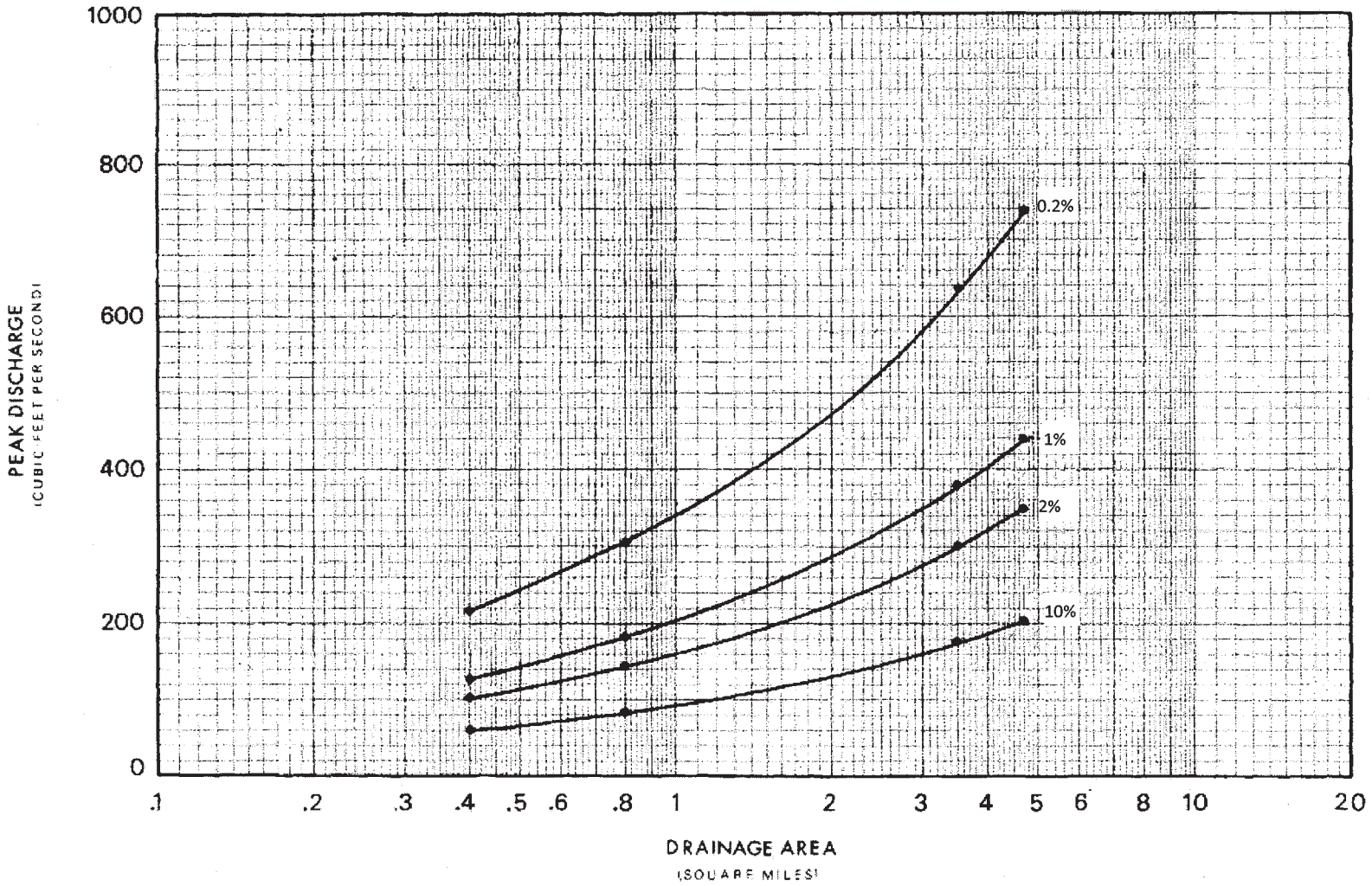


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

WILLOW BROOK TRIBUTARY G

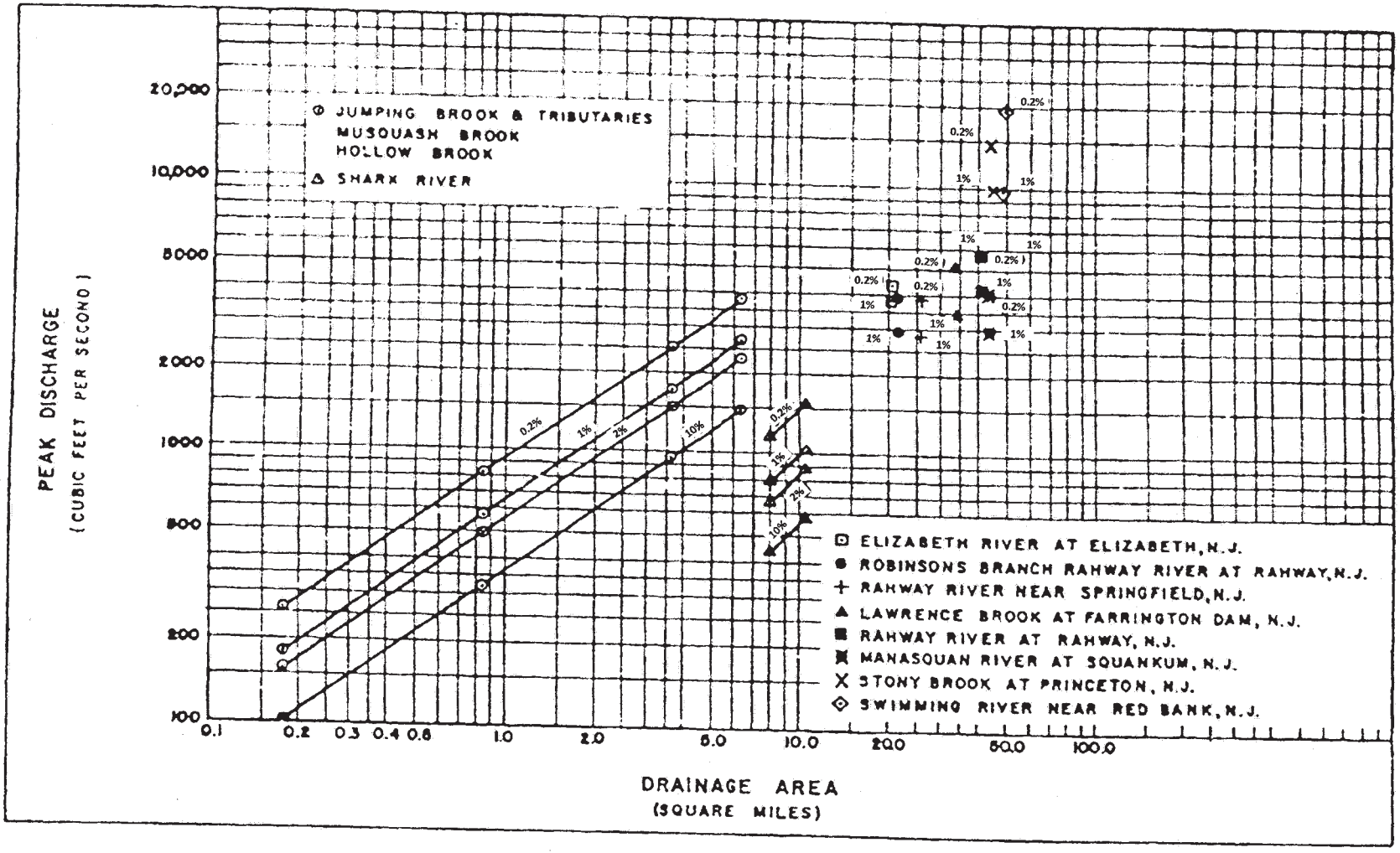


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

JUMPING BROOK 2, SHARK RIVER, HOLLOW BROOK, MUSQUASH BROOK

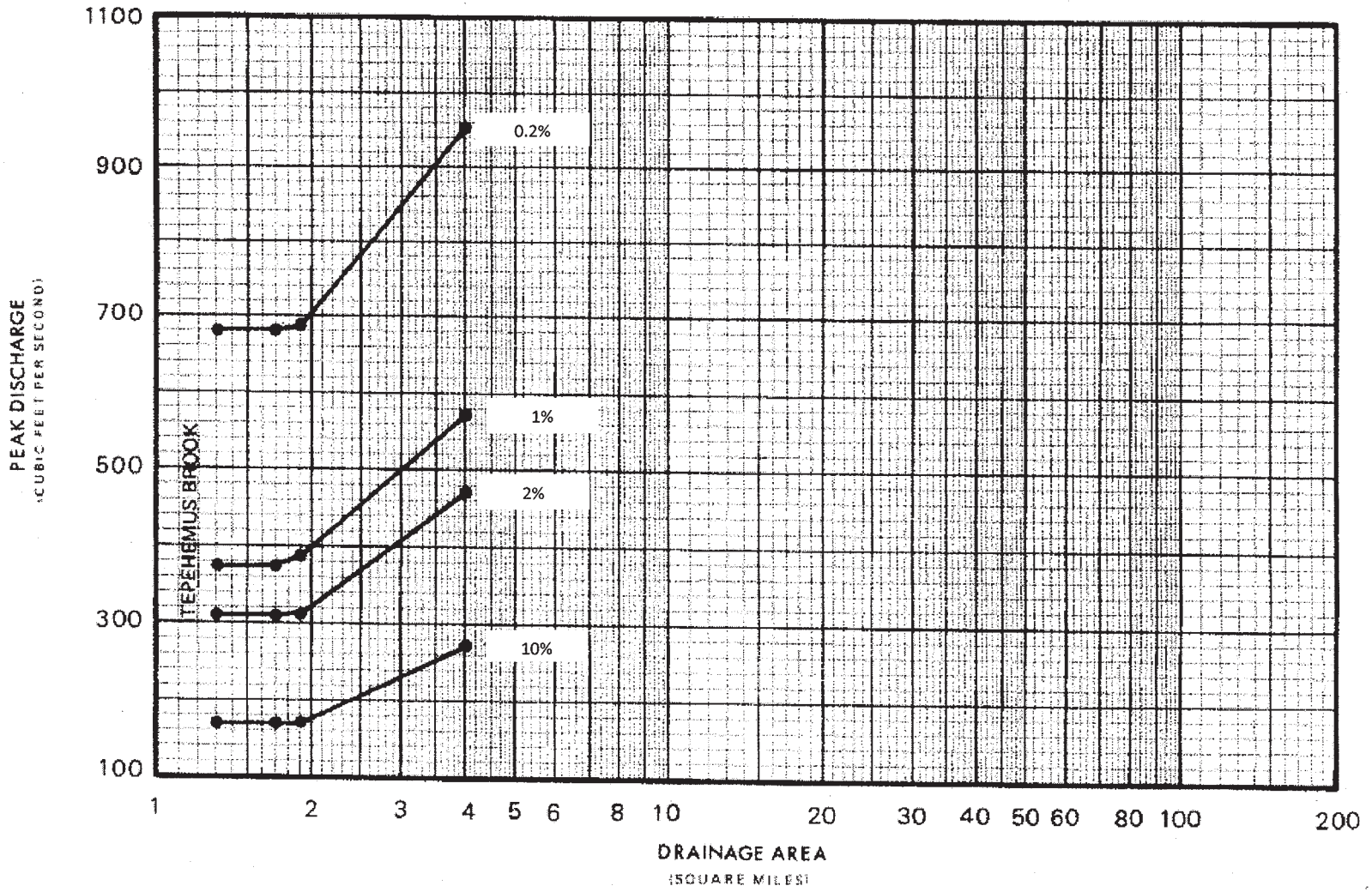


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

TEPHEMUS BROOK

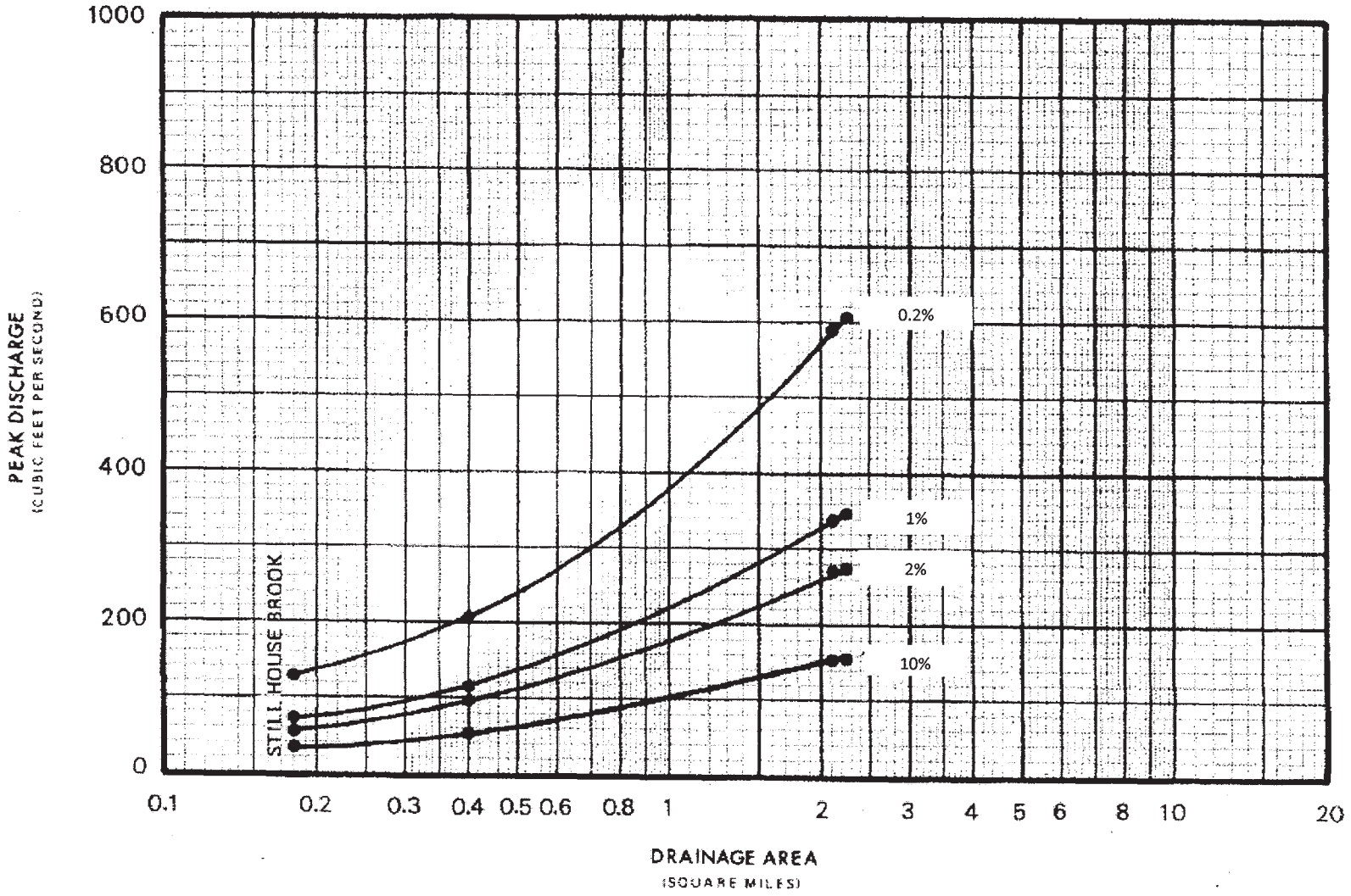


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

STILL HOUSE BROOK

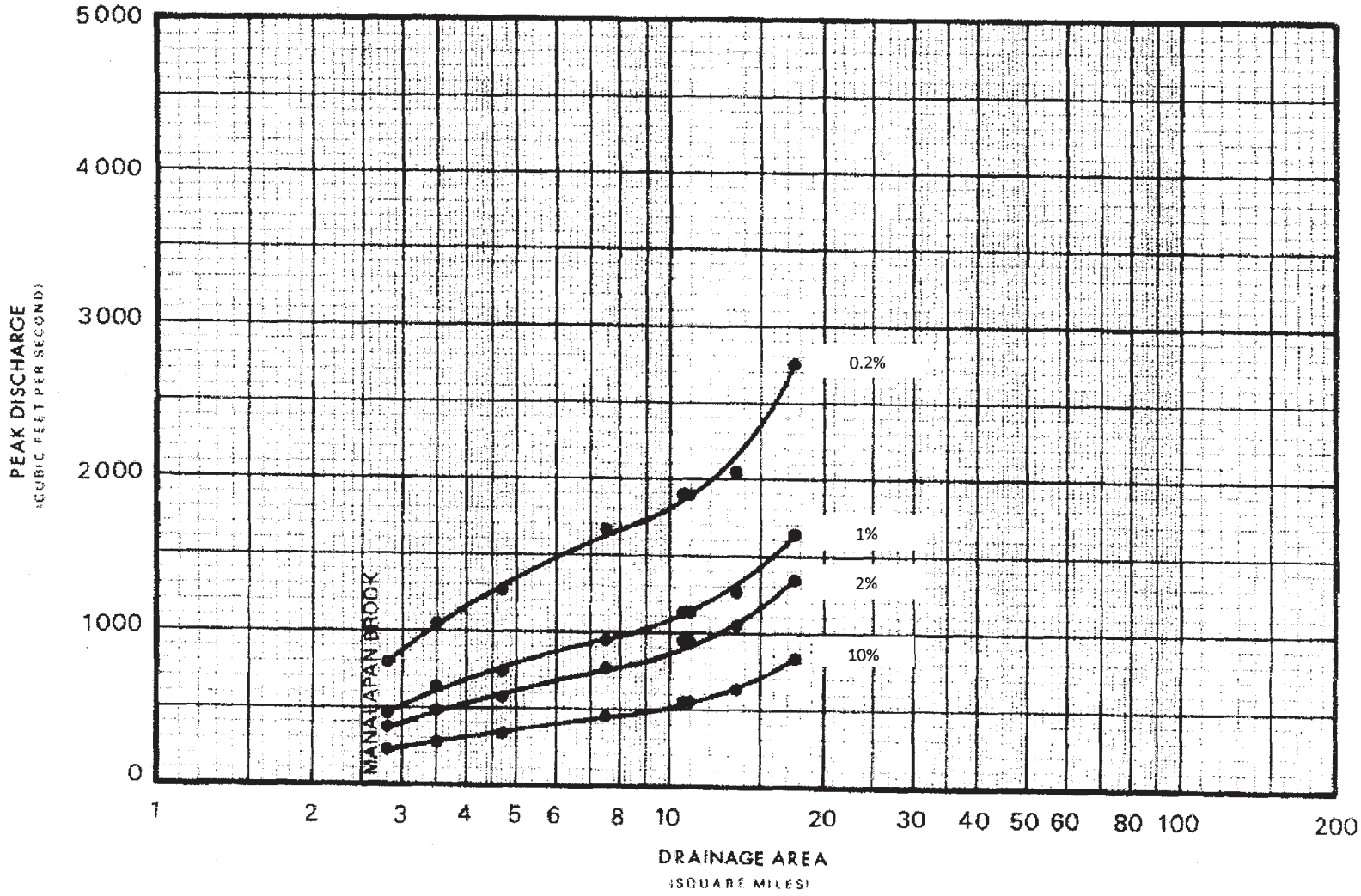


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MANALAPAN BROOK

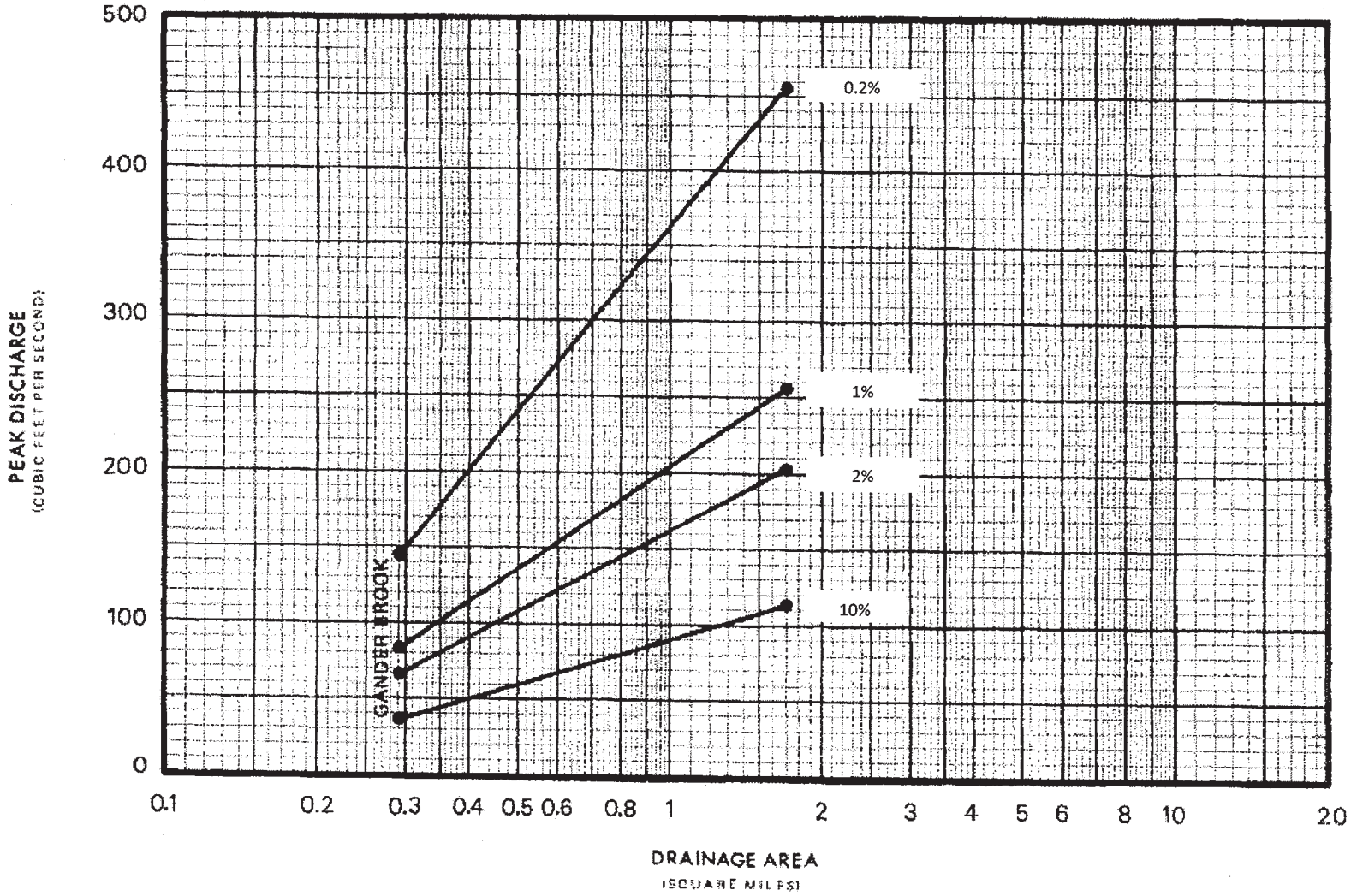


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

GANDER BROOK

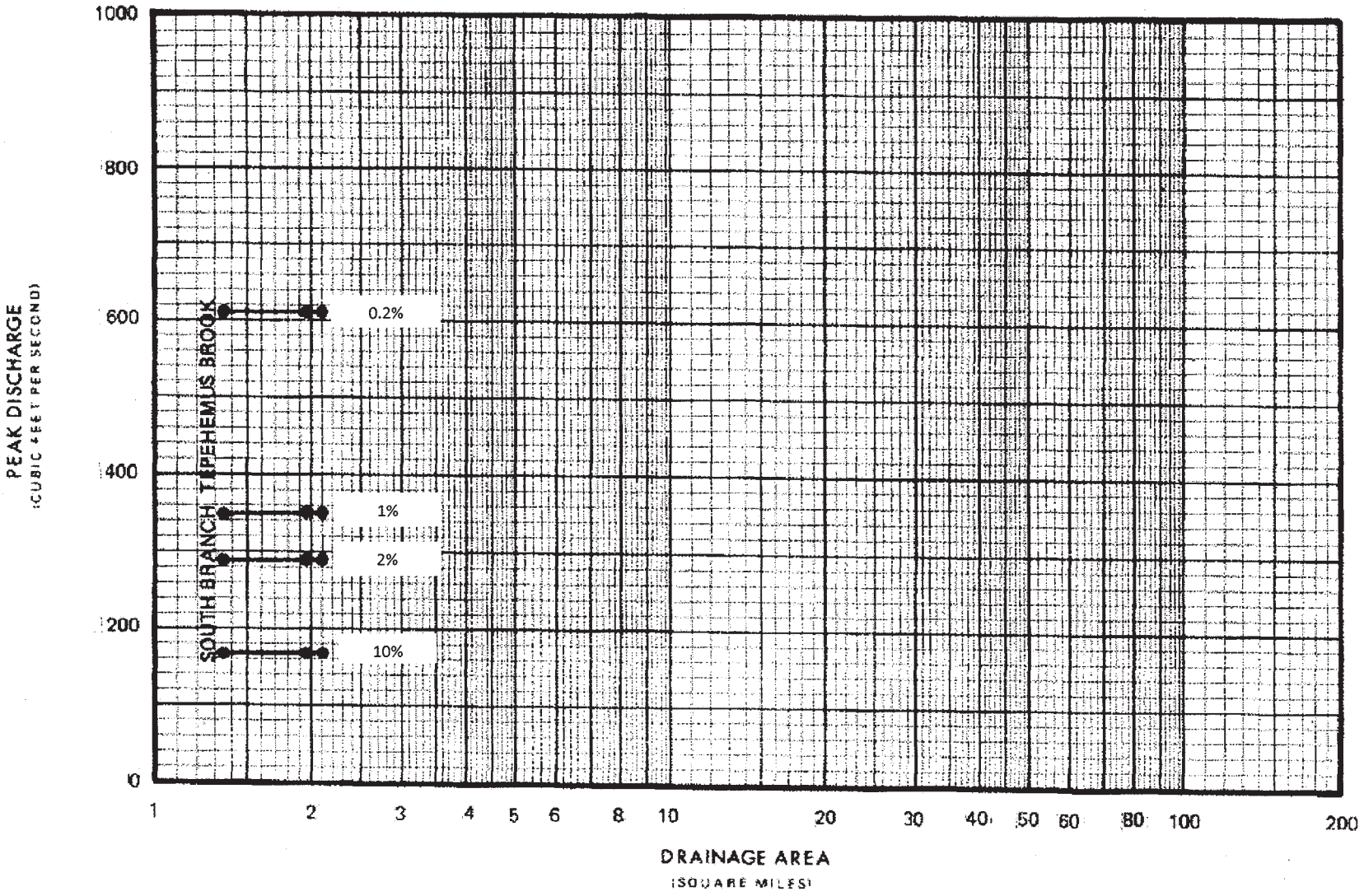


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

SOUTH BRANCH TEPHEMUS BROOK

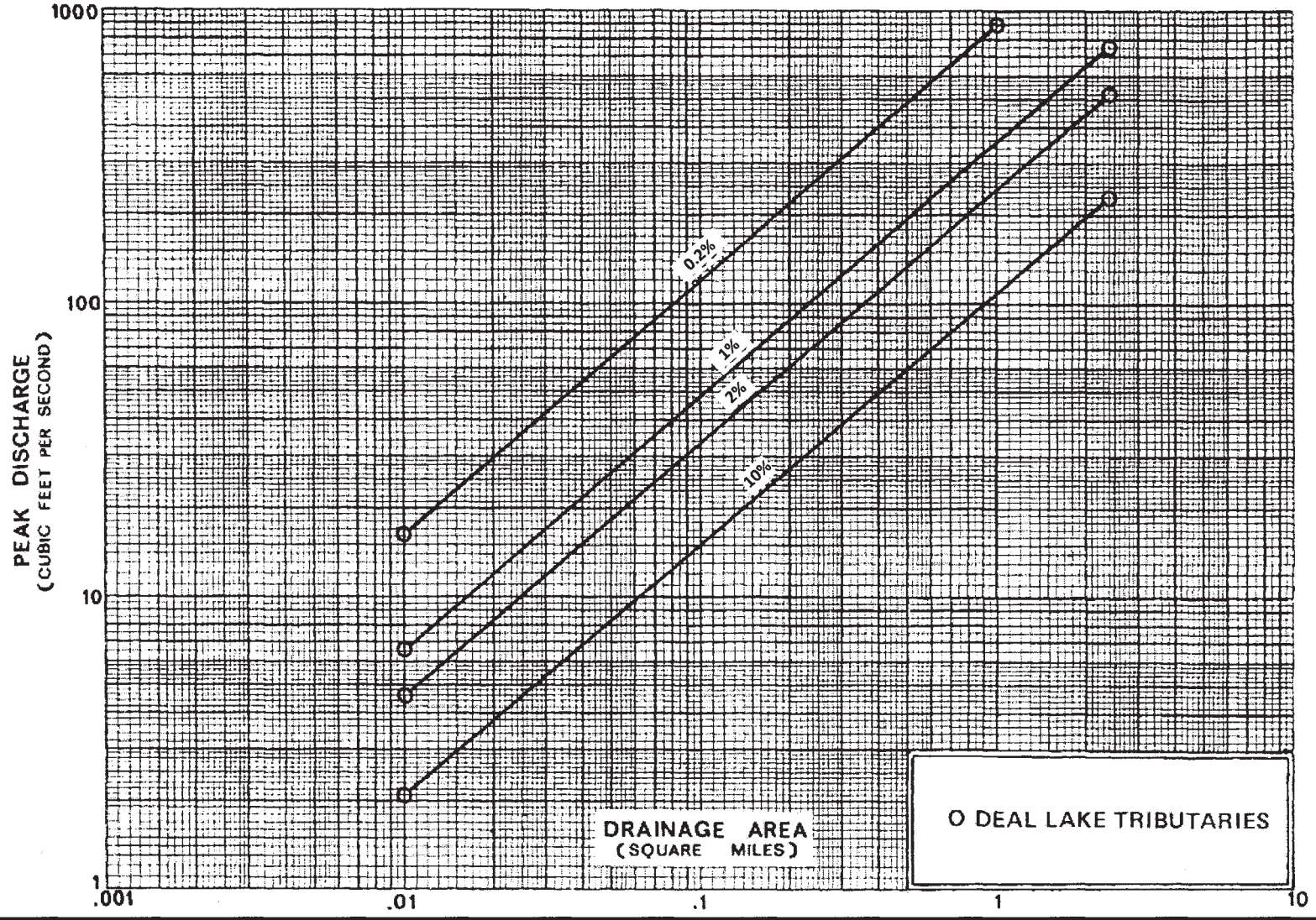


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

DEAL LAKE TRIBUTARIES

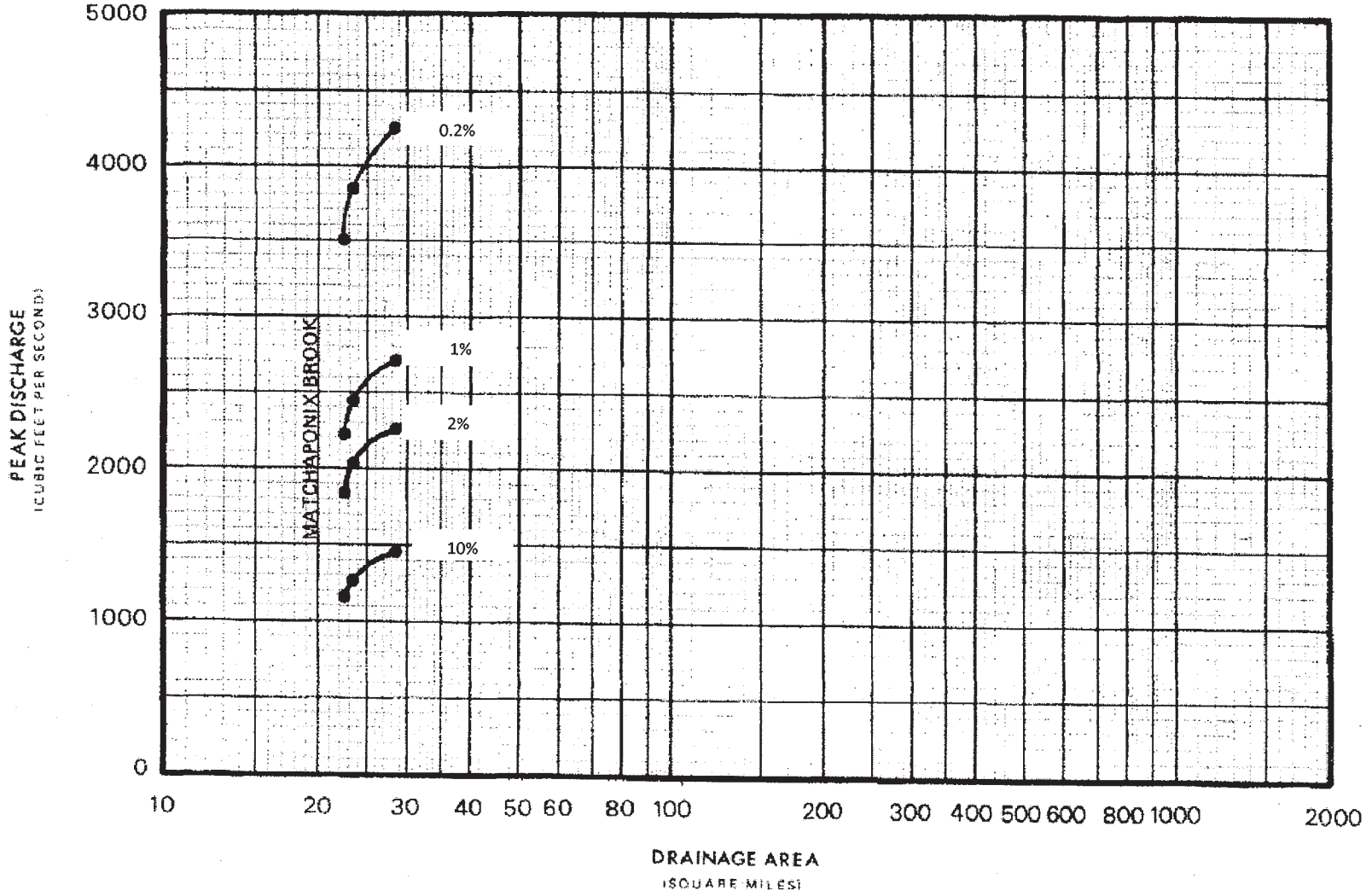


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MATCHAPONIX BROOK

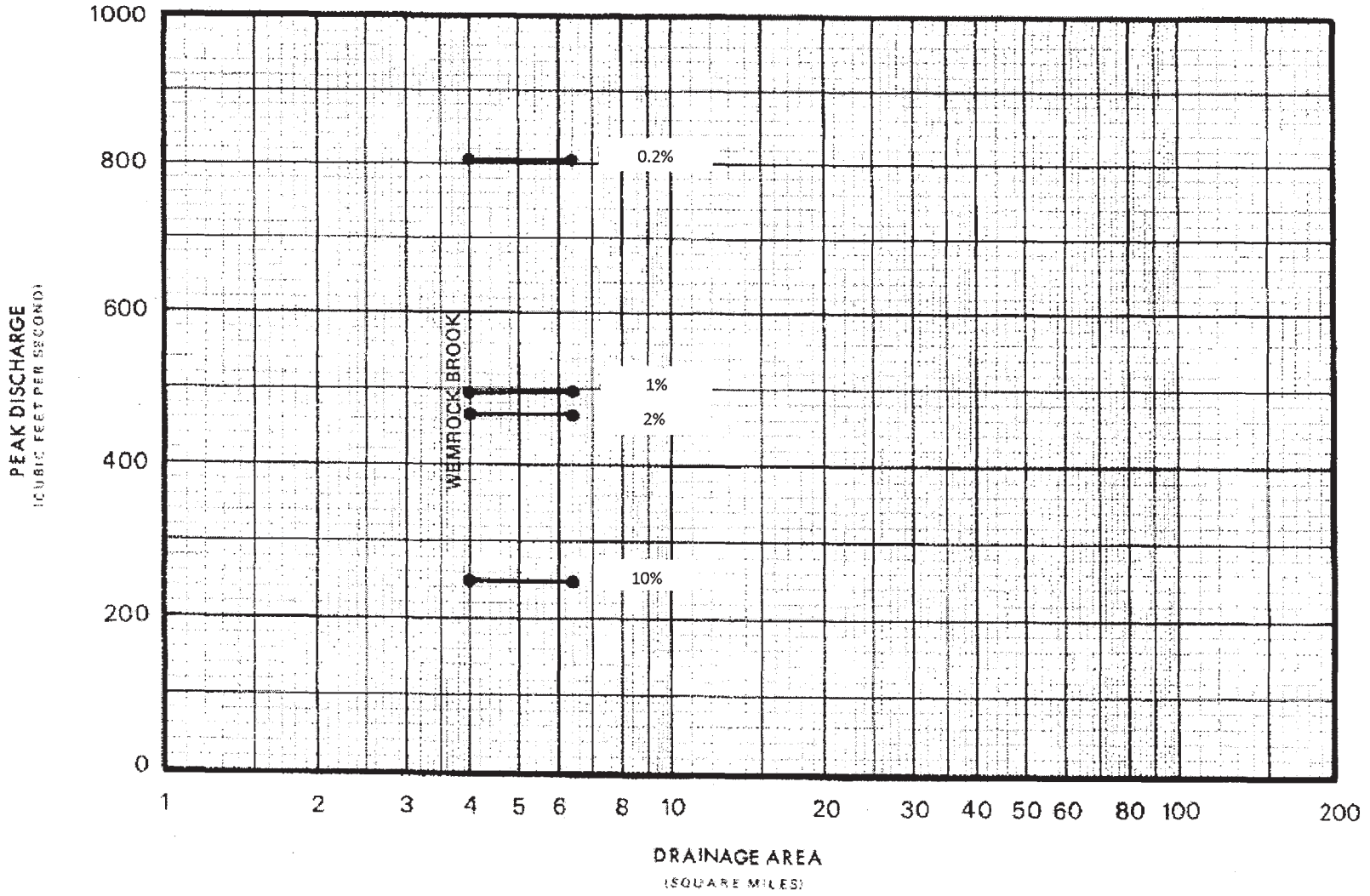


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

WEMROCK BROOK

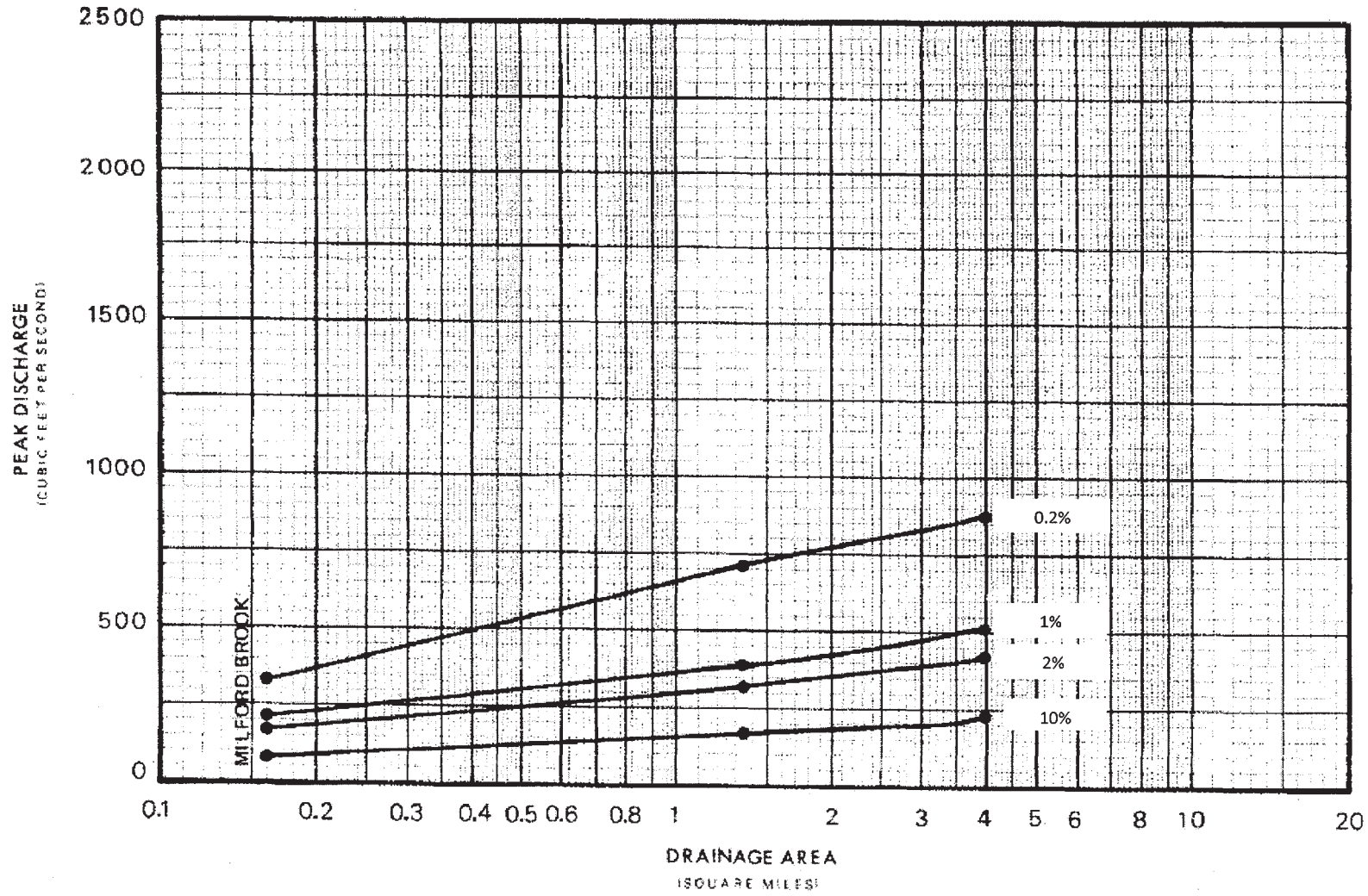


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MILFORD BROOK

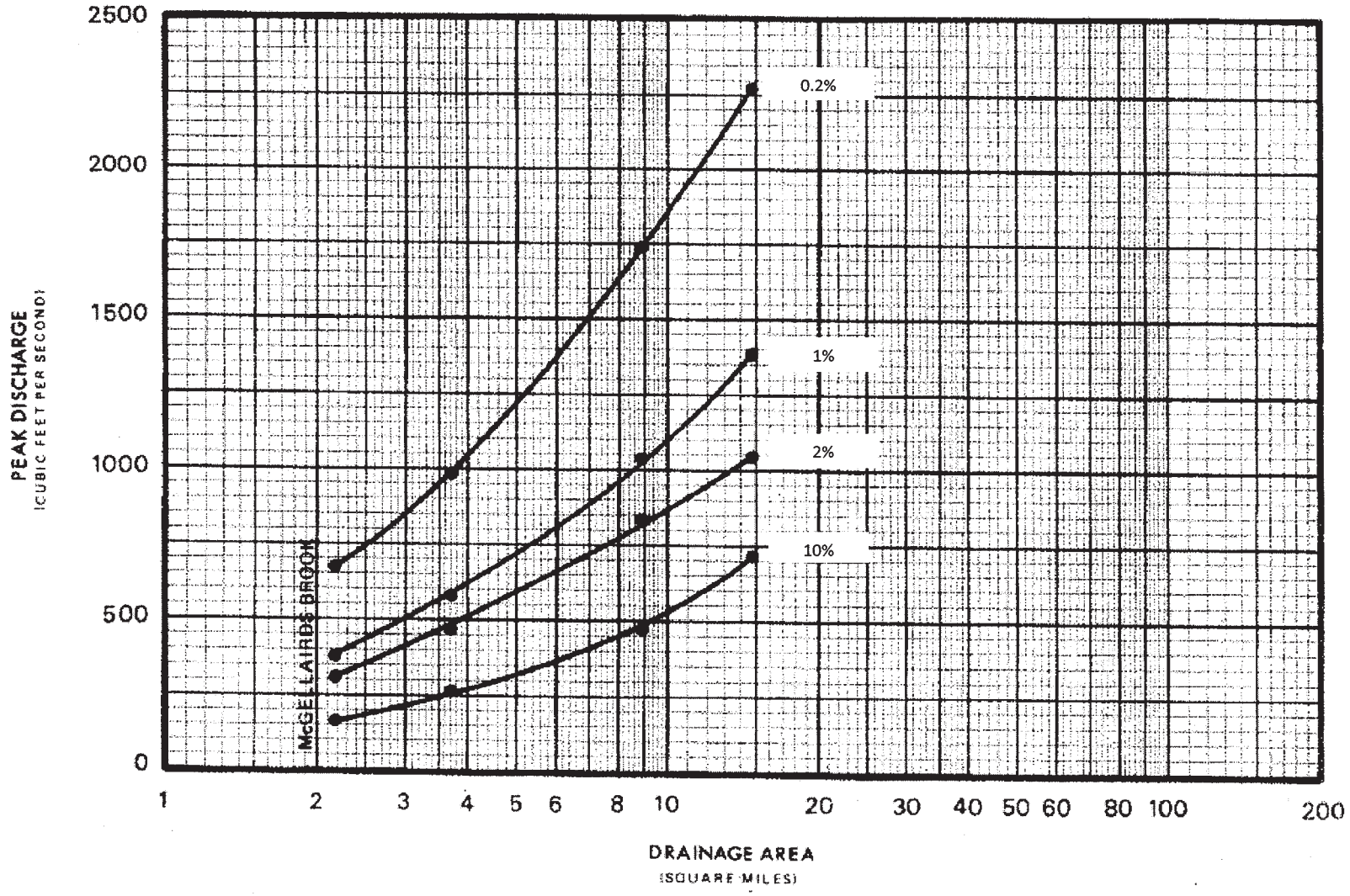


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MCGELLAIRDS BROOK

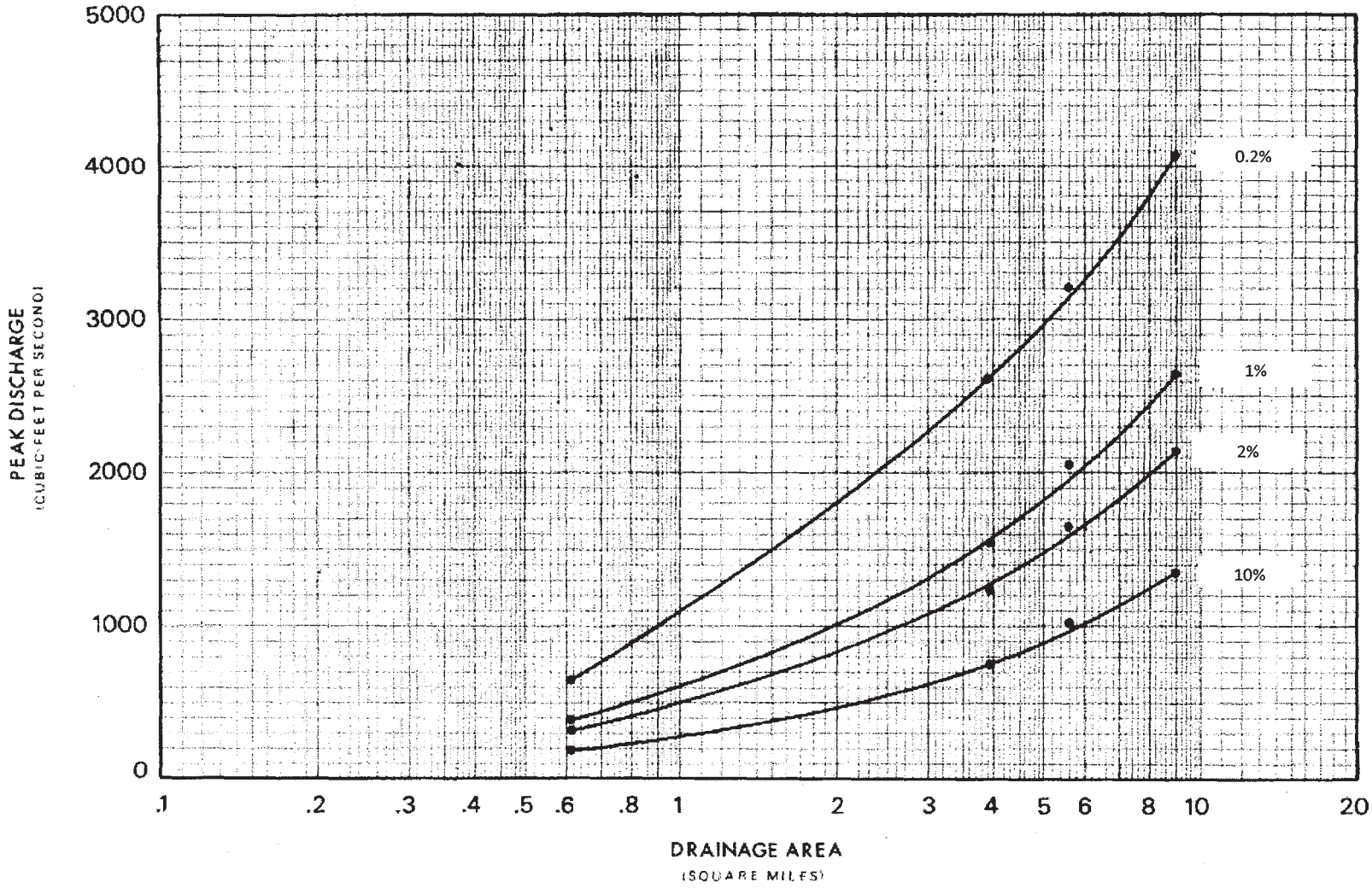


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

DEEP RUN

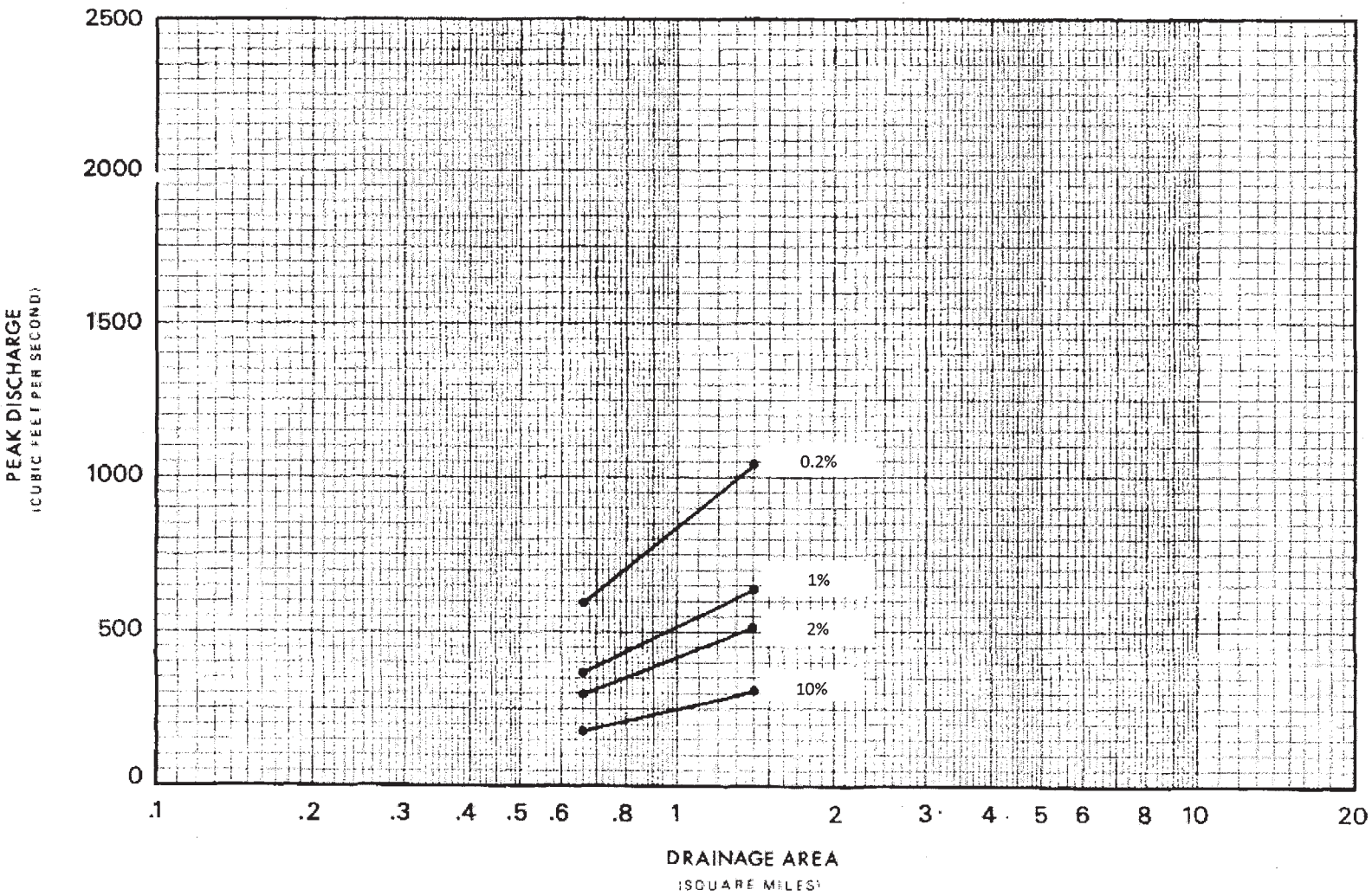


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

DEEP RUN TRIBUTARY A

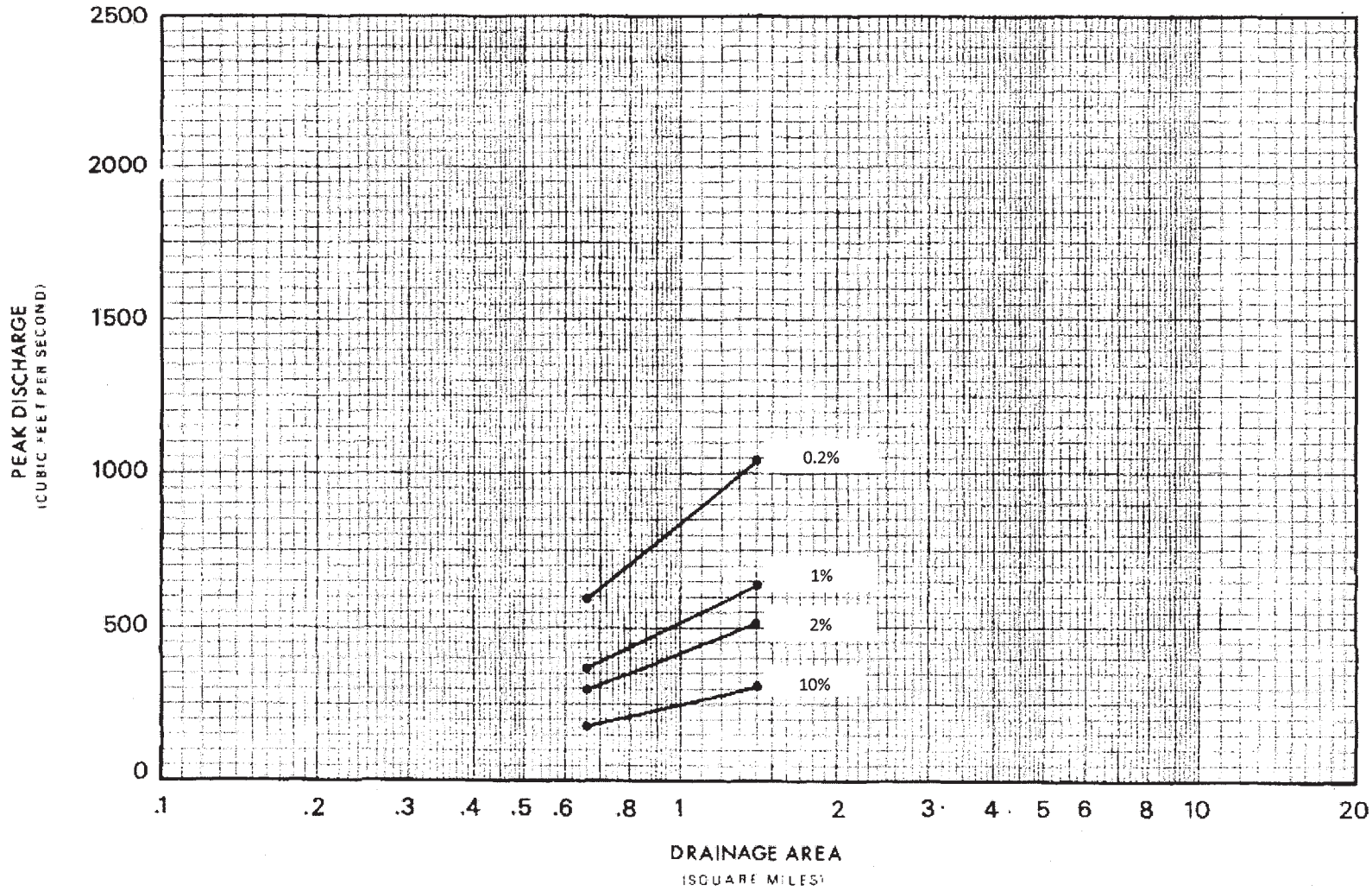


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

DEEP RUN TRIBUTARY B

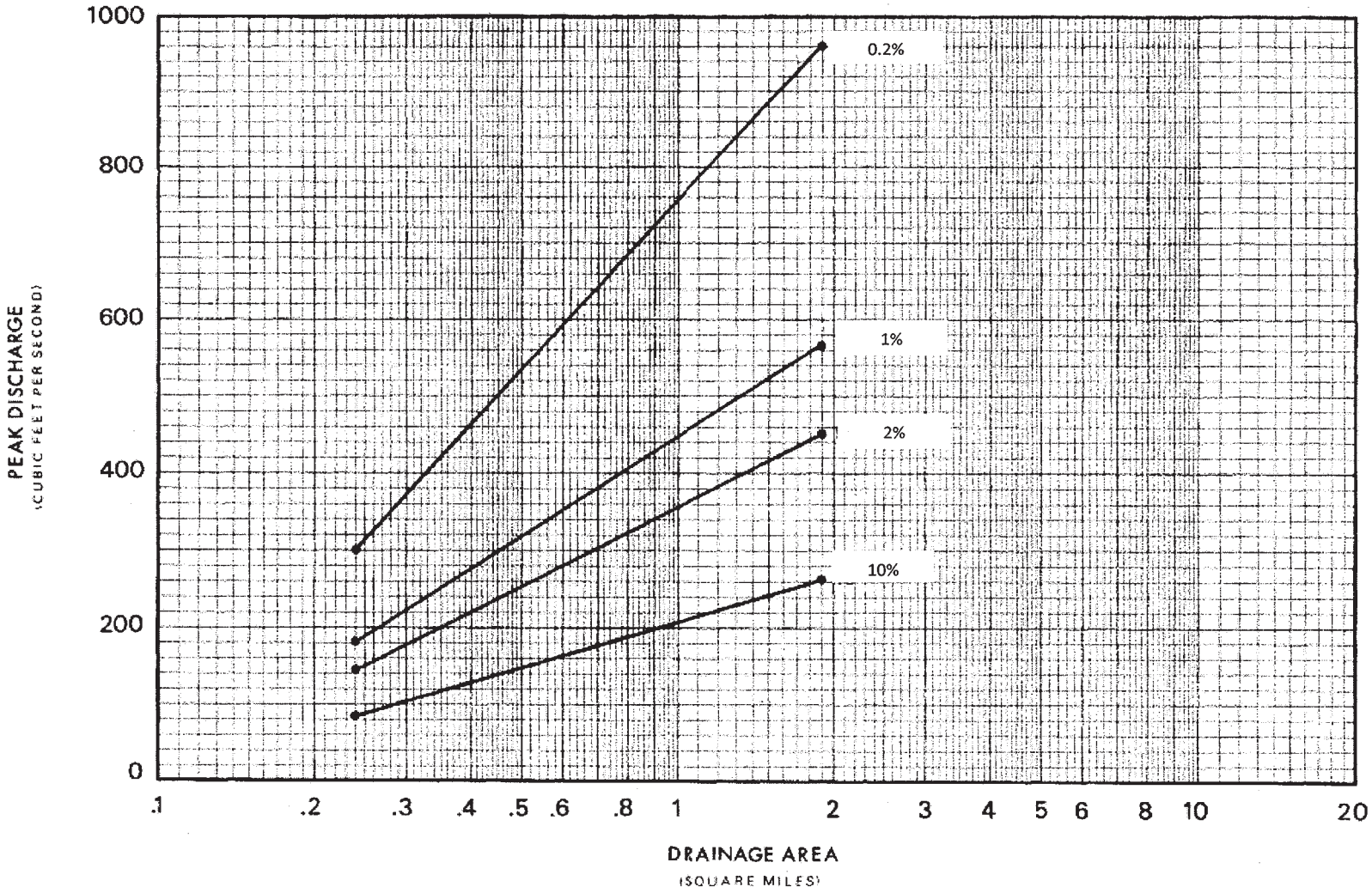


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

DEEP RUN TRIBUTARY C

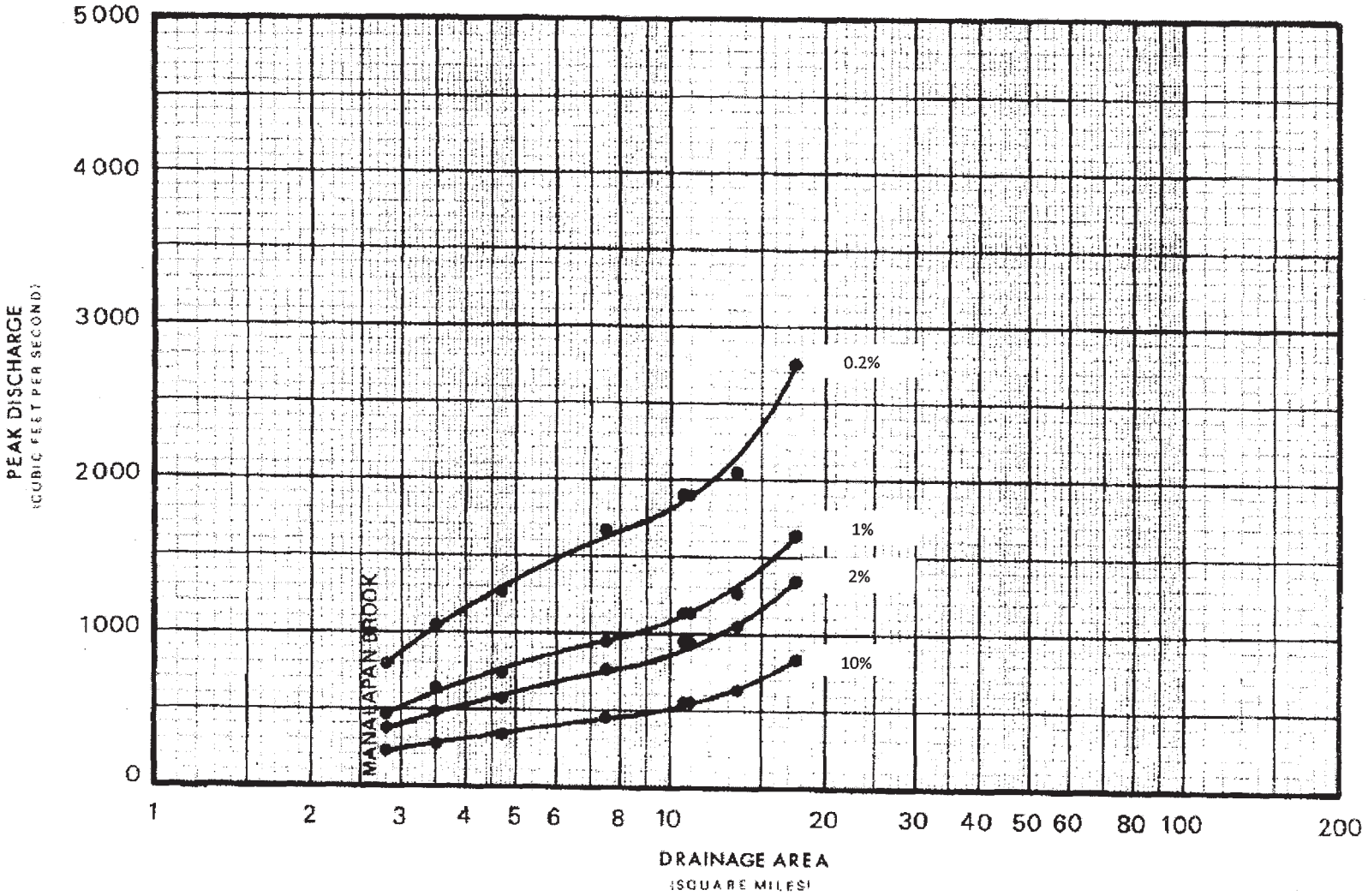


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MANALAPAN BROOK, MANALAPAN BROOK TRIBUTARYA AND TRIBUTARY B

The stillwater elevations have been determined for the 10-, 2-, 1-, and 0.2-percent annual chance floods for the flooding sources studied by detailed methods and are summarized in Table 6, "Summary of Stillwater Elevations."

TABLE 6 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
PARKERS CREEK				
Shoreline within Borough of Shrewsbury	5.1	6.9	7.9	12.4
PERRINEVILLE LAKE				
Entire shoreline	163.9	165.1	165.7	167.3

3.2 Riverine Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data Tables in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Precountywide Analyses

Each incorporated community within, and the unincorporated areas of, Monmouth County, with the exceptions of the Borough of Freehold, Borough of Lake Como and Borough of Neptune City, has a previously printed FIS report. The hydraulic analyses described in those reports have been compiled and are summarized below.

For streams studied by detailed methods, water-surface elevations of floods of the selected recurrence intervals were predominantly computed through use of the USACE HEC-2 step-backwater program (USACE, 1976; 1974). Cross sections for the backwater analyses of the streams studied in detail were field-surveyed and located at close intervals above and below bridges and culverts, in order to compute the significant backwater effects of these structures in highly urbanized areas.

Water surface elevations of floods of the selected recurrence intervals were calculated by a flood/rainfall routing analysis for Deal Lake. Indian Run, in the Borough of Allentown, was studied using the SCS WSP-2 program (U.S. Department of Agriculture, 1976).

In the Township of Aberdeen, starting water surface elevations for Matawan Creek and Whale Creek were derived from the mean high tide. Starting water surface elevations were determined using the slope/area method for Mohingson Brook, and were derived from the FIS for the Borough of Matawan (FEMA, 1981) for Gravelly Brook.

In the Borough of Allentown, starting water surface elevations for Doctors Creek were taken from the FIS for the Township of Hamilton, Mercer County, New Jersey (FEMA, 1984). For Indian Run, starting water surface elevations were calculated using the slope/area method.

In the Borough of Brielle, starting water surface elevations for Roberts Swamp Brook (Downstream Reach) were obtained from the FIS for the Borough of Manasquan (U.S. Department of Housing and Urban Development, 1971).

In the Township of Colts Neck, starting water surface elevations were obtained from the FIS for the township of Middletown (FEMA, 1983) for Barren Neck Creek, Big Brook (Downstream Reach), Willow Brook and Yellow Brook. Starting elevations for Pine Brook 1 were obtained from the FIS for the Borough of Tinton Falls (FEMA, 1981). Starting elevations for Hockhockson Brook were derived from the Pine Brook 1 profiles, while starting water surface elevations for Marl Brook were derived from the Mine Brook Profiles. Starting water surface elevations for Mine Brook and Miry Bog Brook were obtained from the Yellow Brook profiles.

In the Borough of Deal, starting water surface elevations for Poplar Brook were taken from known tidal elevations.

In the Borough of Eatontown, starting water surface elevations for Wampum Brook were derived from a discharge rating curve. Starting water surface elevations for Parkers Creek were obtained from the FIS for the Borough of Oceanport (U.S. Department of Housing and Urban Development, 1976), and starting elevations for Whale Pond Brook were obtained from the FIS for the Borough of West Long Branch (FEMA, 1981).

In the Borough of Englishtown, starting water surface elevations for McGellairds Brook and Weamaconk Creek were obtained from the FIS for the Township of Manalapan (U.S. Department of Housing and Urban Development, 1977). Starting elevations for Weamaconk Creek Tributary were derived from the profiles for Weamaconk Creek.

In the Township of Freehold, starting water surface elevations for Applegates Creek, Burkes Creek, Debois Creek, Debois Creek Tributary, Manasquan River Tributary A, Manasquan River Tributary B, Manasquan River Tributary C, Tepehemus Brook South Branch, Yellow Brook and Yellow Brook Tributary were calculated using the slope/area method. Starting elevations for Manasquan River were obtained from the FIS for the Township of Howell (FEMA, 1982). Starting elevations for McGellairds Brook, Weamaconk Creek and Wemrock

Brook were obtained from the FIS for the Township of Manalapan (U.S Department of Housing and Urban Development, 1977).

In the Township of Hazlet, starting water surface elevations for East Creek and Flat Creek were calculated using the slope/area method. Starting elevations for Monascunk Creek were derived from the Flat Creek profiles. Starting elevations for Waackaack Creek were obtained from the FIS for the Borough of Keansburg (FEMA, 1982).

In the Township of Holmdel, starting water surface elevations for Waackaack Creek were obtained from the FIS for the Township of Hazlet (FEMA, 1982), and starting elevations for Mahoras Brook were derived from the Waackaack Creek profiles. Starting water surface elevations for Willow Brook were obtained from the FISs for the Townships of Colts Neck and Marlboro (FEMA, 1981 & 1982), and the starting elevations for Ramanessin Brook and Willow Brook East Branch were derived from the Willow Brook profiles.

In the Township of Howell, starting water surface elevations for Ardena Brook, Bannen Meadow Brook, Gravelly Run, Groundhog Brook, Haystack Brook, Long Brook and Manasquan River were calculated using the slope/area method. Starting elevations for Metedeconk River North Branch were obtained from the FIS for the Township of Lakewood, Ocean County, New Jersey (FEMA, 1976). Starting elevations for Polypod Brook were derived from the Groundhog Brook profiles.

In the Borough of Keansburg, starting water surface elevations for Waackaack Creek were taken from the Spring High Tide for Raritan Bay.

In the Borough of Matawan, starting water surface elevations for Gravelly Brook and Matawan Creek were calculated using spillway rating curves.

In the Township of Middletown, starting water surface elevations for Claypit Creek, McClees Creek, Poricy Brook and Swimming River were obtained from the Mean Low Tide of Navesink River. Starting elevations for Comptons Creek were calculated using the slope/area method. Starting elevations for Mahoras Brook and Waackaack Creek were obtained from the FIS for the Township of Holmdel (FEMA, 1981). Starting elevations for Jumping Brook 1 and Nut Swamp Brook were derived from the profiles for Shadow Lake. Starting elevations for Town Brook were derived from the profiles for Comptons Creek.

In the Township of Millstone, starting water surface elevations for Rocky Brook (Upstream Reach) and Toms River were calculated using the slope/area method. Starting elevations for Millstone River were obtained from the FIS for the Township of Monroe, Middlesex County, New Jersey (FEMA, unpublished). Starting elevations for Rocky Brook (Downstream Reach) were derived from the profiles for Millstone River.

In the Township of Ocean, starting water surface elevations for Poplar Brook and Whale Pond Brook were obtained from the FIS for the Borough of Deal (FEMA,

1976). Starting elevations for Deal Tributary 1, Deal Tributary 2, Deal Tributary 3, Deal Tributary 3A, Deal Tributary 4, Deal Tributary 4A, Hog Swamp Brook and Hollow Brook were derived from the profiles for Deal Lake. Starting elevations for Poplar Brook Tributary 1, Poplar Brook Tributary 2 and Poplar Brook Tributary 3 were derived from the profiles for Poplar Brook.

In the Borough of Shrewsbury, starting water surface elevations for Parkers Creek were obtained from the FIS for the Boroughs of Oceanport and Little Silver (FEMA, 1976 & 1977). Starting elevations for Parkers Creek North Branch, were derived from the profiles for Parkers Creek.

In the Borough of Spring Lake Heights, starting water surface elevations for Wreck Pond Brook were obtained from the FIS for the Township of Wall (U.S. Department of Housing and Urban Development, 1976).

In the Borough of Tinton Falls, starting water surface elevations for Pine Brook 1 were calculated using the slope/area method. Starting elevations for Jumping Brook 2 were obtained from the FIS for the Borough of Neptune (U.S. Department of Housing and Urban Development, 1978). Starting elevations for Parkers Creek were obtained from the FIS for the Borough of Eatontown (FEMA, 1981). Starting elevations for Shark River were obtained from the FIS for the Township of Wall (U.S. Department of Housing and Urban Development, 1976). Starting elevations for Swimming River were obtained from the FIS for the Township of Middletown (FEMA, 1983).

In the Borough of Union Beach, starting water surface elevations for Waackaack Creek were obtained from the FIS for the Borough of Keansburg (FEMA, 1982).

In the Borough of Little Silver, water-surface profiles for floods of the selected recurrence intervals were computed using HEC-2. Starting water surface elevations for Little Silver Creek, Little Silver Tributary 1 and Little Silver Tributary 2 were obtained from a USACE tidal frequency study. Starting water surface elevations for the remaining streams were determined using the profiles of the downstream stream at the confluence.

Revised Analyses

Information on the methods used to determine peak discharge-frequency relationships for Manalapan Brook, restudied as part of this countywide FIS, is shown below.

The study area on Manalapan Brook extends from the downstream corporate limit of Township of Manalapan to Moonlight Court in the Township of Millstone. This stream contains 13 distinct bridges or other structures as it traverses a suburban area. Using aerial photographs, cross-section locations were identified for use in the modeling program. These locations were then surveyed to obtain accurate information on the river channel and bank configurations. The surveyors also obtained the necessary dimensions of crossing structures and overlying streets.

Of the structures, ten (10) are bridges/culverts for roads or pedestrian paths. One surveyed bridge is a home-built stream crossing made of tree trunks and planks. Upon close inspection it was determined that this structure will likely not hold up in severe floods; therefore it was not included in the hydraulic model. The other two structures are small dams located at the downstream ends of Millhurst Pond and Bulks Lake. Neither reservoir has significant surcharge capacity nor serves as a flood control structure. Therefore, this study neglects any detention effects of these ponds.

Using the HEC-RAS 3.1.3 computer model (USACE, 2005) with RiverCAD software (Boss, 2007), a backwater hydraulic model of the river was developed. The study includes approximately 52,000 feet (9.8 miles) of river. The hydraulic analysis was performed using 95 river cross-sections.

Based on the information obtained in the survey and site inspections, several roughness coefficients (Manning's "n" values) are used for the overbank areas, as follows:

0.100 – Trees: heavy stand of timber, few down trees.
0.053 – Development areas (Sub-Urban)
0.050 – Brush and heavy weeds
0.035 – Pasture (native Grass)

The bottom of the channel varies greatly in elevation, from 66 feet in the northern portion to 180 feet in the southern portion. The channel has small stones and some small pools. Banks are mildly sloped in the northern portion and fairly steep in the southern portion and they are lined with trees and brush along the channel. Based on site inspections, Manning's "n" values of 0.045 is assigned to the channel.

Water surface elevations for design floods at the selected cross sections were computed through use of the HEC-RAS 3.1.3 computer program. The downstream beginning water surface elevations are taken from the profiles for Manalapan Brook found in the FIS for Monroe Township, Middlesex County, New Jersey.

Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") for these hydraulic computations were assigned on the basis of field inspection of floodplain areas and the study of past floods. Channel roughness factors for streams studied by detailed methods are listed in Table 7, "Manning's "n" Values."

TABLE 7 – MANNING'S "n" VALUES

Stream	Channel "n"	Overbank "n"
Applegates Creek	0.030-0.035	0.060-0.080
Ardena Brook	0.030-0.040	0.060-0.070
Bannen Meadow Brook	0.025-0.035	0.060-0.080
Barclay Brook	*	*
Barren Neck Creek	0.020-0.035	0.055
Betty Brook	*	*
Big Brook	0.025-0.035	0.050-0.055
Big Brook Tributary H	*	*
Burkes Creek	0.025-0.040	0.050-0.100
Claypit Creek	0.016-0.050	0.080
Comptons Creek	0.018-0.060	0.080-0.100
Cranberry Brook	*	*
Deal Tributary 1	0.035-0.040	0.040-0.060
Deal Tributary 2	0.035-0.040	0.040-0.060
Deal Tributary 3	0.035-0.040	0.040-0.060
Deal Tributary 3A	0.035-0.040	0.040-0.060
Deal Tributary 4	0.035-0.040	0.040-0.060
Deal Tributary 4A	0.035-0.040	0.040-0.060
Debois Creek	0.025-0.035	0.040-0.080
Debois Creek Tributary	0.025-0.040	0.060-0.080
Deep Run	*	*
Deep Run Tributary A	*	*
Deep Run Tributary B	*	*
Deep Run Tributary C	*	*
Doctors Creek	0.030-0.050	0.050-0.080
East Creek	0.050-0.100	0.060-0.140
Flat Creek	0.014-0.060	0.070-0.100
Gander Brook	*	*
Gravelly Brook	*	*
Gravelly Run	0.018-0.040	0.040-0.100
Groundhog Brook	0.030-0.050	0.045-0.060
Hannabrand Brook	*	*
Haystack Brook	0.025-0.040	0.050-0.080
Heroys Pond Creek	*	*
Hockhockson Brook	0.025-0.035	0.055
Hog Swamp Brook	0.035-0.040	0.040-0.060
Hollow Brook	0.035-0.040	0.040-0.060
Indian Run	0.060-0.070	0.100-0.170
Judas Creek (Upstream Reach)	*	*
Jumping Brook 1	0.012-0.070	0.055-0.100
Jumping Brook 2	0.015-0.035	0.055
Little Silver Creek	*	*

*Data not available

TABLE 7 – MANNING'S "n" VALUES – continued

Stream	Channel "n"	Overbank "n"
Little Silver Creek Tributary A	*	*
Little Silver Creek Tributary I	*	*
Little Silver Creek Tributary II	*	*
Little Silver Creek Tributary II-A	*	*
Little Silver Creek Tributary II-B	*	*
Long Brook	0.025-0.045	0.050-0.080
Mac's Brook	*	*
Mahoras Brook	0.013-0.070	0.070-0.100
Manalapan Brook	0.035-0.053	0.035-0.100
Manalapan Brook Tributary A	*	*
Manalapan Brook Tributary B	*	*
Manasquan River	0.030	0.060-0.150
Manasquan River Tributary A	0.030-0.045	0.050-0.150
Manasquan River Tributary B	0.030-0.040	0.050-0.100
Manasquan River Tributary C	0.030-0.045	0.050-0.150
Marl Brook	0.035	0.055
Matawan Creek	0.018-0.040	0.040-0.100
Matchaponix Brook	*	*
McClees Creek	0.018-0.040	0.050-0.100
McGellairds Brook	0.030-0.080	0.040-0.100
Metedeconk River North Branch	0.045-0.060	0.050-0.070
Milford Brook	*	*
Millstone River	0.045	0.100
Mine Brook	0.013-0.035	0.055
Miry Bog Brook	0.015-0.035	0.045-0.055
Mohingson Brook	0.018-0.040	0.060-0.100
Monascunk Creek	0.013-0.070	0.060-0.100
Musquash Brook	*	*
Navesink River	*	*
Nut Swamp Brook	0.012-0.060	0.070-0.085
Parkers Creek	0.015-0.040	0.050-0.065
Parkers Creek, North Branch	0.015-0.040	0.050-0.065
Pine Brook 1	0.015-0.040	0.055
Pine Brook 2	*	*
Pine Brook Tributary C	*	*
Polypod Brook	0.030	0.060
Poly Pond Brook (Wall Township)	*	*
Poly Pond Brook (Spring Lake Heights)	*	*
Poplar Brook	0.035-0.050	0.040-0.070
Poplar Brook Tributary 1	0.035-0.040	0.040-0.060
Poplar Brook Tributary 2	0.035-0.040	0.040-0.060
Poplar Brook Tributary 3	0.035-0.040	0.040-0.060

*Data not available

TABLE 7 – MANNING'S "n" VALUES

Stream	Channel "n"	Overbank "n"
Poricy Brook	0.014-0.040	0.060-0.150
Ramanessin Brook	0.035-0.040	0.055-0.065
Roberts Swamp Brook	*	*
Rocky Brook (Downstream Reach)	0.035-0.045	0.070-0.170
Rocky Brook (Upstream Reach)	0.030-0.040	0.060-0.090
Shark River	0.035	0.035
Shark River Tributary D	*	*
Shark River Tributary E	*	*
Shrewsberry River	*	*
Still House Brook	*	*
Swimming River	0.016-0.040	0.070-0.090
Tepehemus Brook	*	*
Tepehemus Brook South Branch	0.035-0.048	0.040-0.120
Toms River	0.035-0.050	0.060-0.110
Town Brook	0.013-0.060	0.050-0.090
Town Neck Creek	*	*
Turtle Mill Brook	*	*
Upper Yellow Brook	*	*
Waackaack Creek	0.014-0.080	0.013-0.100
Wampum Brook	0.015-0.040	0.050-0.065
Watson Creek	*	*
Weamaconk Creek	0.040-0.050	0.045-0.120
Weamaconk Creek Tributary	0.013-0.035	0.060
Wells Brook	*	*
Wemrock Brook	0.045-0.052	0.090
Whale Creek	0.018-0.040	0.060-0.100
Whale Pond Brook	0.015-0.075	0.030-0.070
Whale Pond Tributary 1	*	*
Whale Pond Tributary 2	*	*
Willow Brook	0.015-0.040	0.050-0.065
Willow Brook Tributary F	*	*
Willow Brook Tributary G	*	*
Willow Brook, East Branch	0.040-0.045	0.070
Wreck Pond East Branch	*	*
Wreck Pond Brook	*	*
Yellow Brook	0.015-0.040	0.045-0.080
Yellow Brook 2	0.030-0.040	0.050-0.080
Yellow Brook Tributary 2	0.030	0.040-0.060
Yellow Brook Tributary K	*	*
Yellow Brook Tributary L	*	*

*Data not available

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

All elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88).

All qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that 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 Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

3.3 Coastal Hydrologic Analyses

For all other municipalities bordering the Atlantic Ocean, and for the Raritan Bay, Navesink River and Shrewsbury River, the determination of coastal inundation caused by the passage of a hurricane storm surge was approached by the joint probability method (U.S. Department of Commerce, 1970). The storm populations were described by probability distributions of five parameters which influence surge heights. These were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point and crossing angle. These characteristics were described statistically, based upon an analysis of observed storms in the vicinity of New Jersey. Several primary sources of data were researched for this information (U.S. Department of Commerce: 1975, 1970, 1965, 1957; National Hurricane Research Project No. 5, 1957). The storm parameters adopted for New Jersey are shown in Table 8, "Parameter Values for Surge Evaluation."

A numerical hydrodynamic model of the region was used to simulate the coastal surge generated by any chosen storm (any combination of the five storm parameters defined previously). Performing such simulations for a large number of storms – each of known total probability – permits the establishment of frequency distribution of surge heights at a coastal location. The astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level. This procedure is detailed in the Coastal Flooding Handbook (Tetra Tech, 1977).

Wave heights and corresponding wave crest elevations were determined using the National Academy of Sciences (NAS) methodology (1977). This methodology considers maximum conditions associated with the 1% annual chance flood, and uses transects which are oriented perpendicular to the mean sea level shoreline to deduce wave crest elevations. The stillwater elevations and the maximum wave crest elevations of the selected recurrence intervals are shown in Table 9, "Summary of Stillwater Elevations."

CENTRAL PRESSURE (INCHES HG)	27.39	27.68	27.97	28.26	28.55	28.84	29.12	29.40	29.70
ASSIGNED PROBABILITIES:									
STORMS OVER LAND	0.00	0.00	0.000	0.000	0.000	0.00	0.80	0.125	0.075
STORMS OVER SEA	0.00	0.02	0.055	0.100	0.145	0.15	0.33	0.125	0.075
STORM RADIUS (NAUTICAL MILES [NM])					37.5				
ASSIGNED PROBABILITY					1.0				
FORWARD SPEED (KNOTS)		20			30			40	
ASSIGNED PROBABILITIES:									
STORMS OVER LAND		0.76			0.15			0.09	
STORMS OVER SEA		0.56			0.44			0.00	
DIRECTION (DEGREE)			-11				20		
ASSIGNED PROBABILITY:									
STORMS OVER LAND			0.32				0.68		
STORMS OVER SEA			0.06				0.94		
SPATIAL OCCURRENCE RATE	1.22×10^{-3}				Storms Over Land				
STORMS/NM YEAR	2.28×10^{-3}				Storms Over Sea				

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

PARAMETER VALUES FOR SURGE ELEVATIONS

TABLE 9 - SUMMARY OF COASTAL STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
ATLANTIC OCEAN				
Shoreline within Borough of Allenhurst	5.5	6.8	7.4	9.0
Shoreline within City of Asbury Park	5.5	6.8	7.4 / 11.9*	9.0
Shoreline within Borough of Avon-by-the-Sea	5.5	6.8	7.4 / 11.9*	9.0
Shoreline within Borough of Bradley Beach	5.5	6.8	7.4 / 11.9*	9.0
Shoreline within Borough of Brielle	5.5	6.7	7.3 / 8.9*	8.8
Shoreline within Village of Loch Arbour	5.5	6.8	7.4	9.0
Shoreline within Borough of Deal	5.5	6.9	7.5	9.1
Shoreline within Township of Wall	6.0	7.9	8.9	12.9
NAVESINK RIVER				
Shoreline within Borough of Fair Haven	5.9	7.3	8.1	10.4
Shoreline within Township of Middletown	5.9	7.3	8.1 / 10.9*	10.4
Shoreline within Borough of Red Bank	5.9	7.3	8.1	10.4
RARITAN BAY				
Shoreline within Borough of Keansburg	6.1	9.1	10.5 / 16.9*	13.4
Shoreline within Township of Middletown	6.1	9.0	10.5 / 16.9*	12.9
Shoreline within Borough of Matawan	6.1	9.3	10.5	13.6
At confluence of Matawan Creek with Raritan Bay	6.3	9.5	10.7 / 16.9*	13.8
At western corporate limits of Township of Aberdeen	6.3	9.6	10.8 / 16.9*	14.1
Shoreline within Township of Hazlet	6.3	9.5	10.7	13.8
Shoreline within Borough of Keyport	6.3	9.5	10.7 / 15.9*	13.8
Shoreline within Borough of Union Beach	6.3	9.5	5.5	13.8
SANDY HOOK BAY				
Shoreline within Borough of Highlands	6.3	8.8	9.7	11.8
SHARK RIVER				
Shoreline within Township of Wall	6.0	7.9	8.9	12.9
SHREWSBURY RIVER				
Shoreline within Township of Middletown	5.9	7.3	8.1 / 10.9*	10.4

*Stillwater Elevation / Maximum Wave Crest Elevation

TABLE 9 - SUMMARY OF COASTAL STILLWATER ELEVATIONS – continued

FLOODING SOURCE AND LOCATION	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT
SOUTH SHREWSBURY RIVER				
Shoreline within Borough of Oceanport	5.4	6.9	8.0	12.9
WRECK POND BROOK				
Shoreline within Borough of Spring Lake Heights	7.4	9.0	9.4	13.7

*Stillwater Elevation / Maximum Wave Crest Elevation

3.4 Coastal Hydraulic Analyses

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones. The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame and brick veneer structures.

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in the NAS report (National Academy of Sciences, 1977). This method is based on three major concepts. First, depth-limited waves in the shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth, and the wave crest is 70 percent of the total wave height above the stillwater level. Second, wave height may be diminished by the dissipation of energy due to the presence of obstructions such as sand dunes, dikes, sea walls, buildings and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstructions and is determined by procedures outlined in the User's Manual for Wave Height Analysis (FEMA, 1981). Third, wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

As of 1989, FEMA defines a "coastal high hazard area" as an area of special flood hazards extending from offshore to the inland limit of a primary frontal dune along an open coast or any other area subject to high velocity wave actions (i.e., wave heights greater than or equal to 3 feet) from storms or seismic sources. The "primary frontal dune" is defined as a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from relatively steep slope to a relatively mild slope.

Wave heights were computed along transects (cross-section lines) located along the coastal areas, as illustrated in Figure 3 in accordance with the User's Manual for Wave Height Analysis (FEMA, 1981). The transects were located perpendicular to the shoreline, representing sections of similar characteristics. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects.

Figure 2, "Transect Location Map," illustrates the locations of transects, and Table 10, "Transect Descriptions," provides a list of the transect locations and stillwater elevations, as well as initial wave crest elevations. In addition, Table 9 provides the 1-annual chance stillwater and maximum wave crest elevations for each transect in the County.

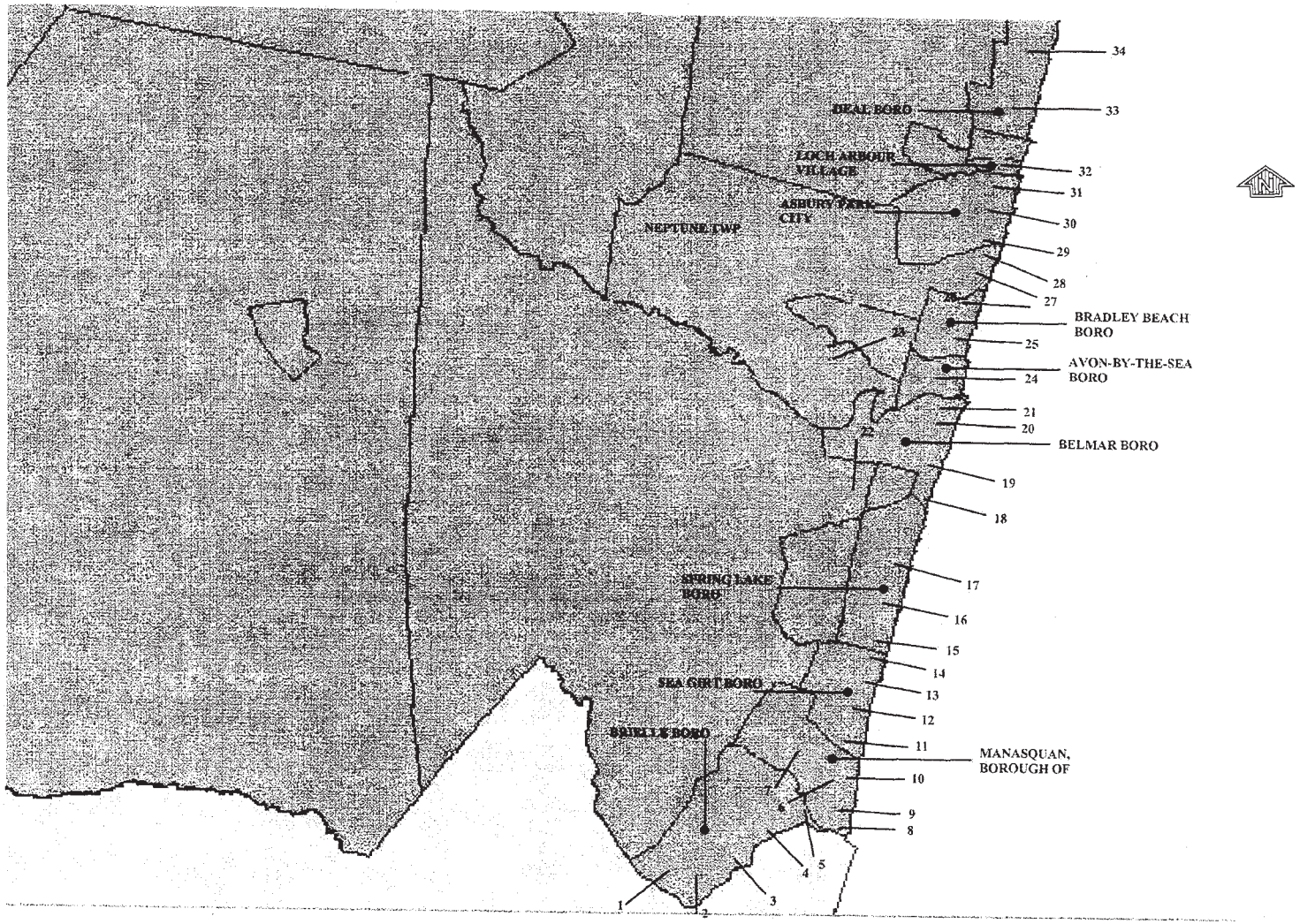


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

TRANSECT LOCATION MAP – BRIELLE BOROUGH TO DEAL BOROUGH

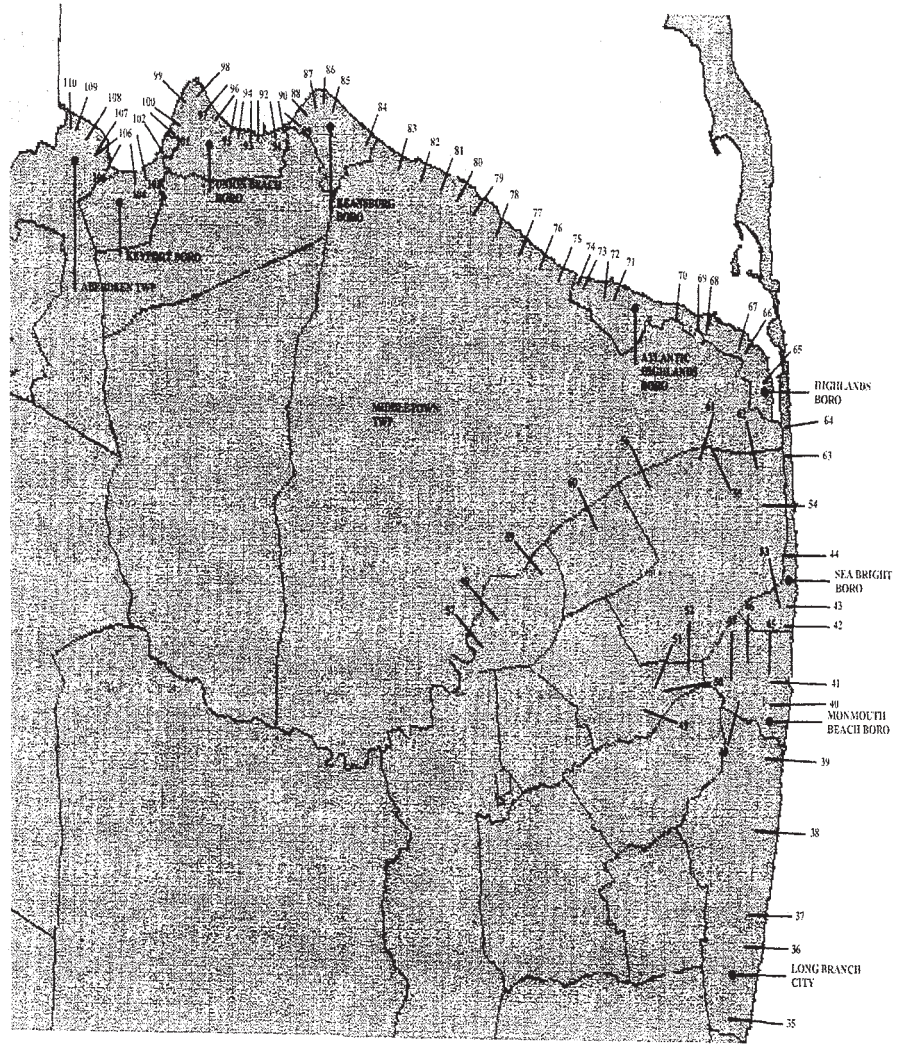


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

TRANSECT LOCATION MAP – LONG BRANCH CITY TO ABERDEEN TOWNSHIP

TABLE 10 – TRANSECT DESCRIPTIONS

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	ELEVATION (feet NAVD) MAXIMUM WAVE CREST[1]
1	*	7.3	8.9
2	*	7.3	8.9
3	*	7.3	8.9
4	*	7.3	8.9
5	*	7.3	8.9
6	*	7.3	8.9
7	*	7.3	8.9
8	From Whiting Avenue, extended, to the southern corporate limits of the Borough of Manasquan	7.3	11.9
9	From Brielle Road, extended, to Whiting Avenue, extended	7.4	11.9
10	From Ocean Avenue, extended, to Brielle Road, extended	7.4	11.9
11	From northern corporate limits of the Borough of Manasquan to Ocean Avenue, extended	7.4	11.9
12	From Boston Boulevard, extended, to Sea Girt Avenue, extended	7.4	11.9
13	From the Terrace, extended, to Boston Boulevard, extended	7.4	11.9
14	From the northern corporate limits of the Borough of Sea Girt to the Terrace, extended	7.4	11.9
15	From the southern corporate limits of the Borough of Spring Lake to Union Avenue, extended	7.4	11.9
16	From Union Avenue, extended, to Morris Avenue, extended	7.4	11.9
17	From Morris Avenue, extended, to Pitney Avenue, extended	7.4	11.9
18	From 18th Avenue, extended, to the southern corporate limits of the Borough of Belmar	7.4	11.9
19	From 6th Avenue, extended, to 18th Avenue, extended	7.4	11.9
20	From 5th Avenue, extended, to 6th Avenue, extended	7.4	11.9
21	From the northern corporate limits of the Borough of Belmar to 5th Avenue, extended	7.4	11.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM
*Data not available

TABLE 10 – TRANSECT DESCRIPTIONS – continued

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	MAXIMUM WAVE CREST[1]
22	The entire Shark River shoreline within the Borough of Belmar	7.4	8.9
23	From the corporate boundary of the Boroughs of Fair Haven and Rumson to Oceanic Bridge	7.4	8.9
24	From Sylvan Lake to the confluence of Shark River	7.4	12.0
25	From the southern limits of the Borough of Bradley Beach to Brinley Avenue	7.4	12.0
26	From Brinley Avenue to the northern corporate limits of the Borough of Bradley Beach	7.4	12.0
27	From Pitman Avenue, extended, to the southern corporate limits of the Township of Neptune	7.4	11.9
28	From the northern corporate limits of the Township of Neptune Avenue to Pitman Avenue, extended	7.4	11.9
29	*	7.4	11.9
30	*	7.4	11.9
31	*	7.4	11.9
32	*	7.4	11.9
33	From the southern corporate limits of the Borough of Deal to Parker Avenue, extended	7.5	11.9
34	From Parker Avenue, extended, to the northern corporate limits of the Borough of Deal	7.5	11.9
35	From the southern corporate limits of the City of Long Branch to Pullman Avenue, extended	7.5	11.9
36	From Pullman Avenue, extended, to Sternberger Avenue, extended	7.6	11.9
37	From Sternburger Avenue, extended, to Brighton Avenue, extended	7.6	11.9
38	From Brighton Avenue, extended, to Sea View Avenue, extended	7.6	11.9
39	From Sea View Avenue, extended, to the northern corporate limits of the City of Long Branch	7.7	12.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM
*Data not available

TABLE 10 – TRANSECT DESCRIPTIONS – continued

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	MAXIMUM WAVE CREST[1]
40	From Cottage Street, extended, to the southern corporate limits of the Borough of Monmouth Beach	9	14.9
41	From the northern corporate limits of the Borough of Monmouth Beach, to Cottage Street, extended	9	14.9
42	The South Shrewsbury River shoreline within the Borough of Sea Bright	8	10.9
43	From the southern corporate limits of the Borough of Sea Bright to approximately 1,000' north of Imbrie Place, extended	7.8	12.9
44	From approximately 1,000' north of Imbrie Place, extended, to approximately 2,800' north of Rumson Road, extended	7.8	12.9
45	From the northern corporate limits of the Borough of Monmouth Beach to Monmouth Parkway, extended	8.0	10.9
46	From Monmouth Parkway, extended, to Raccoon Island	8.0	10.9
47	From Raccoon Island to Manahassett Creek	8.0	10.9
48	The entire Branchport Creek and Manahassett Creek shorelines within the City of Long Branch	8.0	9.9
49	From the south side of Paag Court	8.0	10.9
50	From the south side of Little Silver Point Road	8.0	10.9
51	From the north side of Little Silver Point Road	8.0	10.9
52	From the eastern shore of Oyster Bay to the corporate limits of the Boroughs of Little Silver and Rumson	8.0	10.9
53	From Rumson Road to the eastern shore of Oyster Bay	8.0	11.9
54	From approximately 1,000' above Hartshorne Lane, extended, to Rumson Road	8.0	7.9
55	From Oceanic Bridge to approximately 1,000' above Hartshorne Lane, extended	8.1	10.9
56	Entire Shark River shoreline within the Township of Neptune	8.1	10.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM

TABLE 10 – TRANSECT DESCRIPTIONS – continued

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	MAXIMUM WAVE CREST[1]
57	From Conover Lane, extended, to Hubbards Bridge	8.1	9.9
58	From Hubbards Bridge to Newman Spring Road	8.1	9.9
59	From Jones Point to Conover Lane, extended	8.1	10.9
60	From Claypit Creek to Jones Point	8.1	10.9
61	From Tan Vat Road, extended, to Claypit Creek	8.1	10.9
62	From the eastern corporate limits of the Township of Middletown to Tan Vat Road, extended	8.1	10.9
63	From approximately 2,800' north of Rumson Road, extended, to the northern corporate limits of the Borough of Sea Bright	7.9	12.9
64	The entire Shrewsbury River shoreline within the Borough of Sea Bright	8.1	10.9
65	From Shrewsbury River, approximately 150' west of the intersection of 5th Street and Valley Avenue	9.7	15.7
66	From Sandy Hook Bay, approximately 250' northwest of the intersection of Central Avenue and Shore Drive	9.7	15.7
67	From Sandy Hook Bay, approximately 800' northwest of the intersection of Central Avenue and Shore Drive	9.7	15.7
68	From Beverout Place, extended, to the eastern corporate limits of the Borough of Highlands	10.5	15.9
69	From Cedar Place, extended, to Beverout Place, extended	10.5	15.9
70	From Ballinswood Road, extended, to Cedar Place, extended	10.5	15.9
71	From 1st Avenue, extended, to Ballinswood Road, extended	10.5	15.9
72	From Avenue A, extended, to 1st Avenue, extended	10.5	15.9
73	From Bowne Avenue, extended, to Avenue A, extended	10.5	15.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM

TABLE 10 – TRANSECT DESCRIPTIONS – continued

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	MAXIMUM WAVE CREST[1]
74	From the western corporate limits of the Borough of Atlantic Highlands to Bowne Avenue, extended	10.5	16.9
75	From Brevent Avenue, extended, to the eastern corporate limits of the Township of Middletown	10.5	16.9
76	From the State of New Jersey Marina to Brevent Avenue, extended	10.5	16.9
77	From Cedar Avenue, extended, to the State of New Jersey Marina	10.5	16.9
78	From the mouth of Ware Creek to Cedar Avenue, extended	10.5	16.9
79	From the mouth of Comptons Creek to the mouth of Ware Creek	10.5	16.9
80	From approximately 3,000' east of Wilson Avenue, extended, to the mouth of Comptons Creek	10.5	16.9
81	From Wilson Avenue, extended, to approximately 3,000' east of Wilson Avenue	10.5	16.9
82	From the mouth of Pews Creek to Wilson Avenue, extended	10.5	16.9
83	From the western corporate limits of the Township of Middletown to the mouth of Pews Creek	10.5	16.9
84	*	10.5	16.9
85	*	10.5	16.9
86	*	10.5	16.9
87	*	10.5	16.9
88	*	10.5	16.9
89	*	10.5	16.9
90	*	10.5	16.9
91	*	10.5	16.9
92	*	10.7	16.9
93	*	10.7	16.9
94	*	10.7	16.9
95	*	10.7	16.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM
*Data not available

TABLE 10 – TRANSECT DESCRIPTIONS – continued

TRANSECT	LOCATION	ELEVATION (feet NAVD) 1-PERCENT	MAXIMUM WAVE CREST[1]
95	*	10.7	16.9
97	*	10.7	16.9
98	*	10.7	16.9
99	*	10.7	16.9
100	*	10.7	16.9
101	*	10.7	16.9
102	*	10.7	15.9
103	*	10.7	16.9
104	*	10.7	15.9
105	From the confluence of Matawan Creek with Raritan Bay (Keyport Harbor)	10.7	15.9
106	From Woodmere Road, extended, to South Concourse Drive, extended	10.7	15.9
107	From South Concourse Drive, extended, to Woodlane Drive, extended	10.7	16.9
108	From Woodlane Drive, extended, to Lakeshore Drive, extended	10.7	16.9
109	From Lakeshore Drive, extended, to the confluence of Whale Creek with Raritan Bay (Keyport Harbor)	10.7	15.9
110	From the confluence of Whale Creek with Raritan Bay (Keyport Harbor) to the northern corporate limits of the Township of Aberdeen	10.8	16.9

[1] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM
*Data not available

Each transect was taken perpendicular to the shoreline and extended inland to a point where the wave action ceased. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical or cultural features. The stillwater elevations for the 1-annual chance flood were used as starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The locations of the 3-foot breaking wave for determining the terminus of the V Zone (area with velocity wave actions) was also computed at each transect. The results of this analysis are summarized in Table 11, "Transect Data."

TABLE 11 – TRANSECT DATA

FLOODING SOURCE	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	BASE FLOOD ELEVATION ZONE	(feet NAVD)
ATLANTIC OCEAN						
Transect 8	5.5	6.7	7.3	8.9	AE	7-10
					VE	10-12
Transects 9-14	5.5	6.7	7.4	8.9	AE	7-10
					VE	10-12
Transects 15-21	5.5	6.8	7.4	9.0	AE	7-10
					VE	10-12
Transects 24-26	5.5	6.7	7.4	9.0	AE	7-10
					VE	10-12
Transects 27-32	5.5	6.8	7.4	9.0	AE	7-10
					VE	10-12
Transects 33-35	5.5	6.9	7.5	9.1	AE	8-11
					VE	11-12
Transect 36	5.6	6.9	7.6	9.2	AE	8-11
					VE	11-12
Transect 37	5.6	7.0	7.6	9.3	AE	8-11
					VE	11-12
Transect 38	5.6	7.1	7.6	9.4	AE	8-11
					VE	11-12
Transect 39	5.7	7.1	7.7	9.5	AE	8-11
					VE	11-13
Transect 40-41	6.0	7.8	9.0	13.6	AE	9-12
					VE	12-15
Transect 43	5.8	7.1	7.8	9.6	AE	8-11
					VE	11-13
Transect 44	5.9	7.2	7.8	9.8	AE	8-11
					VE	11-13
Transect 54	5.0	7.0	8.0	12.6	AE	8-11
					VE	11-12
Transect 63	5.9	7.3	7.9	9.9	AE	8-11
					VE	11-13
GLIMMER GLASS HARBOR						
Transects 6-7	5.5	6.7	7.3	8.8	AE	7-9

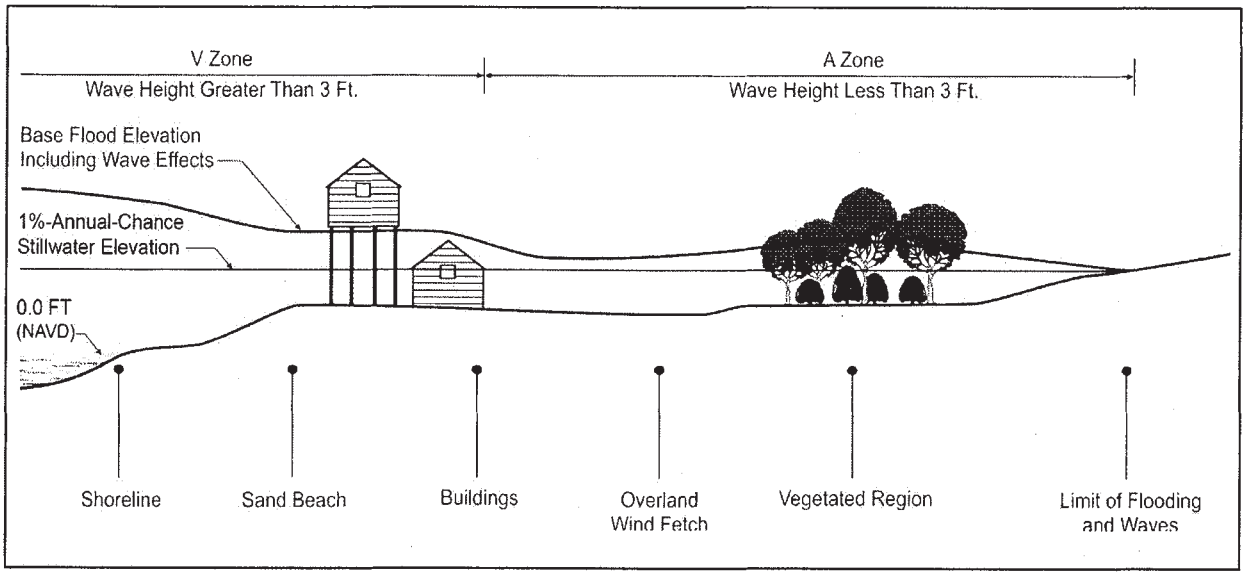
TABLE 11 – TRANSECT DATA – continued

FLOODING SOURCE	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	BASE FLOOD ELEVATION ZONE	(feet NAVD)
MANASQUAN RIVER						
Transects 1-5	5.5	6.7	7.3	8.8	AE	7-9
NAVESINK RIVER						
Transects 55-56	5.9	7.3	8.1	10.4	AE	8-11
Transects 57-58	5.9	7.3	8.1	10.4	AE	8-10
Transects 59-62	5.9	7.3	8.1	10.4	AE	8-11
RARITAN BAY						
Transects 75-83	6.1	9.0	10.5	12.9	AE	11-14
					VE	14-17
Transects 84-89	6.1	9.1	10.5	13.4	AE	11-14
					VE	14-17
Transects 90-102	6.3	9.5	10.7	13.8	AE	11-14
					VE	14-17
Transects 103-106	6.3	9.5	10.7	13.8	AE	11-14
					VE	14-16
Transects 107-108	6.3	9.5	10.7	13.8	AE	11-14
					VE	14-17
Transect 109	6.3	9.5	10.7	13.8	AE	11-14
					VE	14-16
Transect 110	6.3	9.5	10.7	13.8	AE	11-14
					VE	14-17
SANDY HOOK BAY						
Transects 65-67	6.3	8.8	9.7	11.8	AE	10-13
					VE	13-16
Transects 68-73	6.1	9.0	10.5	12.9	AE	11-14
					VE	14-16
Transect 74	6.1	9.0	10.5	12.9	AE	11-14
					VE	14-17
SHARK RIVER						
Transects 22-23	5.5	6.8	7.4	9.0	AE	7-9

TABLE 11 – TRANSECT DATA – continued

FLOODING SOURCE	STILLWATER ELEVATION (feet NAVD) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	BASE FLOOD ELEVATION ZONE	(feet NAVD)
SHREWSBURY RIVER						
Transects 45-47	5.0	6.8	8.0	12.7	AE	8-11
Transect 48	5.0	6.8	8.0	12.7	AE	8-10
Transects 49-53	5.0	7.0	8.0	12.6	AE	8-11
Transect 64	5.9	7.3	8.1	12.6	AE	8-11
SOUTH SHREWSBURY RIVER						
Transect 42	5.0	7.3	8.0	12.6	AE	8-11

Figure 3 is a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave elevations being decrease by obstructions, such as buildings, vegetation and rising ground elevations, and being increased by open, unobstructed wind fetches. Actual wave conditions in the County may not include all situations illustrated in Figure 3.



TRANSECT SCHEMATIC Figure 3

3.5 Vertical Datum

All FISs 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 FISs and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in base flood elevations across the corporate limits between the communities.

Prior versions of the FIS report and FIRM were referenced to NGVD 29. When a datum conversion is effected for an FIS report and FIRM, the Flood Profiles, base flood elevations (BFEs) and ERMs reflect the new datum values. To compare structure and ground elevations to 1-percent annual chance flood elevations shown in the FIS and on the FIRM, the subject structure and ground elevations must be referenced to the new datum values.

As noted above, the elevations shown in the FIS report and on the FIRM for Monmouth County are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor to NGVD 29 is +1.1. The conversion between the datums may be expressed as an equation:

NAVD 88 + 1.1 feet = NGVD 29

The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the Spatial Reference System Division, National Geodetic Survey, NOAA, Silver Spring Metro Center, 1315 East-West Highway, Silver Spring, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent annual chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent annual chance flood elevations; delineations of the 1- and 0.2-percent annual chance floodplains; and 1-percent annual chance floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local community 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 county. For the streams studied in detail, the 1- and 0.2-percent annual chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

Floodplain delineation was based on topographic data provided by Monmouth County. This data were derived from April 2003 aerial photogrammetry.

Similarly, using datum-converted effective flood profiles for non-revised, detailed streams, all flood boundaries were made current with the topography supplied by Monmouth County.

In the Township of Aberdeen, aerial photographs at a scale of 1:9,600 and 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1"=400' with a 4-foot contour interval. Information was supplemented by 7.5-Minute Series Topographic Maps at a scale of 1:24,000 and contour interval of 20 feet.

In the Borough of Allenhurst, aerial contour maps at a scale of 1"=500' and a 2-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series Topographic Maps at a scale of 1:24,000 and contour interval of 20 feet.

In the Borough of Allentown, aerial photographs and topographic maps at a scale of 1:2,400 and 5-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series Topographic Maps at a scale of 1:24,000 and 10-foot contour interval.

In the City of Asbury Park, floodplain boundaries between cross sections were interpolated using aerial contour maps at a scale of 1:6,000 with a 2-foot contour interval, as well as 7.5-Minutes Series Topographic Maps at a scale of 1:24,000 and a 20-foot contour interval.

In the Borough of Avon-by-the-Sea, aerial photographs and topographic maps at a scale of 1:6,000 and contour interval of 2 feet were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 and contour interval of 20 feet.

In the Borough of Belmar, floodplain boundaries between cross sections were interpolated using aerial photographs at a scale of 1:12,000, topographic maps at a scale of 1:2,400 with a 4-foot contour interval, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 and a 20-foot contour interval.

In the Borough of Bradley Beach, floodplain boundaries between cross sections were interpolated using aerial photographs and topographic maps at a scale of 1:6,000 with a 2-foot contour interval, and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Brielle, aerial contour maps of a 1:6,000 scale and 2-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as aerial contour maps of a 1:2,400 scale with a 5-foot contour interval. Additionally, 7.5-Minute Series topographic maps were used, with a scale of 1:24,000 and 20-foot contour interval.

In the Township of Colts Neck, floodplain boundaries between cross sections were interpolated using topographic maps of 1:2,400 scale with a 5-foot contour interval.

In the Borough of Deal, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at scales of 1:24,000 and 1:2,400 with contour intervals of 4 feet. Additionally, 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval were used.

In the Borough of Eatontown, topographic maps of Northeast Monmouth County, at a scale of 1:1,200 and a one-foot contour interval, were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 and a 20-foot contour interval.

In the Borough of Englishtown, topographic maps sheets at a scale of 1"=200' and a contour interval of 5 feet were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 and a 20-foot contour interval.

In the Borough of Fair Haven, floodplain boundaries between cross sections were interpolated using topographic maps of Northeast Monmouth County, at a scale of 1:1,200 and a one-foot contour interval.

In the Township of Freehold, topographic maps at a scale of 1:2,400 with a 5-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps and flood-prone area maps at a scale of 1:24,000 and a 10-foot contour interval.

In the Township of Hazlet, topographic maps at a scale of 1:1,200 and a 2-foot contour interval were used to delineate floodplain boundaries between cross sections.

In the Borough of Highlands, topographic maps at a scale of 1"=200' with a contour interval of 2 feet were used to delineate floodplain boundaries between cross sections.

In the Township of Holmdel, topographic maps at a scale of 1:24,000 with a 5-foot contour interval were used to delineate floodplain boundaries between cross sections.

In the Township of Howell, topographic maps at a scale of 1:2,400 with a 5-foot contour interval were used to delineate floodplain boundaries between cross sections.

In the Borough of Keansburg, topographic maps of scales 1" = 500' with a contour interval of 2 feet and 1:600 with a one-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Keyport, aerial contour maps at a scale of 1:6,000 with a 2-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Little Silver, aerial photographs with a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:1,200 with a one-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Village of Loch Arbour, aerial contour maps at a scale of 1:6,000 with a 2-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the City of Long Branch, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Township of Manalapan, 7.5-Minute Series topographic maps at a scale of 1:24,000 with contour intervals of 10 feet and 5 feet were used to delineate floodplain boundaries between cross sections.

In the Borough of Manasquan, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Township of Marlboro, topographic maps at a scale of 1:2,400 with a 5-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with contour intervals of 10 feet and 20 feet.

In the Borough of Matawan, floodplain boundaries were interpolated between cross sections using topographic maps at a scale of 1:2,400 with a 5-foot contour interval.

In the Township of Middletown, floodplain boundaries were interpolated between cross sections using topographic maps at a scale of 1"=100' with a one-foot contour interval, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with contour intervals of 10 feet and 20 feet.

In the Township of Millstone, aerial photographs and photogrammetric mapping at a scale of 1:2,400 with a 5-foot contour interval were used to delineate floodplain boundaries between cross sections, as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with contour intervals of 5 feet and 10 feet.

In the Borough of Monmouth Beach, aerial photographs at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:1,200 with a one-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Township of Neptune, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Township of Ocean, topographic maps at scales of 1:1,200 with a 2-foot contour interval and 1:24,000 with a 4-foot contour interval were used to delineate floodplain boundaries between cross sections.

In the Borough of Oceanport, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1"=100' with a one-foot contour interval.

In the Borough of Red Bank, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:1,200 with a 2-foot contour interval.

In the Borough of Rumson, aerial photographs at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:1,200 with a one-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Sea Bright, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Sea Girt, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Shrewsbury, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:1,200 with a one-foot contour interval.

In the Borough of Spring Lake, aerial photographs and aerial plotting plates at a scale of 1:12,000 were used to delineate floodplain boundaries between cross sections, as well as topographic maps at a scale of 1:2,400 with a 4-foot contour interval and 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Spring Lake Heights, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 5 feet, as well as 7.5-Minute Series flood-prone area maps at a scale of 1:24,000 with a 20-foot contour interval.

In the Borough of Tinton Falls, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:1,200 with a 3-foot contour interval.

In the Borough of Union Beach, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1"=50' with a one-foot contour interval and 1:6,000 with a 2-foot contour interval.

In the Township of Wall, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:2,400 with a 2-foot contour interval, as well as the Tax Map for the Township of Wall.

In the Borough of West Long Branch, floodplain boundaries between cross sections were interpolated using topographic maps at a scale of 1:1,200 with a one-foot contour interval as well as 7.5-Minute Series topographic maps at a scale of 1:24,000 with a 20-foot contour interval.

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 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 federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain.

Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 12). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

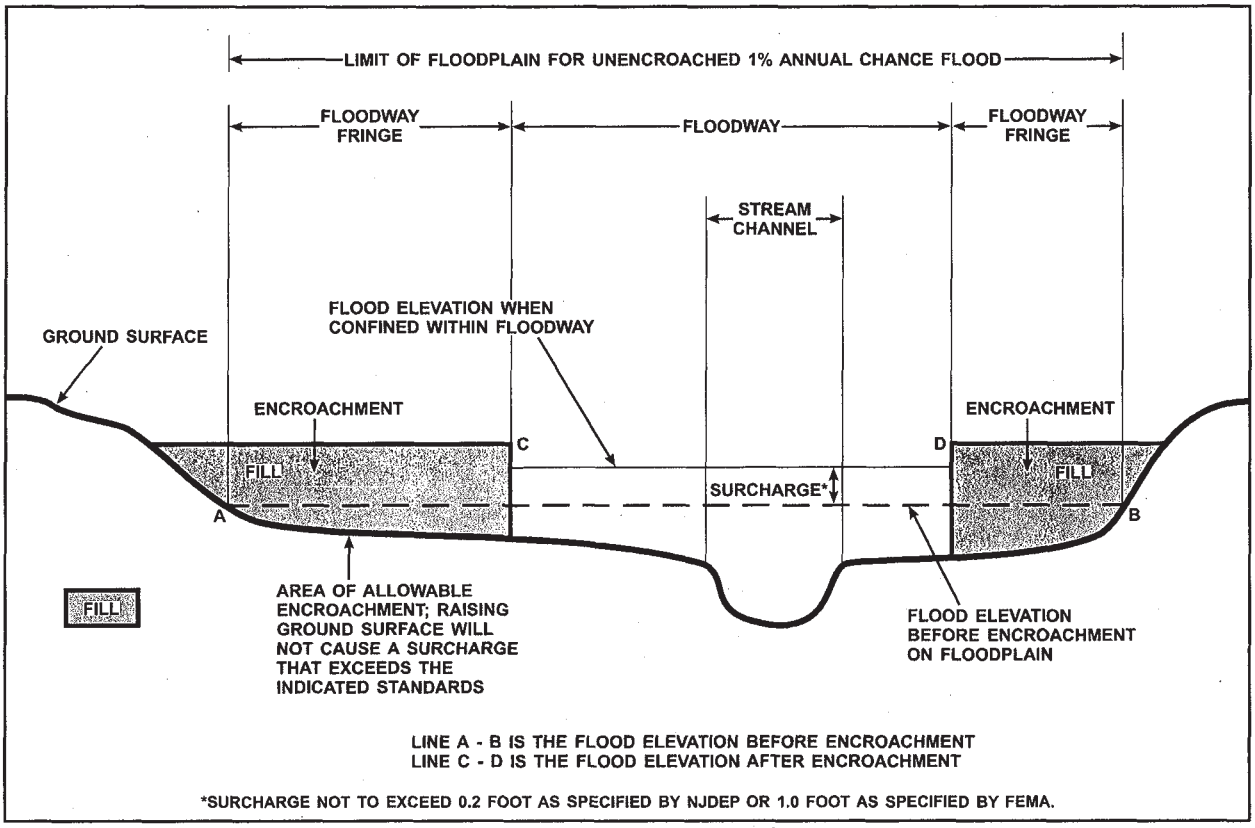
Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 12 for certain downstream cross sections of Ardena Brook, Bannen Meadow Brook, Burkes Creek, Claypit Creek, Comptons Creek, Gravelly Run, Groundhog Brook, Haystack Brook, Jumping Brook 1, McClees Creek, Mohingson Brook, Parkers Creek, Parkers Creek North Branch, Pine Brook 1, Poplar Creek Tributary 1, Shark River, Waackaack Creek, Weamaconk Creek Tributary, and Yellow Brook Tributary 2 are lower than the regulatory flood elevations in that area, which must take into account the 1-percent annual chance flooding due to backwater from other sources.

No floodways were calculated for Cranberry Brook or Wells Brook.

Portions of the floodways for Metedeconk River North Branch and Rocky Brook (Downstream Reach) extend beyond the county boundary

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 12, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 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 by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.



FLOODWAY SCHEMATIC Figure 4

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Applegates Creek								
A	90[1]	37	92	5.90	91.7	91.7	91.9	0.2
B	1,375[1]	69	214	2.50	95.5	95.5	95.7	0.2
C	2,835[1]	74	198	2.70	102.7	102.7	102.9	0.2
D	2,865[1]	189	669	0.80	103.1	103.1	103.3	0.2
E	4,030[1]	31	131	4.10	103.7	103.7	103.8	0.1
F	4,080[1]	15	70	7.70	103.7	103.7	103.8	0.1
G	4,205[1]	15	85	6.30	104.5	104.5	104.7	0.2
H	4,255[1]	59	184	2.90	105.2	105.2	105.3	0.1
I	5,055[1]	34	86	6.20	106.2	106.2	106.4	0.2
J	6,015[1]	67	174	3.10	110.0	110.0	110.0	0.0
K	6,665[1]	97	282	1.90	114.7	114.7	114.7	0.0
L	6,695[1]	109	247	2.20	114.7	114.7	114.7	0.0
Ardena Brook								
A	280[2]	19	60	6.10	63.4	61.5[3]	61.7	0.2
B	1,165[2]	19	59	6.30	66.1	66.1	66.3	0.2
C	1,680[2]	28	62	6.00	70.6	70.6	70.6	0.0
D	2,274[2]	14	56	6.60	78.8	78.8	78.8	0.0
E	2,304[2]	35	138	2.70	79.6	79.6	79.6	0.0
Bannen Meadow Brook								
A	310[2]	30	100	6.90	69.5	67.5[3]	67.7	0.2
B	1,028[2]	19	130	5.30	74.3	74.3	74.3	0.0
C	1,058[2]	69	374	1.80	74.8	74.8	74.8	0.0
D	1,960[2]	152	798	0.90	75.0	75.0	75.0	0.0
E	2,945[2]	86	216	3.20	75.1	75.1	75.1	0.0

[1]Feet above confluence with Debois Creek
[2]Feet above confluence with Manasquan River
[3]Elevation computed without consideration of backwater effects from Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

APPLEGATES CREEK – ARDENA BROOK – BANNEN MEADOW BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bannen Meadow Brook (continued)								
F	3,000[1]	14	59	11.70	75.3	75.3	75.3	0.0
G	3,160[1]	14	83	8.30	78.0	78.0	78.0	0.0
H	3,210[1]	53	256	2.70	79.1	79.1	79.1	0.0
I	4,010[1]	58	155	4.40	80.0	80.0	80.1	0.1
J	4,617[1]	100	308	2.20	81.4	81.4	81.6	0.2
K	5,347[1]	79	282	2.40	84.3	84.3	84.3	0.0
L	5,377[1]	52	109	6.30	84.3	84.3	84.3	0.0
M	6,034[1]	49	182	3.80	87.5	87.5	87.6	0.1
Barclay Brook								
A	211[2]	30	85	4.60	73.9	73.9	73.9	0.0
B	581[2]	70	165	2.30	75.5	75.5	75.5	0.0
C	686[2]	70	330	1.20	78.4	78.4	78.4	0.0
D	1,214[2]	30	95	4.10	78.6	78.6	78.8	0.2
E	1,320[2]	45	225	1.70	82.5	82.5	82.5	0.0
F	1,795[2]	25	45	8.20	83.5	83.5	83.5	0.0
G	3,010[2]	35	115	3.30	94.0	94.0	94.0	0.0
H	3,590[2]	35	50	7.50	99.5	99.5	99.5	0.0
I	4,066[2]	80	160	2.40	105.9	105.9	106.1	0.2
J	4,435[2]	15	40	9.20	110.1	110.1	110.1	0.0
Barren Neck Creek								
A	2,000[3]	102	367	1.40	44.4	44.4	44.4	0.0
B	2,700[3]	33	75	6.70	46.6	46.6	46.6	0.0
C	3,050[3]	29	64	7.90	50.0	50.0	50.0	0.0
D	3,300[3]	30	285	1.80	59.5	59.5	59.5	0.0

[1]Feet above confluence with Manasquan River
[2]Feet above county boundary
[3]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

BANNEN MEADOW BROOK – BARCLAY BROOK – BARREN NECK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Barren Neck Creek (continued)								
E	3,950[1]	36	235	2.10	59.5	59.5	59.7	0.2
F	4,200[1]	55	412	1.20	61.8	61.8	61.8	0.0
G	4,600[1]	119	595	0.80	61.9	61.9	62.0	0.1
Betty Brook								
A	0[1]	289	498	1.00	54.8	54.8	55.0	0.2
B	600[1]	50	74	7.00	61.1	61.1	61.1	0.0
C	1,100[1]	40	71	7.20	66.5	66.5	66.6	0.1
D	1,900[1]	30	76	6.80	72.1	72.1	72.3	0.2
E	2,340[1]	26	70	7.30	74.5	74.5	74.6	0.1
Big Brook (Downstream Reach)								
A	740[2]	171	532	3.00	38.5	38.5	38.7	0.2
B	1,700[2]	187	473	3.30	39.9	39.9	40.1	0.2
C	2,770[2]	252	786	2.00	41.5	41.5	41.7	0.2
D	3,000[2]	250	629	2.50	42.3	42.3	42.3	0.0
E	4,500[2]	296	484	3.20	45.1	45.1	45.3	0.2
F	5,330[2]	475	877	1.80	47.5	47.5	47.6	0.1
G	6,830[2]	267	484	3.20	50.1	50.1	50.3	0.2
H	7,880[2]	220	890	1.80	53.9	53.9	54.0	0.1
I	8,400[2]	203	773	2.00	54.1	54.1	54.3	0.2
J	9,000[2]	71	273	5.70	54.6	54.6	54.8	0.2
K	10,220[2]	161	633	2.50	57.4	57.4	57.6	0.2
Big Brook (Upstream Reach)								
A	0[3]	90	375	3.10	78.5	78.5	78.7	0.2
B	158[3]	90	400	2.90	78.8	78.8	79.0	0.2
C	2,218[3]	80	245	3.30	81.7	81.7	81.9	0.2
D	4,118[1]	80	195	4.20	86.7	86.7	86.7	0.0

[1]Feet above mouth
[2]Feet above confluence with Swimming River Reservoir
[3]Feet above limit of detailed study (limit of detailed study is approximately 50 feet below Boundary Road)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

BARREN NECK CREEK – BETTY BROOK – BIG BROOK (UPSTREAM REACH) – BIG BROOK (DOWNSTREAM REACH)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Big Brook (Upstream Reach) (continued)								
E	5,861[1]	40	165	4.20	93.3	93.3	93.3	0.0
F	5,966[1]	35	175	4.00	93.9	93.9	93.9	0.0
G	7,075[1]	30	105	6.70	97.2	97.2	97.2	0.0
H	7,181[1]	35	145	4.80	98.4	98.4	98.5	0.1
I	9,504[1]	50	130	3.90	104.3	104.3	104.3	0.0
J	11,405[1]	20	55	8.80	116.2	116.2	116.3	0.1
Big Brook Tributary H								
A	211[2]	40	180	3.00	79.2	79.2	79.4	0.2
B	2,482[2]	70	135	2.90	90.1	90.1	90.2	0.1
C	2,587[2]	70	430	0.90	94.5	94.5	94.5	0.0
D	5,702[2]	25	30	3.10	119.8	119.8	120.0	0.2
Burkes Creek								
A	370[3]	53	161	2.40	90.2	89.3[4]	89.5	0.2
B	590[3]	12	50	7.80	90.3	89.3[4]	89.5	0.2
C	620[3]	55	134	2.90	90.3	90.2[4]	90.3	0.1
D	690[3]	125	158	2.50	94.2	94.2	94.3	0.1
E	720[3]	185	1,444	0.30	94.3	94.3	94.4	0.1
F	1,300[3]	143	911	0.40	94.3	94.3	94.4	0.1
G	1,800[3]	24	158	2.50	99.1	99.1	99.2	0.1
H	1,830[3]	195	1,517	0.30	99.3	99.3	99.4	0.1
I	2,180[3]	156	1,108	0.40	99.3	99.3	99.4	0.1
J	2,695[3]	172	573	0.70	99.5	99.5	99.6	0.1
K	2,725[3]	110	456	0.90	99.5	99.5	99.6	0.1
L	3,110[3]	25	86	4.50	99.6	99.6	99.7	0.1
M	3,610[3]	121	250	1.50	100.4	100.4	100.6	0.2

[1]Feet above limit of detailed study (limit of detailed study is approximately 50 feet below Boundary Road)
[2]Feet above confluence with Big Brook
[3]Feet above confluence with Debois Creek
[4]Elevation computed without consideration of backwater effects from Debois Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

BIG BROOK (DOWNSTREAM REACH) – BIG BROOK TRIBUTARY H – BURKES CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Claypit Creek								
A	0[1]	*	2,419	0.30	8.1	4.0[4]	4.2	0.2
B	1,200[1]	220	691	0.90	8.1	4.1[4]	4.3	0.2
C	1,900[1]	250	390	1.60	8.1	4.8[4]	4.9	0.1
D	2,020[1]	214	631	1.00	10.6	10.6	10.6	0.0
E	2,450[1]	*	781	0.50	10.8	10.8	10.8	0.0
Comptons Creek								
A	115[2]	359	1,209	1.10	10.5	5.9[5]	6.0	0.1
B	622[2]	554	1,713	0.80	10.5	6.1[5]	6.3	0.2
C	1,430[2]	34	262	5.10	10.5	7.0[5]	7.2	0.2
D	3,850[2]	253	681	1.90	10.5	7.9[5]	8.1	0.2
E	5,235[2]	185	570	1.60	12.3	12.3	12.4	0.1
F	5,615[2]	124	446	2.00	13.1	13.1	13.1	0.0
Cranberry Brook								
A	640[3]	*	*	*	14.0	*	*	*
B	2,280[3]	*	*	*	16.5	*	*	*
C	2,490[3]	*	*	*	19.6	*	*	*
D	3,610[3]	*	*	*	19.6	*	*	*
E	3,960[3]	*	*	*	19.6	*	*	*
F	4,340[3]	*	*	*	19.6	*	*	*
G	5,295[3]	*	*	*	19.6	*	*	*
Deal Tributary 1								
A	230[3]	12	88	0.50	10.5	10.5	10.5	0.0
B	350[3]	16	84	0.50	10.6	10.6	10.6	0.0
C	630[3]	39	206	0.20	10.7	10.7	10.8	0.1

[1]Feet above Locust Avenue Bridge (upstream face)
[2]Feet above Campbell Avenue
[3]Feet above mouth
[4]Elevation computed without consideration of backwater effects from Navesink River
[5]Elevation computed without consideration of backwater effects from Raritan Bay
*Data not available

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

CLAYPIT CREEK – COMPTONS CREEK – CRANBERRY BROOK – DEAL TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Deal Tributary 1 (continued)								
D	1,060[1]	20	12	3.30	10.7	10.7	10.7	0.0
E	1,560[1]	35	97	0.40	19.8	19.8	19.8	0.0
F	1,940[1]	11	17	2.40	19.8	19.8	19.8	0.0
G	1,975[1]	13	13	3.10	19.9	19.9	19.9	0.0
Deal Tributary 2								
A	0[1]	54	450	0.40	10.5	10.5	10.5	0.0
B	137[1]	177	1,082	0.10	14.8	14.8	14.8	0.0
C	1,200[1]	157	768	0.20	18.3	18.3	18.5	0.2
D	2,450[1]	6	15	5.80	25.1	25.1	25.2	0.1
E	2,520[1]	4	10	8.70	25.5	25.5	25.7	0.2
F	2,990[1]	4	14	6.20	31.0	31.0	31.0	0.0
Deal Tributary 3								
A	310[1]	142	968	0.40	13.7	13.7	13.7	0.0
B	2,650[1]	98	208	0.60	18.2	18.2	18.2	0.0
C	3,820[1]	49	65	1.30	28.1	28.1	28.1	0.0
D	4,525[1]	75	120	0.70	33.7	33.7	33.8	0.1
E	5,295[1]	4	4	6.50	43.1	43.1	43.1	0.0
F	5,345[1]	13	6	4.30	44.2	44.2	44.2	0.0
Deal Tributary 3A								
A	470[2]	20	31	0.80	18.2	18.2	18.4	0.2
B	595[2]	41	119	0.40	26.2	26.2	26.2	0.0
C	940[2]	23	49	0.90	26.2	26.2	26.2	0.0
D	985[2]	28	89	0.50	26.2	26.2	26.2	0.0

[1]Feet above mouth
[2]Feet above confluence with Deal Tributary 3

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

DEAL TRIBUTARY 1 – DEAL TRIBUTARY 2 – DEAL TRIBUTARY 3 – DEAL TRIBUTARY 3A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Deal Tributary 4								
A	15[1]	144	693	0.00	13.7	13.7	13.9	0.2
B	500[1]	78	335	0.10	13.7	13.7	13.9	0.2
C	1,000[1]	84	295	0.10	13.7	13.7	13.9	0.2
D	1,680[1]	24	49	5.30	15.2	15.2	15.4	0.2
E	1,900[1]	62	97	2.70	16.6	16.6	16.6	0.0
F	4,000[1]	8	38	6.40	26.8	26.8	26.9	0.1
Deal Tributary 4A								
A	645[2]	9	9	5.60	16.7	16.7	16.7	0.0
B	730[2]	53	57	0.90	17.5	17.5	17.7	0.2
C	845[2]	53	57	0.90	17.5	17.5	17.7	0.2
Debois Creek								
A	80[3]	330	973	1.10	76.5	76.5	76.7	0.2
B	1,045[3]	30	182	6.10	77.0	77.0	77.2	0.2
C	1,075[3]	107	354	3.10	77.6	77.6	77.6	0.0
D	1,890[3]	163	425	2.60	78.9	78.9	79.1	0.2
E	2,670[3]	210	480	2.30	80.3	80.3	80.5	0.2
F	3,620[3]	96	229	4.80	83.4	83.4	83.5	0.1
G	4,685[3]	55	278	4.00	86.2	86.2	86.3	0.1
H	4,735[3]	31	190	5.80	86.2	86.2	86.3	0.1
I	4,925[3]	31	244	4.60	87.8	87.8	87.9	0.1
J	4,975[3]	78	412	2.70	88.1	88.1	88.2	0.1
K	6,035[3]	28	193	5.80	88.3	88.3	88.4	0.1
L	6,065[3]	24	130	8.50	88.3	88.3	88.4	0.1
M	6,975[3]	210	480	2.30	90.0	90.0	90.2	0.2
N	7,890[3]	68	234	4.70	91.0	91.0	91.1	0.1

[1]Feet above confluence with Deal Tributary 3
[2]Feet above confluence with Deal Tributary 4
[3]Feet above confluence with Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

DEAL TRIBUTARY 4 – DEAL TRIBUTARY 4A – DEBOIS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Debois Creek (continued)								
O	8,870	29	122	7.60	93.1	93.1	93.3	0.2
P	9,600	29	105	8.80	96.0	96.0	96.0	0.0
Q	10,525	72	269	3.40	101.3	101.3	101.5	0.2
R	10,555	64	241	3.80	101.4	101.4	101.6	0.2
S	11,640	46	145	6.30	104.9	104.9	105.0	0.1
T	12,520	50	273	3.40	107.2	107.2	107.4	0.2
U	13,270	28	118	7.80	108.2	108.2	108.4	0.2
V	14,210	26	155	5.90	114.2	114.2	114.2	0.0
W	14,240	111	580	1.60	115.0	115.0	115.0	0.0
X	14,980	20	122	25.80	115.2	115.2	115.3	0.1
Y	15,865	17	92	3.80	115.6	115.6	115.8	0.2
Z	16,905	41	167	2.10	119.7	119.7	119.7	0.0
AA	17,008	8	56	6.20	119.9	119.9	120.0	0.1
AB	17,038	32	114	3.10	120.5	120.5	120.5	0.0
AC	17,545	12	81	4.30	120.7	120.7	120.8	0.1
AD	17,595	45	160	2.20	121.0	121.0	121.1	0.1
AE	18,235	14	48	7.20	121.0	121.0	121.2	0.2
AF	18,595	24	84	4.10	123.6	123.6	123.8	0.2
AG	19,635	33	89	3.90	125.3	125.3	125.3	0.0
AH	20,195	10	41	8.50	128.1	128.1	128.1	0.0
AI	20,530	36	88	4.00	130.2	130.2	130.3	0.1
AJ	21,240	246	325	1.10	136.8	136.8	136.8	0.0
AK	21,270	304	1,189	0.30	136.9	136.9	136.9	0.0

[1]Feet above confluence with Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

DEBOIS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Debois Creek Tributary								
A	500[1]	39	103	4.40	95.0	95.0	95.2	0.2
B	950[1]	61	179	2.50	96.3	96.3	96.5	0.2
C	1,750[1]	27	86	5.30	101.6	101.6	101.6	0.0
D	2,660[1]	12	52	8.70	106.6	106.6	106.6	0.0
Deep Run								
A	53[2]	309	2,628	1.00	53.7	53.7	53.9	0.2
B	2,851[2]	412	2,629	1.00	60.1	60.1	60.1	0.0
C	2,957[2]	506	20.8	1.00	61.2	61.2	61.2	0.0
D	6,125[2]	315	2,038	1.00	63.8	63.8	63.8	0.0
E	9,029[2]	280	735	2.80	76.8	76.8	77.0	0.2
F	9,134[2]	350	1,050	1.90	77.4	77.4	77.5	0.1
G	10,296[2]	355	1,340	1.10	78.3	78.3	78.5	0.2
H	10,982[2]	220	300	4.70	82.5	82.5	82.5	0.0
I	11,088[2]	265	520	1.10	85.5	85.5	85.5	0.0
J	13,781[2]	160	245	2.30	101.3	101.3	101.3	0.0
Deep Run Tributary A								
A	1,373[3]	140	180	3.40	89.8	89.8	89.8	0.0
B	3,062[3]	190	300	1.60	93.4	93.4	93.4	0.0
C	4,752[3]	50	55	6.40	104.1	104.1	104.1	0.0
Deep Run Tributary B								
A	1,690[3]	390	685	1.40	71.4	71.4	71.5	0.1
B	3,115[3]	180	270	3.20	81.0	81.0	81.1	0.1
C	3,221[3]	225	490	1.70	82.6	82.6	82.7	0.1

[1]Feet above confluence with Debois Creek
[2]Feet above county boundary
[3]Feet above confluence with Deep Run

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

DEBOIS CREEK TRIBUTARY – DEEP RUN – DEEP RUN TRIBUTARY A – DEEP RUN TRIBUTARY B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Deep Run Tributary B (continued)								
D	4,013[1]	250	700	1.20	83.0	83.0	83.2	0.2
E	4,594[1]	260	305	1.20	83.2	83.2	83.4	0.2
F	4,699[1]	500	795	0.40	85.3	85.3	85.3	0.0
G	6,758[1]	20	64	5.50	97.6	97.6	97.6	0.0
H	8,606[1]	10	30	8.30	107.8	107.8	107.8	0.0
I	8,712[1]	310	1345	0.20	113.8	113.8	113.8	0.0
J	9,240[1]	10	20	6.30	113.8	113.8	113.8	0.0
Deep Run Tributary C								
A	898[2]	185	240	2.30	86.0	86.0	86.0	0.0
B	1,109[2]	130	155	3.50	86.5	86.5	86.5	0.0
C	2,429[2]	270	275	1.60	92.5	92.5	92.6	0.1
D	2,699[2]	290	200	2.10	110.4	110.4	110.6	0.2
E	2,805[2]	310	380	0.60	111.9	111.9	111.9	0.0
F	5,386[2]	20	70	2.60	117.5	117.5	117.6	0.1
Doctors Creek								
A	85[3]	65	539	4.00	60.2	60.2	60.3	0.1
B	985[3]	166	841	2.60	61.1	61.1	61.2	0.1
C	1,320[3]	149	652	3.30	61.4	61.4	61.6	0.2
D	2,170[3]	266	1,315	1.60	62.2	62.2	62.3	0.1
E	2,900[3]	2,320	1,303	1.70	62.5	62.5	62.6	0.1
F	3,830[3]	166	869	2.50	63.0	63.0	63.2	0.2
G	4,085[3]	295	2,942	0.70	71.9	71.9	71.9	0.0
H	4,610[3]	665	5,682	0.40	71.9	71.9	71.9	0.0
I	5,695[3]	403	2,482	0.90	71.9	71.9	71.9	0.0

[1]Feet above confluence with Deep Run
[2]Feet above confluence with Deep Run Tributary B
[3]Feet above Fowlers Bridge Road

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

DEEP RUN TRIBUTARY B – DEEP RUN TRIBUTARY C – DOCTORS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Creek								
A	4,800[1]	33	232	4.10	15.0	15.0	15.1	0.1
B	5,920[1]	173	633	1.50	16.8	16.8	16.9	0.1
C	6,945[1]	320	890	0.80	21.9	21.9	21.9	0.0
D	7,730[1]	127	332	2.30	24.3	24.3	24.5	0.2
E	8,070[1]	103	269	2.80	25.7	25.7	25.8	0.1
Flat Creek								
A	1,850[1]	112	579	2.30	10.8	10.8	10.9	0.1
B	2,550[1]	225	909	1.50	11.6	11.6	11.7	0.1
C	3,500[1]	98	351	3.80	14.3	14.3	14.4	0.1
D	4,450[1]	120	170	4.10	22.4	22.4	22.4	0.0
E	4,950[1]	50	218	3.20	25.1	25.1	25.2	0.1
F	5,775[1]	46	185	3.70	26.2	26.2	26.4	0.2
G	6,775[1]	50	134	5.20	29.8	29.8	30.0	0.2
H	7,900[1]	96	441	1.30	39.8	39.8	39.8	0.0
I	8,550[1]	21	47	8.50	39.9	39.9	39.9	0.0
Gander Brook								
A	1,637[2]	100	220	0.80	106.0	106.0	106.1	0.1
B	5,597[2]	35	40	4.30	123.8	123.8	123.8	0.0
Gravelly Brook								
A	3,065[3]	290	1,545	0.90	21.1	21.1	21.3	0.2
B	3,899[3]	232	425	2.90	21.2	21.2	21.4	0.2
C	4,378[3]	201	988	1.30	26.7	26.7	26.9	0.2
D	4,652[3]	290	577	2.20	23.6	23.6	23.8	0.2

[1]Feet above downstream side of State Route 36
[2]Feet above confluence with Still House Brook
[3]Feet above confluence with Matawan Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

EAST CREEK – FLAT CREEK – GANDER BROOK – GRAVELLY BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Gravelly Brook (continued)								
E	5,000[1]	217	1,316	1.00	26.7	26.7	26.9	0.2
F	6,092[1]	190	767	1.60	27.1	27.1	27.3	0.2
G	11,976[1]	100	280	3.50	53.4	53.4	53.4	0.0
H	13,549[1]	24	123	8.10	66.7	66.7	66.7	0.0
I	14,077[1]	20	55	8.30	72.6	72.6	72.6	0.0
J	14,182[1]	30	105	3.00	75.1	75.1	75.2	0.1
K	16,241[1]	15	35	2.60	91.9	91.9	91.9	0.0
L	19,093[1]	10	15	6.00	162.2	162.2	162.2	0.0
Gravelly Run								
A	200[2]	68	151	1.70	19.0	16.2[4]	16.4	0.2
B	1,040[2]	16	51	4.90	20.0	20.0	20.2	0.2
C	1,860[2]	16	42	6.00	25.2	25.2	25.3	0.1
D	2,650[2]	33	69	3.60	32.0	32.0	32.2	0.2
Groundhog Brook								
A	100[3]	23	59	6.40	49.0	47.4[5]	47.6	0.2
B	1,134[3]	16	60	6.40	52.7	52.7	52.7	0.0
C	1,142[3]	50	252	1.50	57.5	57.5	57.5	0.0
D	1,165[3]	274	1,836	0.20	57.6	57.6	57.6	0.0
E	2,430[3]	153	572	0.50	57.6	57.6	57.6	0.0
F	2,970[3]	23	68	4.40	57.6	57.6	57.6	0.0

[1]Feet above confluence with Matawan Creek
[2]Feet above confluence with Metedeconk River North Branch
[3]Feet above confluence with Haystack Brook
[4]Elevation computed without consideration of backwater effects from Metedeconk River North Branch
[5]Elevation computed without consideration of backwater effects from Haystack Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

GRAVELLY BROOK – GRAVELLY RUN – GROUNDHOG BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hannabrand Brook								
A	1,050[1]	290	1,231	3.10	11.9	11.9	12.1	0.2
B	2,946[1]	28	169	7.40	18.0	18.0	18.2	0.2
C	5,075[1]	80	209	7.50	24.5	24.5	24.7	0.2
D	8,150[1]	277	621	2.10	33.4	33.4	33.6	0.2
E	11,200[1]	64	171	4.50	45.3	45.3	45.5	0.2
F	12,950[1]	77	192	4.00	55.7	55.7	55.9	0.2
G	15,000[1]	46	103	7.30	65.6	65.6	65.8	0.2
H	16,850[1]	98	194	4.40	81.2	81.2	81.4	0.2
Haystack Brook								
A	55[2]	257	919	1.10	22.0	20.1[3]	20.3	0.2
B	830[2]	28	169	6.00	22.0	20.5[3]	20.6	0.1
C	865[2]	30	152	6.70	22.0	20.5[3]	20.6	0.1
D	2,250[2]	127	348	2.90	23.7	23.7	23.8	0.1
E	3,030[2]	226	413	2.50	24.8	24.8	24.8	0.0
F	4,235[2]	84	266	3.80	26.9	26.9	27.0	0.1
G	5,165[2]	67	226	3.70	28.8	28.8	29.0	0.2
H	6,025[2]	89	249	3.30	30.3	30.3	30.4	0.1
I	6,934[2]	28	249	3.30	30.3	30.3	30.4	0.1
J	6,964[2]	66	183	4.60	31.7	31.7	31.7	0.0
K	8,325[2]	204	520	1.60	34.2	34.2	34.3	0.1
L	9,126[2]	28	148	5.60	35.2	35.2	35.3	0.1
M	9,156[2]	76	176	4.70	35.6	35.6	35.6	0.0
N	10,865[2]	112	354	2.00	39.0	39.0	39.2	0.2
O	11,785[2]	198	458	1.60	39.8	39.8	40.0	0.2
P	12,685[2]	57	156	4.60	42.1	42.1	42.3	0.2
Q	13,356[2]	27	166	4.40	44.4	44.4	44.6	0.2
R	13,381[2]	27	166	4.40	44.4	44.4	44.6	0.2

[1]Feet above confluence with Wreck Pond Brook
[2]Feet above confluence with Metedeconk River North Branch
[3]Elevation computed without consideration of backwater effects from Metedeconk River North Branch

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

HANNABRAND BROOK – HAYSTACK BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Haystack Brook (continued)								
S	14,176[1]	87	234	3.10	46.2	46.2	46.4	0.2
T	14,830[1]	27	121	6.00	47.3	47.3	47.5	0.2
U	14,860[1]	126	377	1.80	48.0	48.0	48.1	0.1
V	15,640[1]	111	278	2.40	49.0	49.0	49.2	0.2
W	16,365[1]	164	310	2.20	50.1	50.1	50.3	0.2
X	17,055[1]	50	120	5.60	52.1	52.1	52.3	0.2
Y	17,845[1]	176	371	1.80	54.5	54.5	54.7	0.2
Z	19,280[1]	111	278	2.40	56.3	56.3	56.4	0.1
AA	20,266[1]	16	104	6.50	57.8	57.8	58.0	0.2
AB	20,296[1]	97	161	4.20	58.4	58.4	58.6	0.2
AC	21,565[1]	99	240	2.80	62.0	62.0	62.0	0.0
AD	22,670[1]	66	163	4.10	64.3	64.3	64.5	0.2
AE	23,493[1]	88	281	2.40	68.5	68.5	68.6	0.1
AF	23,523[1]	38	131	5.10	68.5	68.5	68.6	0.1
AG	24,505[1]	64	220	2.10	69.8	69.8	69.9	0.1
AH	25,905[1]	56	141	3.20	70.7	70.7	70.9	0.2
AI	26,875[1]	111	284	1.60	72.1	72.1	72.3	0.2
AJ	27,785[1]	34	78	5.90	73.6	73.6	73.8	0.2
Heroys Pond Creek								
A	230[2]	140	670	0.90	8.9	4.9[3]	5.1	0.2
B	2,950[2]	129	836	0.80	32.1	32.1	32.3	0.2
C	4,500[2]	112	249	2.50	34.4	34.4	34.6	0.2
D	5,100[2]	65	100	6.20	36.7	36.7	36.9	0.2

[1]Feet above confluence with Metedeconk River North Branch
[2]Feet above confluence with Shark River Estuary
[3]Minimum elevation for establishing 1%-annual chance boundary is tidal elevation (8.9 feet NAVD)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

HAYSTACK BROOK – HEROYS POND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hockhockson Brook								
A	0[1]	227	1,470	0.80	46.3	46.3	46.5	0.2
B	280[1]	99	522	2.30	46.3	46.3	46.5	0.2
C	1,500[1]	161	666	1.80	47.0	47.0	47.2	0.2
D	2,520[1]	190	571	2.10	47.6	47.6	47.8	0.2
E	3,000[1]	74	252	4.70	48.0	48.0	48.2	0.2
F	3,500[1]	139	291	4.10	49.7	49.7	49.9	0.2
G	4,250[1]	196	577	2.10	51.4	51.4	51.6	0.2
Hog Swamp Brook								
A	300[2]	80	1,215	0.80	20.5	20.5	20.7	0.2
B	1,450[2]	65	780	1.20	20.5	20.5	20.7	0.2
C	2,570[2]	130	1,247	0.80	20.5	20.5	20.7	0.2
D	3,550[2]	140	573	1.70	21.5	21.5	21.7	0.2
E	5,280[2]	69	405	2.40	32.5	32.5	32.6	0.1
F	6,070[2]	115	283	3.40	33.2	33.2	33.4	0.2
G	6,980[2]	85	254	3.80	35.4	35.4	35.4	0.0
H	8,560[2]	190	406	2.40	41.9	41.9	42.1	0.2
I	9,140[2]	170	473	1.40	43.3	43.3	43.4	0.1
J	9,840[2]	100	172	4.00	43.4	43.4	43.6	0.2
K	11,220[2]	280	539	1.30	48.6	48.6	48.7	0.1
L	12,320[2]	55	101	6.70	49.9	49.9	49.9	0.0
M	12,710[2]	55	141	4.80	51.0	51.0	51.2	0.2
N	13,910[2]	70	100	4.40	54.6	54.6	54.8	0.2
O	14,930[2]	150	982	0.50	63.5	63.5	63.5	0.0
P	16,410[2]	91	232	1.90	63.5	63.5	63.6	0.1

[1]Feet above confluence with Pine Brook 1
[2]Feet above confluence with Deal Lake

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

HOCKHOCKSON BROOK – HOG SWAMP BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hollow Brook								
A	0[1]	177	827	0.80	13.2	13.2	13.4	0.2
B	1,140[1]	118	1,461	0.30	16.3	16.3	16.5	0.2
C	2,348[1]	272	836	0.80	20.2	20.2	20.4	0.2
D	5,538[1]	90	205	2.30	34.3	34.3	34.5	0.2
E	6,748[1]	24	56	8.60	45.2	45.2	45.2	0.0
F	6,948[1]	35	82	5.80	47.1	47.1	47.2	0.1
G	7,148[1]	39	86	5.60	48.1	48.1	48.1	0.0
H	7,488[1]	29	58	8.10	50.9	50.9	50.9	0.0
I	7,588[1]	645	2,186	0.20	51.9	51.9	52.1	0.2
J	7,948[1]	163	112	4.70	52.9	52.9	53.1	0.2
K	8,308[1]	164	144	3.40	55.7	55.7	55.9	0.2
Indian Run								
A	370[2]	145	521	2.00	67.9	67.9	68.1	0.2
B	1,220[2]	38	294	3.50	69.5	69.5	69.7	0.2
C	1,320[2]	275	2,821	0.40	80.4	80.4	80.5	0.1
D	2,440[2]	174	1,026	1.00	81.1	81.1	81.3	0.2
E	3,480[2]	147	613	1.70	82.8	82.8	83.0	0.2
Judas Creek (Upstream Reach)								
A	200[3]	138	1,078	0.20	29.1	29.1	29.3	0.2
B	500[3]	102	550	0.40	29.1	29.1	29.3	0.2
C	830[3]	50	44	5.40	29.3	29.3	29.3	0.0
D	1,050[3]	102	108	2.20	31.1	31.1	31.1	0.0
E	1,600[3]	60	47	5.10	35.2	35.2	35.2	0.0
F	2,200[3]	52	72	3.30	39.9	39.9	40.0	0.1

[1]Feet above mouth
[2]Feet above county boundary
[3]Feet above limit of detailed study (limit of detailed study is approximately 900 feet below State Highway 35)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

HOLLOW BROOK – INDIAN RUN – JUDAS CREEK (UPSTREAM REACH)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Jumping Brook 1								
A	0[1]	318	614	2.70	16.0	16.0[3]	16.1	0.1
B	565[1]	312	1,787	0.50	16.6	16.6	16.7	0.1
C	885[1]	215	1,096	0.70	17.6	17.6	17.7	0.1
D	1,615[1]	100	705	1.10	22.2	22.2	22.2	0.0
E	2,365[1]	105	409	1.90	22.3	22.3	22.4	0.1
F	2,955[1]	122	463	1.60	24.1	24.1	24.3	0.2
G	3,985[1]	96	445	1.70	27.6	27.6	27.8	0.2
H	4,465[1]	70	194	3.80	29.4	29.4	29.6	0.2
I	5,335[1]	65	313	2.20	32.7	32.7	32.9	0.2
J	5,556[1]	130	1,019	0.70	39.3	39.3	39.3	0.0
K	7,466[1]	109	239	2.40	40.7	40.7	40.8	0.1
L	8,006[1]	121	574	1.00	44.1	44.1	44.3	0.2
M	8,966[1]	101	462	1.20	44.6	44.6	44.8	0.2
Jumping Brook 2								
A	0[2]	130	1,335	2.00	8.9	8.9	9.1	0.2
B	500[2]	580	2,225	1.20	8.9	8.9	9.1	0.2
C	2,850[2]	325	1,035	2.60	8.9	8.9	9.1	0.2
D	3,360[2]	120	490	5.40	10.3	10.3	10.5	0.2
E	3,900[2]	135	700	3.80	11.7	11.7	11.9	0.2
F	4,400[2]	255	1,035	2.60	12.4	12.4	12.6	0.2
G	4,750[2]	280	765	3.55	12.9	12.9	13.1	0.2
H	5,150[2]	50	245	10.90	15.1	15.1	15.2	0.1
I	5,400[2]	50	250	10.70	17.9	17.9	18.0	0.1
J	5,700[2]	130	430	6.20	21.3	21.3	21.5	0.2
K	5,904[2]	328	1,057	2.90	25.4	25.4	25.6	0.2
L	6,300[2]	150	897	3.00	25.5	25.5	25.7	0.2

[1]Feet above Private Drive (Upstream Face) (Private drive is approximately 775 feet below West Front Street)
[2]Feet above mouth
[3]Elevation computed without consideration of backwater effects from Nut Swamp Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

JUMPING BROOK 1 – JUMPING BROOK 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Jumping Brook 2 (continued)								
M	6,700	348	1,732	1.60	25.7	25.7	25.9	0.2
N	6,900	116	569	4.70	25.7	25.7	25.9	0.2
O	8,052	386	581	4.60	27.2	27.2	27.4	0.2
P	8,972	205	1,834	1.40	38.3	38.3	38.3	0.0
Q	9,100	317	3,924	0.80	38.3	38.3	38.3	0.0
R	10,050	390	3,086	0.80	38.3	38.3	38.3	0.0
S	11,400	132	835	2.80	38.3	38.3	38.3	0.0
T	12,600	123	454	5.20	38.7	38.7	38.7	0.0
U	13,100	87	249	9.60	39.6	39.6	39.8	0.2
V	13,500	99	554	4.10	42.3	42.3	42.5	0.2
W	13,620	283	3,287	0.80	52.2	52.2	52.4	0.2
X	15,000	225	1,778	1.40	52.2	52.2	52.4	0.2
Y	15,700	199	1,255	1.80	52.2	52.2	52.4	0.2
Z	17,100	176	822	2.70	52.4	52.4	52.6	0.2
AA	18,500	170	316	7.40	54.2	54.2	54.4	0.2
AB	18,900	67	207	8.70	57.0	57.0	57.2	0.2
AC	19,720	95	313	5.70	60.8	60.8	61.0	0.2
AD	19,940	187	2,340	0.80	71.4	71.4	71.5	0.1
AE	19,990	240	3,858	0.00	71.4	71.4	71.5	0.1
AF	21,220	140	3,200	0.00	71.4	71.4	71.5	0.1
AG	21,470	250	2,013	0.90	71.4	71.4	71.6	0.2
AH	22,125	350	2,704	0.70	71.4	71.4	71.6	0.2
AI	22,240	350	2,070	0.90	71.4	71.4	71.6	0.2
AJ	23,230	319	1,115	1.10	72.1	72.1	72.2	0.1
AK	23,620	289	808	1.60	72.2	72.2	72.3	0.1
AL	24,495	84	322	3.90	73.9	73.9	74.0	0.1

[1]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

JUMPING BROOK 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Jumping Brook 2 (continued)								
AM	25,070	172	688	1.80	78.1	78.1	78.1	0.0
AN	25,770	109	370	4.10	78.7	78.7	78.9	0.2
AO	26,605	83	244	5.20	82.2	82.2	82.3	0.1
AP	27,220	150	2,076	0.60	90.1	90.1	90.1	0.0
Little Silver Creek								
A	9,480	35	204	0.4	8.0	8.0	8.0	0.0
B	9,980	150	449	1.7	8.2	8.2	8.4	0.2
C[2]	10,479	46	283	2.7	11.3	11.3	11.3	0.0
D	10,980	100	487	1.6	11.5	11.5	11.6	0.1
E	11,580	268	683	1.1	11.6	11.6	11.8	0.2
F	12,080	140	363	2.1	11.9	11.9	12.1	0.2
G	12,680	99	224	3.4	12.9	12.9	13.1	0.2
H	13,180	110	280	2.4	13.8	13.8	14.0	0.2
Little Silver Tributary A								
A	140	113	240	0.04	12.9	12.9	13.1	0.2

[1]Feet above mouth

[2]Data at bridge culverts reflect conditions on upstream side of bridge

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

JUMPING BROOK 2 – LITTLE SILVER CREEK – LITTLE SILVER TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Silver Tributary 1								
A[2]	1,830	30	142	0.9	10.4	10.4	10.4	0.0
B	1,910	10	55	2.2	10.4	10.4	10.5	0.1
C[2]	2,020	152	334	0.4	11.1	11.1	11.3	0.2
D	2,450	28	60	2.0	11.1	11.1	11.3	0.2
E	2,850	91	91	1.3	11.9	11.9	12.1	0.2
F[2]	3,150	33	142	0.9	14.9	14.9	15.1	0.2
Little Silver Tributary 2								
A	3,270	138	232	1.6	8.4	8.4	8.5	0.1
B	3,570	55	126	2.8	8.9	8.9	9.0	0.1
C[2]	3,870	115	250	1.4	12.9	12.9	13.1	0.2
D	4,270	140	501	0.7	13.0	13.0	13.2	0.2
E	4,670	80	235	1.5	13.1	13.1	13.3	0.2
F	5,070	102	199	1.8	13.5	13.5	13.7	0.2
G	5,450	56	91	2.4	13.7	13.7	13.8	0.1
H[2]	5,950	40	81	2.7	18.7	18.7	18.8	0.1
I	6,350	53	59	3.7	19.1	19.1	19.3	0.2
J	6,850	42	64	3.4	22.4	22.4	22.5	0.1
Little Silver Tributary 2A								
A	500	30	56	2.5	14.1	14.1	14.4	0.3
B	1,220	38	37	3.1	15.9	15.9	16.0	0.1
C	1,820	38	37	3.1	19.5	19.5	19.7	0.2

[1]Feet above mouth
[2]Data at bridge culverts reflect conditions on upstream side of bridge

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

LITTLE SILVER TRIBUTARY 1 – LITTLE SILVER TRIBUTARY 2 - LITTLE SILVER TRIBUTARY 2 – LITTLE SILVER TRIBUTARY 2A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Silver Tributary 2B								
A[1]	400[2]	101	656	0.04	25.1	25.1	25.2	0.1
B	450[2]	101	656	0.04	25.1	25.1	25.2	0.1
Long Brook								
A	570[3]	20	72	8.30	74.0	74.0	74.2	0.2
B	1,075[3]	47	112	5.30	78.8	78.8	78.8	0.0
C	1,938[3]	95	447	1.30	85.5	85.5	85.7	0.2
D	1,968[3]	28	129	4.60	85.5	85.5	85.7	0.2
E	2,665[3]	36	118	5.00	86.7	86.7	86.9	0.2
F	3,913[3]	16	92	6.50	93.4	93.4	93.5	0.1
G	3,948[3]	104	547	1.10	94.3	94.3	94.4	0.1
H	5,017[3]	41	171	3.50	96.5	96.5	96.5	0.0
I	5,047[3]	153	570	1.00	96.7	96.7	96.9	0.2
J	6,065[3]	100	344	1.70	97.0	97.0	97.2	0.2
K	6,781[3]	25	90	6.60	98.0	98.0	98.2	0.2
L	6,811[3]	63	208	2.90	99.0	99.0	99.0	0.0
M	7,535[3]	116	324	1.60	99.7	99.7	99.9	0.2
N	8,255[3]	114	216	2.40	101.1	101.1	101.3	0.2
O	8,285[3]	26	72	7.20	101.1	101.1	101.3	0.2
P	8,450[3]	35	118	4.40	101.8	101.8	102.0	0.2
Q	9,440[3]	43	111	4.70	104.0	104.0	104.2	0.2
R	10,589[3]	98	204	2.50	108.0	108.0	108.2	0.2
S	10,619[3]	61	206	2.50	108.2	108.2	108.3	0.1
T	11,615[3]	20	73	5.00	110.0	110.0	110.1	0.1

[1]Data at bridge culverts reflect conditions on upstream side of bridge
[2]Feet above mouth
[3]Feet above confluence with Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

LITTLE SILVER TRIBUTARY 2B - LONG BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Long Brook (continued)								
U	12,510[1]	52	141	2.60	111.4	111.4	111.6	0.2
V	13,429[1]	42	77	4.70	113.6	113.6	113.7	0.1
W	13,459[1]	25	66	5.50	113.6	113.6	113.8	0.2
X	14,615[1]	21	33	10.80	116.3	116.3	116.3	0.0
Y	14,645[1]	70	224	1.60	118.2	118.2	118.2	0.0
Z	15,664[1]	38	135	2.70	118.7	118.7	118.8	0.1
AA	16,669[1]	37	80	4.50	120.1	120.1	120.3	0.2
AB	16,989[1]	74	165	2.20	122.4	122.4	122.4	0.0
AC	17,019[1]	59	165	2.20	122.4	122.4	122.4	0.0
AD	17,354[1]	34	117	3.10	124.1	124.1	124.2	0.1
AE	17,384[1]	57	211	1.70	124.2	124.2	124.3	0.1
Mahoras Brook								
A	500[2]	94	197	7.20	16.9	16.9	17.0	0.1
B	1,900[2]	380	1,052	1.40	21.7	21.7	21.9	0.2
C	2,900[2]	175	245	5.80	24.0	24.0	24.1	0.1
D	3,520[2]	285	704	2.00	27.3	27.3	27.5	0.2
E	3,900[2]	150	272	5.20	29.5	29.5	29.6	0.1
F	4,300[2]	260	613	2.30	32.4	32.4	32.6	0.2
G	4,588[2]	56	350	3.30	35.4	35.4	35.6	0.2
H	4,690[2]	292	540	2.10	35.5	35.5	35.6	0.1
I	6,330[2]	423	353	3.20	37.1	37.1	37.2	0.1
J	7,460[2]	183	217	5.30	42.7	42.7	42.9	0.2
K	8,180[2]	298	3,063	0.30	55.6	55.6	55.6	0.0
L	10,510[2]	185	470	1.40	58.6	58.6	58.8	0.2
M	11,580[2]	106	222	3.10	61.2	61.2	61.2	0.0

[1]Feet above confluence with Manasquan River
[2]Feet above confluence with Waackaack Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

LONG BROOK – MAHORAS BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mahoras Brook (continued)								
N	12,070[1]	100	156	4.30	67.7	67.7	67.7	0.0
O	13,935[1]	226	310	2.00	79.8	79.8	79.8	0.0
P	15,140[1]	68	168	3.80	86.0	86.0	86.2	0.2
Q	16,780[1]	118	248	2.60	100.5	100.5	100.7	0.2
Manalapan Brook								
A	945[2]	436	1,369	1.30	76.3	76.3	76.4	0.1
B	1,968[2]	484	1,241	1.40	76.6	76.6	76.7	0.1
C	2,211[2]	463	1,372	1.30	77.6	77.6	77.7	0.1
D	3,654[2]	476	1,104	1.60	78.0	78.0	78.1	0.1
E	4,967[2]	247	469	3.80	79.2	79.2	79.2	0.0
F	5,138[2]	142	533	3.10	81.1	81.1	81.2	0.1
G	6,079[2]	384	1,003	1.60	82.3	82.3	82.3	0.0
H	7,165[2]	450	1,214	1.40	83.0	83.0	83.0	0.0
I	8,363[2]	510	1,177	1.30	84.2	84.2	84.2	0.0
J	9,705[2]	445	1,023	1.50	85.9	85.9	85.9	0.0
K	10,978[2]	509	1,649	1.00	86.5	86.5	86.5	0.0
L	12,507[2]	516	686	2.30	87.6	87.6	87.7	0.1
M	13,526[2]	707	1,040	1.50	89.5	89.5	89.5	0.0
N	14,424[2]	265	465	3.40	91.0	91.0	91.0	0.0
O	14,597[2]	82	326	3.90	92.3	92.3	92.3	0.0
P	15,657[2]	491	1,365	0.70	93.6	93.6	93.6	0.0
Q	17,126[2]	318	736	1.40	94.5	94.5	94.5	0.0
R	17,277[2]	280	765	1.30	94.6	94.6	94.7	0.1
S	18,423[2]	327	706	1.40	95.8	95.8	95.9	0.1
T	19,457[2]	70	273	3.70	96.7	96.7	96.8	0.1

[1]Feet above confluence with Waackaack Creek
[2]Feet above county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MAHORAS BROOK – MANALAPAN BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manalapan Brook (continued)								
U	20,223	160	399	2.50	99.1	99.1	99.1	0.0
V	20,835	217	506	2.00	99.7	99.7	99.8	0.1
W	22,023	202	401	2.50	101.2	101.2	101.3	0.1
X	22,677	71	373	2.70	102.4	102.4	102.5	0.1
Y	22,998	281	1,915	1.20	113.2	113.2	113.2	0.0
Z	24,032	244	1,585	0.70	113.2	113.2	113.2	0.0
AA	25,239	243	1,251	0.80	113.3	113.3	113.3	0.0
AB	25,676	206	481	2.10	113.4	113.4	113.4	0.0
AC	26,815	260	587	1.40	114.8	114.8	114.8	0.0
AD	27,870	225	532	1.60	116.5	116.5	116.5	0.0
AE	28,991	92	308	2.70	118.5	118.5	118.5	0.0
AF	29,165	148	525	1.60	119.5	119.5	119.5	0.0
AG	29,850	348	1,031	0.80	119.8	119.8	119.8	0.0
AH	31,299	234	375	1.70	120.9	120.9	120.9	0.0
AI	32,499	292	672	0.90	123.0	123.0	123.0	0.0
AJ	33,605	139	173	3.60	125.0	125.0	125.0	0.0
AK	34,972	185	412	1.50	128.0	128.0	128.0	0.0
AL	36,479	28	94	4.00	129.9	129.9	129.9	0.0
AM	36,677	306	1,623	1.20	136.7	136.7	136.7	0.0
AN	37,734	316	869	0.50	136.9	136.9	136.9	0.0
AO	38,552	112	170	2.20	137.3	137.3	137.3	0.0
AP	39,661	102	199	1.90	140.6	140.6	140.6	0.0
AQ	40,305	118	236	1.60	142.1	142.1	142.1	0.0
AR	40,485	44	181	2.10	143.2	143.2	143.2	0.0
AS	40,890	95	255	1.50	143.6	143.6	143.6	0.0
AT	41,710	153	249	1.50	145.3	145.3	145.3	0.0

[1]Feet above county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANALAPAN BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manalapan Brook (continued)								
AU	42,611[1]	110	210	1.80	113.4	113.4	113.4	0.0
AV	43,974[1]	131	256	1.50	114.8	114.8	114.8	0.0
AW	45,097[1]	157	290	1.30	116.5	116.5	116.6	0.1
AX	46,091[1]	35	112	2.70	118.5	118.5	118.5	0.0
AY	46,216[1]	149	829	0.40	119.5	119.5	119.6	0.1
AZ	47,225[1]	110	439	0.70	119.8	119.8	119.9	0.1
BA	48,259[1]	227	688	0.40	120.9	120.9	121.0	0.1
BB	48,945[1]	290	599	0.50	123.0	123.0	123.0	0.0
BC	49,288[1]	130	127	2.40	125.0	125.0	125.0	0.0
BD	50,034[1]	150	247	1.20	164.4	164.4	164.5	0.1
BE	51,071[1]	70	105	2.90	167.2	167.2	167.3	0.1
BF	51,704[1]	79	133	2.30	170.6	170.6	170.8	0.2
BG	52,735[1]	38	29	1.60	176.2	176.2	176.3	0.1
BH	52,902[1]	51	97	0.50	178.9	178.9	178.9	0.0
BI	53,335[1]	10	12	3.80	181.1	181.1	181.2	0.1
Manalapan Brook Tributary A								
A	1,690[2]	120	110	2.60	91.7	91.7	91.8	0.1
B	7,181[2]	100	200	1.50	108.3	108.3	108.3	0.0
C	8,237[2]	100	200	1.40	109.8	109.8	109.9	0.1
D	9,134[2]	100	150	1.90	112.3	112.3	112.3	0.0
E	10,296[2]	60	150	1.50	117.3	117.3	117.5	0.2
F	14,942[2]	50	50	4.60	131.7	131.7	131.7	0.0

[1]Feet above county boundary
Feet above confluence with Manalapan Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANALAPAN BROOK – MANALAPAN BROOK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manalapan Brook Tributary B								
A	264[1]	140	70	2.20	123.6	123.6	123.7	0.1
B	528[1]	140	140	1.10	124.8	124.8	125.0	0.2
C	2,746[1]	20	40	3.90	132.7	132.7	132.8	0.1
D	5,861[1]	20	50	3.30	147.1	147.1	147.2	0.1
Manasquan River								
A	12[2]	81	532	4.20	43.3	43.3	43.5	0.2
B	44[2]	59	373	6.00	43.3	43.3	43.5	0.2
C	785[2]	164	636	3.50	44.1	44.1	44.3	0.2
D	1,685[2]	50	327	6.80	44.9	44.9	45.1	0.2
E	3,245[2]	68	397	5.60	47.3	47.3	47.4	0.1
F	4,035[2]	70	402	5.60	48.2	48.2	48.3	0.1
G	4,835[2]	50	388	5.80	49.1	49.1	49.2	0.1
H	5,346[2]	94	608	3.70	49.8	49.8	49.9	0.1
I	5,396[2]	69	457	4.90	49.8	49.8	49.9	0.1
J	6,635[2]	52	292	7.70	51.2	51.2	51.2	0.0
K	7,490[2]	44	301	7.40	53.5	53.5	53.5	0.0
L	8,340[2]	95	520	4.30	55.2	55.2	55.2	0.0
M	9,280[2]	273	917	2.40	55.8	55.8	55.8	0.0
N	10,200[2]	123	550	3.60	56.8	56.8	56.9	0.1
O	12,330[2]	319	1,257	1.60	58.0	58.0	58.2	0.2
P	13,232[2]	105	753	2.69	58.5	58.5	58.7	0.2
Q	13,282[2]	47	394	5.00	58.5	58.5	58.7	0.2
R	13,950[2]	50	367	5.40	58.9	58.9	59.1	0.2
S	15,410[2]	50	395	5.00	60.2	60.2	60.4	0.2
T	16,585[2]	55	465	4.30	61.1	61.1	61.3	0.2
U	17,605[2]	51	420	4.70	61.7	61.7	61.8	0.1

[1]Feet above confluence with Manalapan Brook
Feet from Southard Road

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANALAPAN BROOK TRIBUTARY B – MANASQUAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manasquan River (continued)								
V	18,425	51	371	5.30	62.2	62.2	62.4	0.2
W	19,230	45	333	5.90	63.0	63.0	63.2	0.2
X	20,190	70	463	3.90	64.1	64.1	64.3	0.2
Y	20,990	61	511	3.50	64.4	64.4	64.6	0.2
Z	21,585	57	389	4.60	64.6	64.6	64.7	0.1
AA	22,515	77	560	3.20	65.8	65.8	66.0	0.2
AB	22,565	55	378	4.70	65.8	65.8	66.0	0.2
AC	23,225	48	332	5.40	66.2	66.2	66.4	0.2
AD	23,890	77	370	4.80	67.0	67.0	67.2	0.2
AE	24,990	53	388	4.60	68.1	68.1	68.3	0.2
AF	26,755	75	450	4.00	69.3	69.3	69.5	0.2
AG	28,096	83	456	2.80	70.4	70.4	70.6	0.2
AH	28,146	48	264	6.00	70.4	70.4	70.6	0.2
AI	29,265	66	335	4.70	71.9	71.9	72.0	0.1
AJ	30,240	40	261	6.10	73.0	73.0	73.2	0.2
AK	31,340	70	530	3.00	74.0	74.0	74.2	0.2
AL	33,180	45	279	5.20	74.7	74.7	74.8	0.1
AM	34,820	247	764	1.90	76.5	76.5	76.7	0.2
AN	35,650	396	1,166	0.80	76.8	76.8	77.0	0.2
AO	36,450	43	147	6.00	76.8	76.8	77.0	0.2
AP	37,330	42	145	6.10	78.9	78.9	78.9	0.0
AQ	38,400	37	169	4.40	79.8	79.8	79.8	0.0
AR	39,000	32	128	5.80	80.7	80.7	80.7	0.0
AS	39,760	31	144	5.20	82.4	82.4	82.4	0.0
AT	40,630	31	105	6.00	83.4	83.4	83.4	0.0
AU	41,155	31	130	4.90	84.8	84.8	84.8	0.0

[1]Feet from Southard Road

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANASQUAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manasquan River (continued)								
AV	41,205[1]	16	68	9.30	84.8	84.8	84.8	0.0
AW	41,650[1]	43	182	3.50	86.3	86.3	86.4	0.1
AX	41,950[1]	39	164	3.90	86.5	86.5	86.6	0.1
AY	42,000[1]	46	181	3.50	86.6	86.6	86.7	0.1
AZ	42,465[1]	42	103	6.20	87.3	87.3	87.4	0.1
BA	42,495[1]	45	147	4.30	87.3	87.3	87.4	0.1
BB	43,970[1]	26	88	7.20	91.0	91.0	91.0	0.0
BC	44,480[1]	44	116	3.30	93.3	93.3	93.3	0.0
Manasquan River Tributary A								
A	130[2]	34	126	5.40	92.0	92.0	92.2	0.2
B	1,325[2]	33	154	4.40	98.1	98.1	98.1	0.0
C	2,310[2]	32	96	7.10	101.7	101.7	101.7	0.0
D	3,220[2]	28	72	9.50	105.7	105.7	105.7	0.0
E	3,250[2]	28	120	5.70	107.1	107.1	107.1	0.0
F	3,620[2]	42	119	5.80	109.1	109.1	109.1	0.0
G	4,350[2]	57	204	3.40	113.8	113.8	113.9	0.1
H	5,175[2]	45	132	5.20	117.2	117.2	117.4	0.2
Manasquan River Tributary B								
A	430[2]	16	55	8.30	82.8	82.8	83.0	0.2
B	1,160[2]	20	70	6.60	88.9	88.9	88.9	0.0
C	1,620[2]	20	79	5.80	91.9	91.9	92.0	0.1
D	2,015[2]	31	110	4.20	93.8	93.8	94.0	0.2
E	2,820[2]	32	73	6.20	96.4	96.4	96.5	0.1
F	3,470[2]	111	190	2.40	99.9	99.9	100.1	0.2

[1]Feet from Southard Road
[2]Feet above confluence with Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANASQUAN RIVER – MANASQUAN RIVER TRIBUTARY A – MANASQUAN RIVER TRIBUTARY B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manasquan River Tributary B (continued)								
G	4,490	42	148	3.10	105.2	105.2	105.4	0.2
H	4,520	163	354	1.30	105.5	105.5	105.7	0.2
I	5,160	20	66	7.00	106.5	106.5	106.7	0.2
J	5,905	513	1,010	0.50	110.9	110.9	111.1	0.2
K	5,935	206	477	1.00	111.2	111.2	111.3	0.1
L	6,965	15	71	6.50	114.7	114.7	114.8	0.1
M	6,995	24	94	4.90	115.2	115.2	115.3	0.1
N	7,460	13	58	7.90	117.0	117.0	117.2	0.2
O	7,490	25	85	5.40	118.1	118.1	118.2	0.1
P	8,185	17	62	7.40	121.7	121.7	121.7	0.0
Q	9,000	30	334	1.40	129.2	129.2	129.4	0.2
R	9,030	28	155	2.90	129.2	129.2	129.4	0.2
Manasquan River Tributary C								
A	80	135	120	5.50	79.8	79.8	80.0	0.2
B	620	19	83	7.90	82.2	82.2	82.4	0.2
C	1,126	68	189	3.50	85.8	85.8	85.8	0.0
D	1,156	22	138	4.70	85.9	85.9	85.9	0.0
E	1,811	117	121	5.40	88.4	88.4	88.4	0.0
F	2,510	115	311	2.10	90.4	90.4	90.5	0.1
G	3,520	94	273	2.40	96.7	96.7	96.9	0.2
H	4,435	68	237	2.80	101.1	101.1	101.3	0.2
I	4,465	56	182	3.60	101.1	101.1	101.3	0.2
J	5,010	73	236	2.80	102.5	102.5	102.7	0.2
K	5,040	56	191	3.40	102.6	102.6	102.7	0.1
L	5,670	33	118	5.60	104.2	104.2	104.4	0.2

[1]Feet above confluence with Manasquan River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANASQUAN RIVER TRIBUTARY B – MANASQUAN RIVER TRIBUTARY C

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Manasquan River Tributary C (continued)								
M	6,290[1]	32	121	5.40	106.1	106.1	106.1	0.0
N	7,030[1]	16	84	7.80	108.3	108.3	108.5	0.2
O	7,060[1]	33	134	4.90	109.3	109.3	109.4	0.1
P	7,903[1]	247	634	1.00	110.8	110.8	110.9	0.1
Q	9,165[1]	57	150	4.40	115.2	115.2	115.4	0.2
Marl Brook								
A	1,660[2]	70	149	3.90	71.2	71.2	71.2	0.0
B	2,590[2]	72	110	4.30	74.6	74.6	74.6	0.0
C	4,930[2]	70	166	3.10	82.4	82.4	82.6	0.2
Matawan Creek								
A	19,674[3]	333	2,488	1.00	18.9	18.9	19.0	0.1
B	19,907[3]	402	3,273	0.60	18.9	18.9	19.0	0.1
C	21,098[3]	378	2,351	0.70	18.9	18.9	19.0	0.1
D	22,229[3]	286	302	4.40	19.1	19.1	19.3	0.2
E	23,026[3]	179	411	3.20	24.4	24.4	24.6	0.2
F	23,917[3]	165	717	1.40	25.3	25.3	25.5	0.2
G	24,885[3]	107	178	5.50	30.2	30.2	30.4	0.2
H	26,360[3]	120	530	0.90	39.6	39.6	39.6	0.0
I	26,466[3]	140	645	0.70	40.3	40.3	40.3	0.0
J	27,522[3]	90	95	4.30	48.3	48.3	48.3	0.0
K	27,628[3]	220	730	0.60	50.8	50.8	50.9	0.1
L	28,684[3]	300	345	1.00	51.0	51.0	51.1	0.1
M	29,951[3]	215	175	1.50	66.9	66.9	67.1	0.2

[1]Feet above confluence with Manasquan River
[2]Feet above confluence with Mine Brook
[3]Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MANASQUAN RIVER TRIBUTARY C – MARL BROOK – MATAWAN CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Matchaponix Brook								
A	581[1]	350	2,205	1.20	56.2	56.2	56.4	0.2
B	1,531[1]	730	3,070	0.70	56.2	56.2	56.4	0.2
C	2,112[1]	510	2,935	0.70	56.9	56.9	57.0	0.1
D	6,072[1]	500	920	2.40	58.2	58.2	58.2	0.0
McClees Creek								
A	970[2]	178	497	2.50	8.1	7.2[4]	7.4	0.2
B	2,510[2]	111	259	4.80	9.5	9.5	9.6	0.1
C	4,250[2]	129	744	1.70	17.3	17.3	17.4	0.1
D	5,340[2]	244	623	2.00	24.7	24.7	24.7	0.0
E	6,235[2]	163	843	1.00	27.8	27.8	27.8	0.0
F	7,595[2]	170	371	2.20	32.4	32.4	32.5	0.1
G	8,695[2]	110	374	1.70	34.1	34.1	34.3	0.2
H	9,555[2]	284	1,156	0.50	39.1	39.1	39.2	0.1
McGellairds Brook								
A	2,114[3]	189	360	4.18	61.1	61.1	61.1	0.0
B	2,399[3]	180	373	4.16	62.0	62.0	62.0	0.0
C	2,469[3]	188	759	2.01	62.6	62.6	62.6	0.0
D	3,314[3]	350	968	1.60	63.1	63.1	63.1	0.0
E	4,277[3]	300	1,480	1.00	63.7	63.7	63.7	0.0
F	5,650[3]	400	1,310	1.10	65.4	65.4	65.6	0.2
G	7,286[3]	240	415	3.60	66.9	66.9	66.9	0.0
H	8,290[3]	515	1,030	1.10	68.3	68.3	68.3	0.0
I	9,557[3]	175	720	1.50	71.1	71.1	71.1	0.0
J	12,144[3]	510	775	1.40	72.7	72.7	72.7	0.0
K	12,778[3]	145	80	6.70	73.4	73.4	73.4	0.0

[1] Feet above county boundary
[2] Feet above Cooper Road (upstream face)
[3] Feet above confluence with Matchaponix Brook
[4] Elevation computed without consideration of backwater effects from Navesink River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MATCHAPONIX BROOK – MCCLEES CREEK – MCGELLAIRDS BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
McGellairds Brook (continued)								
L	14,678[1]	160	140	3.80	77.1	77.1	77.1	0.0
M	15,946[1]	150	335	1.60	81.4	81.4	81.4	0.0
N	16,843[1]	210	715	0.70	83.7	83.7	83.7	0.0
O	18,374[1]	320	385	1.40	87.2	87.2	87.3	0.1
P	19,114[1]	290	334	1.60	89.4	89.4	89.4	0.0
Q	19,853[1]	250	565	1.00	90.7	90.7	90.7	0.0
R	20,750[1]	170	180	3.00	92.4	92.4	92.4	0.0
S	22,070[1]	205	475	1.10	97.6	97.6	97.7	0.1
T	23,971[1]	155	315	1.70	100.8	100.8	100.8	0.0
U	24,735[1]	28	54	6.20	101.5	101.5	101.7	0.2
V	25,945[1]	44	104	3.20	107.3	107.3	107.5	0.2
W	25,975[1]	13	49	6.90	107.3	107.3	107.5	0.2
X	26,150[1]	13	62	5.40	108.3	108.3	108.5	0.2
Y	26,180[1]	52	174	1.90	108.8	108.8	109.0	0.2
Z	26,530[1]	155	574	0.60	108.9	108.9	109.1	0.2
AA	27,865[1]	101	305	1.00	109.2	109.2	109.4	0.2
AB	28,215[1]	43	97	3.20	109.3	109.3	109.5	0.2
AC	28,705[1]	32	103	3.00	110.7	110.7	110.7	0.0
AD	29,215[1]	23	50	6.20	112.3	112.3	112.3	0.0
AE	29,265[1]	34	122	2.50	112.9	112.9	112.9	0.0
AF	29,295[1]	34	129	2.40	113.0	113.0	113.2	0.2
Metedeconk River North Branch								
A	10,195[2]	157/80[3]	563	2.10	16.6	16.6	16.8	0.2
B	11,025[2]	118/50[3]	557	2.00	18.6	18.6	18.8	0.2

[1] Feet above confluence with Matchaponix Brook
[2] Feet above confluence with South Branch Metedeconk River
[3] Width / width within county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MCGELLAIRDS BROOK – METEDECONK RIVER NORTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Metedeconk River North Branch (continued)								
C	13,120	433/400	1,985	0.60	21.0	21.0	21.2	0.2
D	14,345	371/275	1,613	0.60	21.8	21.8	22.0	0.2
E	15,450	28/23	252	3.70	23.0	23.0	23.1	0.1
F	15,480	97/70	418	2.20	23.0	23.0	23.2	0.2
G	17,545	182/105	757	1.20	25.6	25.6	25.7	0.1
H	18,790	184/160	797	1.20	26.7	26.7	26.9	0.2
I	19,810	141/95	657	1.40	27.8	27.8	28.0	0.2
J	20,585	173/60	689	1.30	28.8	28.8	28.9	0.1
K	21,440	219/200	828	1.10	30.1	30.1	30.3	0.2
L	22,020	136/65	493	1.90	31.0	31.0	31.2	0.2
M	22,325	74/25	519	1.80	31.9	31.9	32.1	0.2
N	22,355	81/55	348	2.60	31.9	31.9	32.1	0.2
O	24,125	292/215	348	0.60	35.2	35.2	35.4	0.2
P	25,125	166/140	830	1.10	35.8	35.8	36.0	0.2
Q	26,285	74/53	365	2.50	36.8	36.8	36.9	0.1
R	27,110	363/310	889	1.00	37.7	37.7	37.8	0.1
S	28,130	231/195	645	1.40	38.9	38.9	39.0	0.1
T	29,300	45/20	270	3.40	40.4	40.4	40.4	0.0
U	29,330	38/20	220	4.20	40.5	40.5	40.5	0.0
V	30,060	48/40	435	2.10	42.2	42.2	42.4	0.2
W	30,090	207/105	959	0.90	42.2	42.2	42.4	0.2
X	31,660	113/90	580	1.60	43.7	43.7	43.9	0.2
Y	32,590	240/205	887	1.00	44.8	44.8	45.0	0.2
Z	33,480	188/145	716	1.30	45.9	45.9	46.1	0.2
AA	34,520	234/70	961	0.90	47.0	47.0	47.2	0.2

[1] Feet above confluence with South Branch Metedeconk River
[2] Width / width within county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

METEDECONK RIVER NORTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Metedeconk River North Branch (continued)								
AB	43,800	140/65	531	1.70	48.2	48.2	48.4	0.2
AC	43,850	45/20	348	2.60	51.4	51.4	51.6	0.2
AD	45,170	40/25	241	3.70	51.4	51.4	51.6	0.2
AE	46,250	125/120	494	1.80	52.3	52.3	52.5	0.2
AF	47,300	213/130	913	1.00	53.8	53.8	54.0	0.2
AG	48,355	417/360	1,723	0.50	54.5	54.5	54.7	0.2
AH	49,300	221/190	850	1.00	55.4	55.4	55.6	0.2
AI	50,250	295/185	1,187	0.70	56.4	56.4	56.5	0.1
AJ	51,115	286/230	1,179	0.80	57.2	57.2	57.4	0.2
AK	51,950	134/110	735	1.20	58.0	58.0	58.2	0.2
AL	54,425	181/145	1,145	0.80	58.1	58.1	58.3	0.2
AM	55,530	157/95	686	1.30	58.4	58.4	58.6	0.2
AN	56,670	95/85	381	1.10	59.5	59.5	59.6	0.1
AO	57,770	300/280	1,001	0.80	61.1	61.1	61.3	0.2
AP	58,570	154/130	661	1.30	62.2	62.2	62.4	0.2
AQ	59,400	231/191	557	1.50	63.6	63.6	63.8	0.2
AR	43,800	330/280	1,053	0.80	65.4	65.4	65.5	0.1
AS	43,850	321/261	1,147	0.70	66.6	66.6	66.8	0.2
AT	45,170	452/250	1,798	0.50	67.6	67.6	67.8	0.2
AU	46,250	125/55	878	1.00	68.8	68.8	69.0	0.2
AV	47,300	152/60	525	1.50	69.8	69.8	70.0	0.2
AW	48,355	166/43	693	1.10	71.1	71.1	71.3	0.2
AX	49,300	190/160	609	1.30	72.4	72.4	72.5	0.1
AY	50,250	180/70	650	1.20	73.5	73.5	73.5	0.0
AZ	51,115	131/58	569	1.40	74.6	74.6	74.6	0.0

[1] Feet above confluence with South Branch Metedeconk River
[2] Width / width within county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

METEDECONK RIVER NORTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Metedeconk River North Branch (continued)								
BA	59,965[1]	183/120[3]	617	1.30	75.4	75.4	75.5	0.1
BB	60,660[1]	196/100[3]	819	1.00	76.6	76.6	76.7	0.1
BC	61,820[1]	180/85[3]	859	0.90	77.7	77.7	77.8	0.1
BD	62,800[1]	110/53[3]	342	2.30	78.5	78.5	78.6	0.1
BE	64,565[1]	97/57[3]	398	1.70	80.0	80.0	80.2	0.2
BF	65,385[1]	424/349[3]	1,017	0.70	80.6	80.6	80.8	0.2
BG	66,695[1]	402/240[3]	1,349	0.50	81.7	81.7	81.8	0.1
BH	67,700[1]	178/68[3]	1,012	0.70	84.6	84.6	84.7	0.1
BI	68,785[1]	99/39[3]	283	2.10	85.5	85.5	85.7	0.2
BJ	69,335[1]	125/40[3]	665	0.90	87.6	87.6	87.8	0.2
BK	70,785[1]	212/142[3]	890	0.70	88.4	88.4	88.6	0.2
BL	71,815[1]	194/100[3]	870	0.70	89.3	89.3	89.5	0.2
BM	72,815[1]	90/20[3]	476	1.30	90.1	90.1	90.2	0.1
BN	74,495[1]	40/20[3]	247	2.30	91.2	91.2	91.4	0.2
BO	75,700[1]	78/53[3]	424	1.30	92.1	92.1	92.3	0.2
Milford Brook								
A	1,320[2]	285	470	1.20	69.8	69.8	69.8	0.0
B	2,957[2]	325	500	1.20	74.4	74.4	74.5	0.1
C	3,590[2]	230	140	4.30	75.1	75.1	75.1	0.0
D	4,277[2]	250	615	1.00	76.2	76.2	76.3	0.1
E	6,125[2]	180	370	1.60	77.3	77.3	77.3	0.0
F	7,022[2]	180	180	3.30	80.3	80.3	80.3	0.0
G	8,078[2]	325	385	1.50	85.4	85.4	85.4	0.0
H	9,082[2]	280	610	1.00	86.7	86.7	86.7	0.0

[1] Feet above confluence with South Branch Metedeconk River
[2] Feet above confluence with McGellairds Brook
[3] Width / width within county boundary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

METEDECONK RIVER NORTH BRANCH – MILFORD BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Milford Brook (continued)								
I	10,560	210	145	4.00	90.0	90.0	90.0	0.0
J	11,352	225	395	1.50	92.0	92.0	92.0	0.0
K	13,306	205	265	2.20	97.8	97.8	97.9	0.1
L	14,256	210	190	2.10	100.1	100.1	100.1	0.0
M	15,629	240	405	1.00	103.7	103.7	103.8	0.1
N	16,632	255	170	2.30	109.9	109.9	109.9	0.0
O	18,480	210	320	1.20	113.8	113.8	113.8	0.0
P	19,378	60	55	7.30	115.6	115.6	115.6	0.0
Q	19,484	160	210	1.90	116.8	116.8	116.8	0.0
R	20,223	90	200	2.00	119.3	119.3	119.3	0.0
S	21,015	370	405	1.00	121.3	121.3	121.3	0.0
T	21,912	150	100	4.10	123.2	123.2	123.2	0.0
U	22,916	240	255	1.60	125.4	125.4	125.4	0.0
V	23,391	360	180	2.20	129.1	129.1	129.2	0.1
W	23,496	450	495	0.80	129.6	129.6	129.7	0.1
X	24,130	860	1,155	0.30	129.8	129.8	129.8	0.0
Y	25,133	200	170	2.40	131.1	131.1	131.1	0.0
Z	25,239	210	365	1.10	133.2	133.2	133.2	0.0
AA	25,820	450	60	6.60	139.4	139.4	139.4	0.0
AB	26,136	470	825	0.50	142.9	142.9	143.0	0.1
AC	26,823	400	2,095	0.10	142.9	142.9	143.0	0.1
AD	28,090	370	85	1.60	143.3	143.3	143.4	0.1
AE	28,512	150	80	1.80	146.3	146.3	146.3	0.0
AF	28,882	130	50	2.70	149.4	149.4	149.4	0.0
AG	29,252	180	160	2.50	150.4	150.4	150.5	0.1

[1] Feet above confluence with McGellairds Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MILFORD BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Millstone River								
A	308,020[1]	260	794	2.00	118.6	118.6	118.7	0.1
B	310,200[1]	190	570	2.00	122.6	122.6	122.8	0.2
C	312,530[1]	354	902	1.30	126.1	126.1	126.3	0.2
D	314,750[1]	570	1,306	0.80	127.5	127.5	127.7	0.2
E	317,100[1]	280	801	1.10	133.1	133.1	133.3	0.2
F	318,430[1]	370	828	1.00	134.4	134.4	134.6	0.2
G	322,225[1]	152	199	3.60	142.9	142.9	143.0	0.1
H	324,766[1]	23	71	10.00	147.1	147.1	147.1	0.0
I	326,785[1]	140	165	3.40	152.7	152.7	152.8	0.1
J	328,885[1]	167	346	1.60	157.1	157.1	157.3	0.2
K	420,490[1]	402	1,071	0.70	140.7	140.7	140.8	0.1
Mine Brook								
A	1,000[2]	102	417	3.70	41.7	41.7	41.9	0.2
B	2,650[2]	80	307	5.00	45.3	45.3	45.5	0.2
C	4,100[2]	114	589	2.60	49.3	49.3	49.4	0.1
D	4,500[2]	67	341	4.50	49.6	49.6	49.7	0.1
E	5,570[2]	83	283	5.40	54.9	54.9	55.1	0.2
F	6,051[2]	79	44	3.50	58.7	58.7	58.7	0.0
G	6,455[2]	132	318	4.80	59.1	59.1	59.1	0.0
H	7,200[2]	63	400	3.80	64.1	64.1	64.1	0.0
I	7,750[2]	105	667	2.30	64.4	64.4	64.6	0.2
J	8,750[2]	82	284	3.70	65.6	65.6	65.8	0.2
K	9,300[2]	71	219	4.80	67.4	67.4	67.6	0.2
L	9,547[2]	190	1,021	0.90	74.8	74.8	74.8	0.0
M	11,870[2]	133	308	3.00	76.1	76.1	76.2	0.1
N	12,500[2]	80	440	2.10	79.4	79.4	79.4	0.0

[1] Feet above confluence with Raritan River
[2] Feet above confluence with Yellow Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MILLSTONE RIVER – MINE BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mine Brook (continued)								
O	13,720[1]	50	125	7.30	80.4	80.4	80.4	0.0
P	15,540[1]	66	183	5.00	84.4	84.4	84.6	0.2
Q	16,500[1]	88	292	3.10	87.3	87.3	87.5	0.2
R	17,300[1]	118	310	2.90	88.7	88.7	88.9	0.2
Miry Bog Brook								
A	600[1]	26	53	7.20	66.9	66.9	67.0	0.1
B	1,300[1]	26	68	5.60	72.9	72.9	73.0	0.1
C	1,500[1]	40	141	2.70	75.2	75.2	75.2	0.0
D	1,770[1]	61	124	3.10	75.5	75.5	75.5	0.0
E	2,080[1]	184	990	0.40	79.1	79.1	79.1	0.0
F	2,340[1]	184	872	0.40	79.1	79.1	79.1	0.0
G	2,550[1]	191	1,024	0.40	83.3	83.3	83.3	0.0
H	3,040[1]	160	742	0.50	83.3	83.3	83.3	0.0
I	3,530[1]	49	166	2.30	83.3	83.3	83.3	0.0
Mohingson Brook								
A	113[2]	447	695	1.90	10.5	3.4[3]	3.6	0.2
B	625[2]	170	1,015	1.30	10.5	8.9[3]	8.9	0.0
C	1,165[2]	130	842	1.60	16.1	16.1	16.3	0.2
D	1,631[2]	116	976	1.20	21.1	21.1	21.1	0.0
E	2,719[2]	266	3,836	0.30	21.1	21.1	21.3	0.2
F	3,077[2]	90	740	0.40	25.5	25.5	25.5	0.0
G	3,407[2]	498	6,078	0.00	25.5	25.5	25.5	0.0
H	4,798[2]	117	1,150	0.20	25.5	25.5	25.5	0.0
I	5,103[2]	431	4,329	0.10	25.5	25.5	25.5	0.0

[1] Feet above confluence with Yellow Brook
[2] Feet above confluence with Matawan Creek
[3] Elevation computed without consideration of effects of tidal flooding from Raritan Bay

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MINE BROOK – MIRY BOG BROOK – MOHINGSON BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mohingson Brook (continued)								
J	5,337[1]	188	1,377	0.20	25.5	25.5	25.5	0.0
K	6,932[1]	156	402	1.70	25.5	25.5	25.5	0.0
L	7,732[1]	29	106	11.0	26.5	26.5	26.5	0.0
M	8,630[1]	40	194	6.0	34.0	34.0	34.0	0.0
N	9,002[1]	129	115	8.60	39.6	39.6	39.6	0.0
O	9,580[1]	72	338	2.90	41.8	41.8	41.8	0.0
P	9,932[1]	124	273	3.60	45.5	45.5	45.7	0.2
Q	10,862[1]	33	91	8.90	48.0	48.0	48.0	0.0
R	11,221[1]	36	156	5.20	53.4	53.4	53.4	0.0
S	11,561[1]	33	152	5.30	53.9	53.9	53.9	0.0
T	11,887[1]	37	346	2.30	59.9	59.9	59.9	0.0
U	12,220[1]	58	157	5.20	65.3	65.3	65.3	0.0
V	12,585[1]	33	272	3.00	75.7	75.7	75.7	0.0
W	13,232[1]	24	187	3.40	77.3	77.3	77.3	0.0
X	13,623[1]	60	234	2.70	77.5	77.5	77.6	0.1
Monascunk Creek								
A	450[2]	61	169	3.40	19.6	19.6	19.7	0.1
B	980[2]	40	164	3.50	23.9	23.9	24.0	0.1
C	1,400[2]	18	132	4.40	26.8	26.8	26.9	0.1
D	1,950[2]	100	144	4.00	29.7	29.7	29.8	0.1
E	2,810[2]	100	243	2.40	33.7	33.7	33.9	0.2
F	4,070[2]	135	520	1.00	42.6	42.6	42.6	0.0
G	5,115[2]	73	245	2.10	43.4	43.4	43.5	0.1

[1] Feet above confluence with Matawan Creek
[2] Feet above confluence with Flat Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MOHINGSON BROOK – MONASCUNK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Musquash Brook								
A	200[1]	*	*	*	9.0	*	*	*
B	800[1]	*	*	*	9.0	*	*	*
C	1,550[1]	*	*	*	9.0	*	*	*
D	2,400[1]	*	*	*	14.0	*	*	*
E	3,000[1]	*	*	*	18.3	*	*	*
F	4,450[1]	*	*	*	38.5	*	*	*
G	4,900[1]	*	*	*	53.2	*	*	*
H	5,500[1]	291	2303	0.1	53.2	53.2	53.4	0.2
I	7,425[1]	23	61	10.4	57.7	57.7	57.9	0.2
Nut Swamp Brook								
A	0[2]	318	614	2.70	16.0	16.0	16.1	0.1
B	895[2]	240	894	0.90	16.7	16.7	16.8	0.1
C	1,835[2]	80	259	3.20	18.0	18.0	18.1	0.1
D	2,185[2]	114	359	2.30	19.1	19.1	19.3	0.2
E	2,645[2]	201	1,315	0.60	24.7	24.7	24.8	0.1
F	4,395[2]	69	237	3.50	25.6	25.6	25.8	0.2
G	5,185[2]	100	606	1.30	29.5	29.5	29.5	0.0
H	6,405[2]	73	163	3.70	31.3	31.3	31.3	0.0
I	7,925[2]	120	216	2.60	40.2	40.2	40.4	0.2
J	8,495[2]	196	416	1.30	43.7	43.7	43.8	0.1
L	9,175[2]	192	398	1.30	49.3	49.3	49.4	0.1
M	9,595[2]	161	323	1.60	50.0	50.0	50.2	0.2
Parkers Creek								
A	6,420[1]	250	2,893	0.50	8.0	5.1[3]	5.3	0.2
B	7,970[1]	465	3,031	0.40	8.0	5.1[3]	5.3	0.2

[1] Feet above mouth

* Data not available

[2] Feet above limit of detailed study (limit of detailed study is approximately 2300 feet below Normandy Road)

[3] Elevation computed without consideration of backwater effects from Shrewsbury River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

MUSQUASH BROOK – NUT SWAMP BROOK – PARKERS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Parkers Creek (continued)								
C	11,250[1]	294	1,116	1.20	8.0	6.2[4]	6.4	0.2
D	12,900[1]	186	672	0.80	8.0	6.3[4]	6.5	0.2
E	13,995[1]	99	177	3.00	8.0	6.6[4]	6.8	0.2
F	14,520[1]	183	351	1.50	8.0	8.0	8.2	0.2
G	14,950[1]	137	265	2.00	8.7	8.7	8.9	0.2
H	15,320[1]	39	127	4.30	9.9	9.9	10.1	0.2
I	15,610[1]	41	164	3.30	10.8	10.8	11.0	0.2
J	16,020[1]	216	574	0.90	12.5	12.5	12.6	0.1
K	16,350[1]	124	216	2.50	12.7	12.7	12.8	0.1
L	16,652[1]	118	224	2.40	13.6	13.6	13.8	0.2
M	17,220[1]	156	349	1.50	14.6	14.6	14.8	0.2
Parkers Creek North Branch								
A	110[2]	197	1,008	0.30	8.2	8.2[5]	8.4	0.2
B	2,170[2]	187	456	0.80	8.2	8.2[5]	8.4	0.2
C	3,900[2]	48	124	2.80	12.3	12.3	12.5	0.2
D	4,020[2]	45	137	2.50	12.6	12.6	12.8	0.2
E	4,420[2]	23	61	5.60	14.8	14.8	14.8	0.0
Pine Brook 1								
A	300[3]	110	473	3.90	10.6	2.1[6]	2.3	0.2
B	525[3]	240	612	3.00	10.6	2.4[6]	2.6	0.2
C	1,705[3]	242	882	2.10	10.6	3.2[6]	3.4	0.2
D	2,225[3]	345	778	2.40	10.6	3.5[6]	3.7	0.2
E	3,100[3]	350	1,622	1.10	10.6	6.5[6]	6.7	0.2
F	3,700[3]	265	1,310	1.40	10.6	6.5[6]	6.7	0.2

[1] Feet above mouth
[2] Feet above confluence with Parkers Creek
[3] Feet above confluence with Swimming River
[4] Elevation computed without consideration of backwater effects from Shrewsbury River
[5] Elevation computed without consideration of backwater effects from Parkers Creek
[6] Elevation computed without consideration of backwater effects from

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

PARKERS CREEK – PARKERS CREEK, NORTH BRANCH – PINE BROOK 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pine Brook 1 (continued)								
G	4,500[1]	314	1,280	1.20	10.6	6.6[3]	6.8	0.2
H	5,500[1]	311	1,177	1.60	10.6	6.8[3]	7.0	0.2
I	6,000[1]	215	877	2.10	10.6	6.9[3]	7.1	0.2
J	6,500[1]	124	709	2.60	10.6	7.1[3]	7.3	0.2
K	6,730[1]	120	715	2.60	10.6	7.3[3]	7.5	0.2
L	7,000[1]	140	880	2.10	10.6	7.4[3]	7.6	0.2
M	7,500[1]	257	1,570	1.20	10.6	7.5[3]	7.7	0.2
N	8,500[1]	147	323	5.70	10.6	8.1[3]	8.2	0.1
O	9,750[1]	161	518	3.50	11.8	11.8	12.0	0.2
P	10,500[1]	245	669	2.70	13.1	13.1	13.3	0.2
Q	11,300[1]	166	432	4.20	14.7	14.7	14.9	0.2
R	12,303[1]	154	1,090	1.70	33.1	33.1	33.1	0.0
S	12,520[1]	48	304	6.00	33.4	33.4	33.4	0.0
T	13,300[1]	48	297	6.20	35.5	35.5	35.7	0.2
U	13,700[1]	48	316	5.80	36.6	36.6	36.8	0.2
V	14,920[1]	48	300	6.10	40.3	40.3	40.5	0.2
W	15,500[1]	48	288	6.30	41.9	41.9	42.1	0.2
X	16,620[1]	102	643	2.80	44.1	44.1	44.3	0.2
Pine Brook 2								
A	1,056[2]	160	570	1.90	56.7	56.7	56.9	0.2
B	2,587[2]	350	845	1.30	60.5	60.5	60.5	0.0
C	3,221[2]	155	550	2.00	62.4	62.4	62.4	0.0
D	4,277[2]	170	200	4.40	64.6	64.6	64.6	0.0
E	5,280[2]	300	730	1.20	66.8	66.8	66.8	0.0
F	6,811[2]	210	290	3.10	69.5	69.5	69.5	0.0

[1] Feet above confluence with Swimming River
[2] Feet above confluence with Matchaponix Brook
[3] Elevation computed without consideration of backwater effects from Swimming River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

PINE BROOK 1 – PINE BROOK 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pine Brook 2 (continued)								
G	9,240[1]	200	640	1.40	75.6	75.6	75.7	0.1
H	11,246[1]	230	640	1.00	82.1	82.1	82.1	0.0
I	12,778[1]	335	615	1.00	85.4	85.4	85.4	0.0
J	14,203[1]	195	360	1.80	87.9	87.9	87.9	0.0
K	15,787[1]	250	610	1.00	93.5	93.5	93.5	0.0
L	19,166[1]	410	980	0.90	102.2	102.2	102.3	0.1
M	20,223[1]	200	150	3.40	107.7	107.7	107.7	0.0
N	21,120[1]	520	385	1.30	113.4	113.4	113.4	0.0
Pine Brook 2 Tributary C								
A	211[2]	20	120	1.30	77.6	77.6	77.6	0.0
B	1,584[2]	15	40	3.80	77.8	77.8	77.9	0.1
C	1,742[2]	100	315	0.50	83.7	83.7	83.7	0.0
D	2,482[2]	100	155	1.00	84.0	84.0	84.1	0.1
Polypod Brook								
A	170[3]	123	555	0.50	57.6	57.6	57.8	0.2
B	815[3]	41	151	1.70	57.6	57.6	57.8	0.2
Poly Pond Brook								
A	100[4]	431	1,581	0.20	17.0	17.0	17.2	0.2
B	1,000[4]	446	2,453	0.10	17.0	17.0	17.2	0.2
C	2,000[4]	669	3,244	0.10	17.0	17.0	17.2	0.2
D	3,500[4]	206	477	0.80	17.0	17.0	17.2	0.2

[1] Feet above confluence with Matchaponix Brook
[2] Feet above confluence with Pine Brook 2
[3] Feet above confluence with Groundhog Brook
[4] Feet above limit of detailed study (limit of detailed study is approximately 950 feet below Route 71)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

PINE BROOK 2 – PINE BROOK 2 TRIBUTARY C – POLY POND BROOK – POLYPOD BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Poplar Brook								
A	490[1]	25	127	10.20	8.4	8.4	8.6	0.2
B	1,665[1]	236	1,523	0.80	13.6	13.6	13.8	0.2
C	2,370[1]	200	986	1.30	13.7	13.7	13.9	0.2
D	3,305[1]	230	689	1.90	14.1	14.1	14.3	0.2
E	4,080[1]	155	715	1.80	18.1	18.1	18.2	0.1
F	6,630[1]	280	1,164	1.10	27.6	27.6	27.7	0.1
G	7,110[1]	260	1,892	0.50	27.6	27.6	27.8	0.2
H	8,190[1]	140	800	1.20	27.6	27.6	27.8	0.2
I	9,600[1]	80	284	3.40	27.7	27.7	27.9	0.2
J	10,360[1]	440	823	1.20	30.1	30.1	30.2	0.1
K	11,600[1]	180	338	2.80	30.7	30.7	30.9	0.2
L	12,565[1]	260	371	2.10	33.8	33.8	33.9	0.1
M	13,055[1]	200	445	1.70	34.1	34.1	34.3	0.2
N	14,870[1]	45	101	7.60	36.7	36.7	36.7	0.0
O	15,140[1]	37	94	8.10	38.7	38.7	38.7	0.0
P	16,550[1]	190	559	1.10	45.2	45.2	45.4	0.2
Q	17,600[1]	23	101	5.90	47.1	47.1	47.3	0.2
R	18,430[1]	50	174	3.40	50.1	50.1	50.2	0.1
Poplar Brook Tributary 1								
A	750[2]	11	23	4.80	27.6	25.4[3]	25.4	0.0
B	1,650[2]	24	65	1.70	28.6	28.6	28.8	0.2
Poplar Brook Tributary 2								
A	1,000[2]	7	16	3.60	35.8	35.8	35.8	0.0
B	2,150[2]	9	16	3.60	42.2	42.2	42.2	0.0

[1] Feet above Atlantic Ocean
[2] Feet above confluence with Poplar Brook
[3] Elevation computed without consideration of backwater effects from Poplar Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

POPLAR BROOK – POPLAR BROOK TRIBUTARY 1 – POPLAR BROOK TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Poplar Brook Tributary 3								
A	200[1]	100	4,522	0.00	34.8	34.8	35.0	0.2
B	1,200[1]	15	33	5.90	37.1	37.1	37.1	0.0
Poricy Brook								
A	1,800[2]	371	5,470	0.20	24.2	24.2	24.2	0.0
B	2,820[2]	*	4,719	0.20	24.2	24.2	24.2	0.0
C	3,900[2]	*	4,108	0.20	24.2	24.2	24.2	0.0
D	5,200[2]	320	4,563	0.20	24.2	24.2	24.2	0.0
E	6,760[2]	263	2,281	0.30	24.2	24.2	24.2	0.0
F	8,420[2]	196	613	1.10	24.5	24.5	24.5	0.0
G	9,490[2]	92	224	3.10	26.3	26.3	26.5	0.2
H	10,470[2]	119	219	2.90	32.9	32.9	33.0	0.1
I	11,200[2]	142	206	3.10	39.3	39.3	39.5	0.2
J	11,610[2]	139	255	2.50	43.8	43.8	44.0	0.2
K	12,200[2]	164	589	1.00	47.2	47.2	47.4	0.2
L	13,000[2]	120	244	2.40	50.0	50.0	50.2	0.2
M	13,825[2]	45	117	5.10	54.1	54.1	54.3	0.2
N	14,260[2]	40	139	4.10	57.3	57.3	57.3	0.0
O	15,000[2]	17	77	7.40	62.7	62.7	62.8	0.1
Ramanessin Brook								
A	1,760[3]	549	1,785	1.90	41.6	41.6	41.8	0.2
B	2,000[3]	400	1,473	2.30	42.7	42.7	42.7	0.0
C	3,050[3]	224	865	2.30	43.3	43.3	43.5	0.2
D	4,820[3]	224	544	3.70	46.4	46.4	46.4	0.0
E	6,600[3]	179	544	3.70	52.0	52.0	52.2	0.2
F	8,520[3]	127	438	4.60	58.4	58.4	58.5	0.1
G	8,860[3]	79	437	4.30	60.6	60.6	60.7	0.1

[1] Feet above confluence with Poplar Brook
[2] Feet above confluence with Navesink River
[3] Feet above confluence with Willow Brook

* Data not available

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

POPLAR BROOK TRIBUTARY 3 – PORICY BROOK – RAMANESSIN BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Ramanessin Brook (continued)								
H	10,820[1]	226	498	3.80	65.5	65.5	65.6	0.1
I	12,285[1]	112	358	5.30	71.3	71.3	71.5	0.2
J	12,500[1]	166	1,046	1.80	76.4	76.4	76.5	0.1
K	13,700[1]	202	676	2.80	77.1	77.1	77.1	0.0
L	15,560[1]	120	497	3.00	83.1	83.1	83.2	0.1
M	17,600[1]	182	664	2.30	87.3	87.3	87.5	0.2
N	18,500[1]	169	395	3.80	93.1	93.1	93.3	0.2
O	20,085[1]	177	413	2.40	100.7	100.7	100.8	0.1
P	20,900[1]	110	375	2.70	102.5	102.5	102.6	0.1
Q	22,500[1]	189	499	2.00	110.7	110.7	110.8	0.1
R	23,590[1]	105	341	2.90	116.3	116.3	116.4	0.1
S	24,200[1]	127	303	2.00	118.1	118.1	118.3	0.2
T	25,185[1]	130	253	2.50	125.6	125.6	125.8	0.2
Roberts Swamp Brook (Upstream Reach)								
A	300[2]	20	42	8.30	16.4	16.4	16.6	0.2
B	730[2]	22	58	6.10	20.3	20.3	20.5	0.2
C	1,080[2]	36	129	3.40	24.4	24.4	24.6	0.2
D	1,400[2]	72	138	3.70	24.9	24.9	25.1	0.2
E	2,000[2]	20	42	8.30	28.6	28.6	28.7	0.1
Rocky Brook (Downstream Reach)								
A	26,687[3]	162/118[4]	626	1.60	106.5	106.5	106.6	0.1
B	27,887[3]	450/360[4]	995	1.00	107.0	107.0	107.2	0.2
C	28,987[1]	419/379[4]	1,064	0.90	107.4	107.4	107.6	0.2

[1] Feet above confluence with Willow Brook
[2] Feet above limit of detailed study (limit of detailed study is approximately 785 feet below Algonkin Trail)
[3] Feet above county boundary
[4] Width / Width within Monmouth County corporate limits

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

RAMENESSIN BROOK – ROBERTS SWAMP BROOK (UPSTREAM REACH) – ROCKY BROOK (DOWNSTREAM REACH)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky Brook (Downstream Reach) (continued)								
D	29,937[1]	516/481[4]	755	1.30	109.4	109.4	109.4	0.0
E	30,637[1]	525/435[4]	1,145	0.90	110.0	110.0	110.1	0.1
Rocky Brook (Upstream Reach)								
A	-2,240[2]	243	796	1.00	141.1	141.1	141.3	0.2
B	-545[2]	100	399	2.00	146.8	146.8	146.8	0.0
C	519[2]	192	505	1.50	148.5	148.5	148.7	0.2
D	1,118[2]	43	194	4.00	155.3	155.3	155.5	0.2
Shark River								
A	1,900[3]	130	554	1.80	8.9	4.9[5]	5.1	0.2
B	2,530[3]	435	690	1.40	8.9	5.2[5]	5.4	0.2
C	3,230[3]	445	265	3.80	8.9	6.2[5]	6.3	0.1
D	4,600[3]	630	2,193	0.50	8.9	6.4[5]	6.5	0.1
E	5,100[3]	399	1,507	0.80	8.9	6.4[5]	6.5	0.1
F	6,530[3]	327	826	1.10	8.9	6.5[5]	6.6	0.1
G	7,400[3]	148	265	3.80	8.9	6.8[5]	7.0	0.2
H	8,120[3]	50	160	6.30	10.2	10.2	10.4	0.2
I	8,710[3]	50	146	6.10	11.5	11.5	11.7	0.2
J	9,330[3]	90	339	2.70	12.8	12.8	12.9	0.1
K	9,780[3]	110	432	2.10	13.0	13.0	13.1	0.1
L	10,600[3]	90	409	2.10	13.3	13.3	13.4	0.1
M	11,160[3]	43	174	5.10	13.6	13.6	13.7	0.1
N	12,350[3]	49	167	5.30	16.2	16.2	16.4	0.2
O	13,355[3]	50	161	5.90	19.2	19.2	19.4	0.2

[1] Feet above county boundary
[2] Feet from Perrineville Road
[3] Feet above mouth
[4] Width / width within Monmouth County boundary
[5] Elevation computed without consideration of backwater effects from Shark River Estuary

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

ROCKY BROOK (DOWNSTREAM) – ROCKY BROOK (UPSTREAM) – SHARK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shark River (continued)								
P	14,100[1]	92	326	2.80	22.1	22.1	22.3	0.2
Q	15,600[1]	95	265	3.30	23.8	23.8	24.0	0.2
R	16,100[1]	146	261	3.40	24.7	24.7	24.7	0.0
S	16,720[1]	131	322	2.80	25.8	25.8	26.0	0.2
T	17,600[1]	59	180	5.20	27.2	27.2	27.4	0.2
U	18,200[1]	40	161	5.50	28.8	28.8	29.0	0.2
V	18,660[1]	30	137	6.50	29.5	29.5	29.7	0.2
W	19,520[1]	123	387	2.30	31.5	31.5	31.7	0.2
X	20,050[1]	30	104	8.50	32.0	32.0	32.0	0.0
Y	20,460[1]	59	238	3.70	33.5	33.5	33.7	0.2
Z	20,850[1]	53	201	4.60	35.1	35.1	35.3	0.2
AA	21,600[1]	36	156	3.90	36.4	36.4	36.6	0.2
AB	22,900[1]	30	115	5.20	38.6	38.6	38.8	0.2
AC	24,400[1]	30	131	4.50	42.1	42.1	42.2	0.1
AD	25,980[1]	30	109	5.50	45.1	45.1	45.3	0.2
AE	27,480[1]	24	75	8.00	49.0	49.0	49.2	0.2
AF	30,185[1]	19	48	6.40	55.8	55.8	56.0	0.2
AG	30,665[1]	24	69	4.50	57.9	57.9	57.9	0.0
AH	31,255[1]	21	44	7.00	59.6	59.6	59.8	0.2
AI	33,493[1]	30	90	3.40	67.5	67.5	67.6	0.1
AJ	35,285[1]	17	40	7.60	72.8	72.8	72.9	0.1
Shark River Tributary D								
A	400[2]	34	47	6.80	35.1	35.1	35.3	0.2
B	600[2]	169	340	0.90	36.7	36.7	36.9	0.2
C	1,200[2]	90	67	4.70	40.3	40.3	40.3	0.0

[1] Feet above mouth

[2] Feet above confluence with Shark River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

SHARK RIVER – SHARK RIVER TRIBUTARY D

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shark River Tributary D (continued)								
D	1,800[1]	56	58	5.50	51.6	51.6	51.7	0.1
E	2,150[1]	50	54	5.90	57.8	57.8	57.8	0.0
F	2,410[1]	24	49	7.70	64.1	64.1	64.3	0.2
Shark River Tributary E								
A	500[1]	56	129	9.00	51.7	51.7	51.9	0.2
B	1,900[1]	464	672	2.50	59.4	59.4	59.6	0.2
C	2,800[1]	125	340	4.30	63.7	63.7	63.9	0.2
D	3,450[1]	256	1,370	0.10	70.4	70.4	70.6	0.2
Still House Brook								
A	1,056[2]	120	390	0.90	94.1	94.1	94.3	0.2
B	2,270[2]	120	110	3.10	97.5	97.5	97.5	0.0
C	3,432[2]	150	250	0.70	101.1	101.1	101.3	0.2
D	4,435[2]	60	50	3.30	103.3	103.3	103.3	0.0
E	6,600[2]	60	90	1.80	121.6	121.6	121.8	0.2
Swimming River								
A	0[3]	170	1,930	5.80	8.1	8.1	8.3	0.2
B	3,480[3]	639	5,926	1.90	9.7	9.7	9.9	0.2
C	7,180[3]	1,085	6,703	1.40	10.9	10.9	11.1	0.2
D	7,480[3]	250	3,088	3.10	11.0	11.0	11.2	0.2
E	11,780[3]	434	9,247	1.00	21.8	21.8	22.0	0.2
F	14,110[3]	483	7,706	1.20	21.9	21.9	22.1	0.2
G	14,550[3]	566	7,896	1.20	21.9	21.9	22.1	0.2

[1] Feet above confluence with Shark River
[2] Feet above confluence with Manalapan Brook
[3] Feet above Newman Springs Road (downstream face)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

SHARK RIVER TRIBUTARY D – SHARK RIVER TRIBUTARY E – STILL HOUSE BROOK – SWIMMING RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tepehemus Brook								
A	1,267[1]	220	200	3.40	75.9	75.9	75.9	0.0
B	2,006[1]	365	720	0.90	77.3	77.3	77.3	0.0
C	3,379[1]	300	400	1.70	79.8	79.8	79.8	0.0
D	4,488[1]	175	255	2.60	81.6	81.6	81.7	0.1
E	5,227[1]	260	285	2.40	84.4	84.4	84.4	0.0
F	6,336[1]	275	590	1.10	87.2	87.2	87.4	0.2
G	8,184[1]	310	535	1.20	88.9	88.9	89.0	0.1
H	9,187[1]	230	115	6.00	90.7	90.7	90.7	0.0
I	9,821[1]	290	315	2.10	92.4	92.4	92.4	0.0
J	10,243[1]	120	235	2.90	93.1	93.1	93.1	0.0
K	12,302[1]	100	140	2.70	98.7	98.7	98.7	0.0
L	13,464[1]	40	80	4.60	102.6	102.6	102.6	0.0
M	13,728[1]	100	115	4.30	104.1	104.1	104.2	0.1
N	14,625[1]	180	215	4.30	108.3	108.3	108.5	0.2
O	15,523[1]	230	445	1.90	109.8	109.8	109.8	0.0
P	16,420[1]	200	145	3.30	110.8	110.8	110.8	0.0
Tepehemus Brook South Branch								
A	1,162[2]	100	140	3.10	100.0	100.0	100.0	0.0
B	1,954[2]	130	235	1.80	104.1	104.1	104.1	0.0
C	2,799[2]	200	300	1.40	107.1	107.1	107.1	0.0
D	3,538[2]	130	135	3.20	109.9	109.9	109.9	0.0
E	3,591[2]	220	760	0.60	112.3	112.3	112.3	0.0
F	4,436[2]	140	410	1.00	112.5	112.5	112.5	0.0
G	5,069[2]	50	85	5.10	113.9	113.9	114.0	0.1
H	5,702[2]	160	480	0.90	115.9	115.9	116.0	0.1
I	6,336[2]	150	125	3.50	118.3	118.3	118.3	0.0

[1] Feet above confluence with McGellairds Brook
[2] Feet above confluence with Tepehemus Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

TEPEHEMUS BROOK – TEPEHEMUS BROOK NORTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Toms River								
A	380[1]	281	800	0.60	149.5	149.5	149.7	0.2
B	1,967[1]	39	109	4.30	150.4	150.4	150.5	0.1
C	3,830[1]	93	277	1.70	155.0	155.0	155.2	0.2
D	4,622[1]	190	452	1.00	155.6	155.6	155.8	0.2
Town Brook								
A	7,675[2]	336	1,458	0.50	17.5	17.5	17.5	0.0
B	9,175[2]	117	518	1.50	18.7	18.7	18.8	0.1
C	10,870[2]	249	1,434	0.50	26.6	26.6	26.6	0.0
D	11,285[2]	245	1,232	0.50	27.5	27.5	27.5	0.0
E	12,135[2]	163	719	0.90	29.7	29.7	29.7	0.0
F	13,930[2]	252	253	1.80	30.9	30.9	30.9	0.0
G	15,065[2]	209	162	2.80	36.7	36.7	36.7	0.0
H	15,975[2]	473	2,580	0.20	43.7	43.7	43.7	0.0
I	16,925[2]	228	267	1.70	44.2	44.2	44.2	0.0
Turtle Mill Brook								
A	820[3]	90	289	3.80	3.9	3.9	4.1	0.2
B	970[3]	53	146	7.60	3.9	3.9	4.1	0.2
C	1,200[3]	137	611	2.00	5.8	5.8	5.9	0.1
D	1,535[3]	36	186	5.90	5.8	5.8	5.9	0.1
E	1,700[3]	55	205	5.40	6.4	6.4	6.6	0.2
F	1,980[3]	40	199	5.50	7.3	7.3	7.5	0.2
G	2,390[3]	173	473	2.90	9.0	9.0	9.2	0.2
H	3,950[3]	130	565	2.10	9.3	9.3	9.5	0.2
I	5,150[3]	162	385	3.50	9.7	9.7	9.9	0.2

[1] Feet above Monmouth Road
[2] Feet above Campbell Avenue
[3] Feet above confluence with Branchport Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

TOMS RIVER – TOWN BROOK – TURTLE MILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Waackaack Creek								
A	9,130[1]	511	2,740	0.70	10.5	8.0[3]	8.2	0.2
B	9,980[1]	683	3,130	0.60	10.5	8.0[3]	8.2	0.2
C	10,430[1]	552	2,622	0.70	10.5	8.1[3]	8.3	0.2
D	10,680[1]	712	3,315	0.60	10.5	8.1[3]	8.3	0.2
E	11,490[1]	458	2,180	0.90	10.5	8.1[3]	8.3	0.2
F	12,665[1]	1,080	3,068	0.60	10.5	8.4[3]	8.6	0.2
G	13,165[1]	1,140	4,263	0.50	10.5	8.4[3]	8.6	0.2
H	13,740[1]	937	3,025	0.60	10.5	8.5[3]	8.7	0.2
I	14,640[1]	240	1,030	1.90	10.5	8.7[3]	8.9	0.2
J	14,915[1]	530	2,234	0.90	10.5	9.0[3]	9.2	0.2
K	15,620[1]	238	560	3.50	10.5	9.4[3]	9.6	0.2
L	15,720[1]	293	740	2.60	10.5	9.8[3]	10.0	0.2
M	16,570[1]	207	478	4.10	13.9	13.9	14.1	0.2
N	16,700[1]	552	1,458	1.30	16.1	16.1	16.3	0.2
O	18,060[1]	511	1,749	1.10	16.8	16.8	17.0	0.2
P	18,750[1]	150	164	3.70	19.4	19.4	19.4	0.0
Q	19,170[1]	42	132	4.70	20.1	20.1	20.1	0.0
R	19,270[1]	74	136	4.20	22.0	22.0	22.0	0.0
S	19,850[1]	120	345	1.70	23.1	23.1	23.2	0.1
T	20,500[1]	80	121	4.80	24.9	24.9	24.9	0.0
U	21,150[1]	100	254	2.30	26.4	26.4	26.6	0.2
V	21,630[1]	254	339	1.70	29.6	29.6	29.7	0.1
W	22,240[1]	70	97	5.90	33.0	33.0	33.0	0.0
Wampum Brook								
A	430[2]	170	1,137	0.70	12.4	12.4	12.6	0.2
B	2,000[2]	39	207	3.70	12.4	12.4	12.6	0.2

[1] Feet above confluence with Raritan Bay
[2] Feet above Limit of Flood Affecting Community (Limit of Flood Affecting Community is approximately 110 feet downstream of western boundary of Fort Monmouth)
[3] Elevation computed without consideration of backwater effects of Raritan Bay

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WAACKAACK CREEK – WAMPUM BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wampum Brook (continued)								
C	2,390[1]	20	141	5.40	13.7	13.7	13.9	0.2
D	3,000[1]	225	791	1.00	16.5	16.5	16.5	0.0
E	3,500[1]	240	703	1.10	16.5	16.5	16.5	0.0
F	3,800[1]	105	240	3.20	16.6	16.6	16.6	0.0
G	4,000[1]	143	271	2.80	16.9	16.9	17.0	0.1
H	4,210[1]	41	131	5.80	19.0	19.0	19.0	0.0
I	4,480[1]	45	154	4.60	20.0	20.0	20.0	0.0
J	4,680[1]	65	470	1.50	23.5	23.5	23.5	0.0
K	4,880[1]	400	718	1.00	24.5	24.5	24.5	0.0
L	5,050[1]	75	508	1.40	24.5	24.5	24.5	0.0
M	5,360[1]	60	359	2.00	24.6	24.6	24.6	0.0
N	5,480[1]	60	352	2.00	24.6	24.6	24.6	0.0
Watson Creek								
A	90[2]	25	118	6.70	20.2	20.2	20.4	0.2
B	390[2]	22	498	1.60	20.5	20.5	20.7	0.2
C	1,490[2]	50	106	8.20	21.1	21.1	21.1	0.0
D	2,110[2]	50	115	5.20	25.9	25.9	26.1	0.2
E	2,860[2]	42	124	5.70	29.5	29.5	29.7	0.2
Weamaconk Creek								
A	53[3]	420	800	1.00	59.5	59.5	59.5	0.0
B	1,547[3]	347	800	0.99	60.5	60.5	60.5	0.0
C	2,032[3]	430	784	1.01	61.1	61.1	61.1	0.0
D	2,647[3]	230	382	2.07	62.4	62.4	62.4	0.0
E	3,012[3]	61	151	5.23	63.9	63.9	63.9	0.0

[1] Feet above western boundary of Fort Monmouth
[2] Feet above limit of detailed study (limit of detailed study is approximately 1150 feet below Blansing Avenue)
[3] Feet above confluence with Matchaponix Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WAMPUM BROOK – WATSON CREEK – WEAMACONK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Weamaconk Creek (continued)								
F	3,107	240	811	0.97	64.9	64.9	64.9	0.0
G	4,107	290	430	1.84	65.2	65.2	65.2	0.0
H	4,547	133	594	1.33	65.5	65.5	65.5	0.0
I	4,667	370	1,994	0.40	71.1	71.1	71.1	0.0
J	4,957	430	1,990	0.40	71.1	71.1	71.1	0.0
K	5,707	239	508	1.60	71.1	71.1	71.1	0.0
L	6,758	290	380	2.10	72.3	72.3	72.3	0.0
M	9,029	220	475	1.70	76.3	76.3	76.4	0.1
N	10,085	100	155	5.20	78.9	78.9	78.9	0.0
O	10,718	210	625	1.30	81.2	81.2	81.2	0.0
P	11,880	220	475	1.70	82.5	82.5	82.5	0.0
Q	13,622	640	730	1.10	85.5	85.5	85.6	0.1
R	15,312	310	540	1.50	88.9	88.9	88.9	0.0
S	15,998	310	580	1.40	91.3	91.3	91.3	0.0
T	17,582	200	420	0.90	95.6	95.6	95.7	0.1
U	18,374	190	310	1.10	96.6	96.6	96.7	0.1
V	19,219	140	235	1.50	98.3	98.3	98.3	0.0
W	20,011	260	380	0.90	99.3	99.3	99.3	0.0
X	20,750	355	415	0.90	99.8	99.8	99.9	0.1
Y	21,173	255	220	1.60	102.2	102.2	102.2	0.0
Z	22,493	280	285	1.20	104.8	104.8	104.8	0.0
AA	23,285	190	280	1.30	106.1	106.1	106.1	0.0
AB	24,022	154	375	0.80	106.6	106.6	106.8	0.2
AC	24,082	201	592	0.50	107.3	107.3	107.5	0.2
AD	24,957	280	118	2.50	109.7	109.7	109.9	0.2
AE	25,817	90	104	2.90	113.3	113.3	113.5	0.2

[1] Feet above confluence with Matchaponix Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WEAMACONK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Weamaconk Creek (continued)								
AF	26,497[1]	27	79	3.80	115.6	115.6	115.8	0.2
AG	27,057[1]	97	188	1.60	118.6	118.6	118.8	0.2
AH	27,507[1]	66	63	4.70	119.7	119.7	119.9	0.2
AI	27,727[1]	92	376	0.60	123.5	123.5	123.5	0.0
AJ	28,657[1]	45	86	2.50	123.6	123.6	123.7	0.1
AK	29,117[1]	27	73	3.00	124.7	124.7	124.9	0.2
AL	29,652[1]	28	47	4.70	127.5	127.5	127.5	0.0
AM	30,247[1]	42	88	2.50	130.0	130.0	130.0	0.0
AN	30,332[1]	89	190	1.10	133.6	133.6	133.8	0.2
AO	30,927[1]	34	84	2.60	133.9	133.9	134.1	0.2
AP	31,562[1]	24	66	3.30	135.6	135.6	135.8	0.2
AQ	32,087[1]	28	67	3.30	137.8	137.8	137.9	0.1
AR	32,223[1]	21	68	3.20	138.6	138.6	138.6	0.0
Weamaconk Creek Tributary								
A	400[2]	50	36	6.00	64.9	62.6[4]	62.6	0.0
B	730[2]	47	99	2.20	64.9	64.0[4]	64.1	0.1
C	1,080[2]	55	78	2.80	64.9	64.5[4]	64.6	0.1
D	1,504[2]	40	53	4.20	65.8	65.8	65.8	0.0
E	1,604[2]	35	367	0.60	79.6	79.6	79.6	0.0
F	1,719[2]	100	1,087	0.20	79.6	79.6	79.6	0.0
Wells Brook								
A	22[3]	262	*	*	27.5	*	*	*
B	151[3]	115	*	*	27.5	*	*	*
C	1,173[3]	64	*	*	38.1	*	*	*

[1] Feet above confluence with Matchaponix Brook
[2] Feet above confluence with Weamaconk Creek
[3] Feet above mouth
[4] Elevation computed without consideration of backwater effects from Weamaconk Creek

* Data not available

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WEAMACONK CREEK – WEAMACONK CREEK TRIBUTARY – WELLS BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wells Brook (continued)								
D	1,862[1]	60	*	*	49.5	*	*	*
E	2,704[1]	65	*	*	58.2	*	*	*
F	3,172[1]	47	*	*	60.9	*	*	*
G	3,714[1]	*	*	*	66.5	*	*	*
H	3,804[1]	298	*	*	67.6	*	*	*
I	4,953[1]	*	*	*	68.4	*	*	*
J	5,303[1]	106	*	*	73.1	*	*	*
K	4,999[1]	160	*	*	73.3	*	*	*
L	5,503[1]	58	*	*	73.3	*	*	*
M	6,001[1]	48	*	*	78.2	*	*	*
N	6,747[1]	97	*	*	83.6	*	*	*
O	6,848[1]	66	*	*	86.9	*	*	*
P	7,002[1]	52	*	*	88.0	*	*	*
Wemrock Brook								
A	1,478[2]	565	785	0.60	94.0	94.0	94.0	0.0
B	2,323[2]	250	280	1.80	95.4	95.4	95.4	0.0
C	3,274[2]	240	495	1.00	97.3	97.3	97.3	0.0
D	4,382[2]	125	245	2.10	98.8	98.8	98.8	0.0
E	5,016[2]	110	235	2.10	99.6	99.6	99.6	0.0
F	5,755[2]	120	140	3.50	101.5	101.5	101.5	0.0
G	7,250[2]	167	275	1.50	103.7	103.7	103.9	0.2
H	7,325[2]	410	1,801	0.20	107.6	107.6	107.6	0.0
I	7,695[2]	234	768	0.60	107.6	107.6	107.6	0.0
J	8,620[2]	134	227	1.90	108.9	108.9	109.1	0.2
K	9,345[2]	264	409	1.00	111.4	111.4	111.6	0.2

[1] Feet above mouth
[2] Feet above confluence with Weamaconk Creek
* Data not available

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WELLS BROOK – WEMROCK BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wemrock Brook (continued)								
L	9,935[1]	188	381	0.70	112.0	112.0	112.2	0.2
M	10,405[1]	32	54	4.60	112.8	112.8	113.0	0.2
N	10,960[1]	77	152	1.60	116.1	116.1	116.3	0.2
O	11,290[1]	10	55	4.60	116.8	116.8	117.0	0.2
Whale Pond Brook								
A	1,070[2]	125	755	1.70	19.7	19.7	19.9	0.2
B	1,450[2]	205	952	1.30	19.8	19.8	19.9	0.1
C	1,960[2]	170	812	1.60	19.9	19.9	20.1	0.2
D	2,200[2]	126	986	1.30	22.6	22.6	22.6	0.0
E	2,515[2]	233	1,423	0.90	22.6	22.6	22.6	0.0
F	3,150[2]	255	1,306	1.00	22.6	22.6	22.7	0.1
G	4,175[2]	85	379	3.40	22.8	22.8	23.0	0.2
H	4,555[2]	240	1,032	1.20	24.4	24.4	24.6	0.2
I	6,465[2]	126	390	3.30	31.8	31.8	32.0	0.2
J	7,060[2]	305	906	1.40	32.4	32.4	32.6	0.2
K	7,660[2]	410	848	1.50	34.6	34.6	34.8	0.2
L	8,362[2]	385	1,366	0.90	35.0	35.0	35.2	0.2
M	9,260[2]	564	1,439	0.60	35.3	35.3	35.5	0.2
N	9,860[2]	397	812	1.10	35.4	35.4	35.6	0.2
O	11,225[2]	342	613	1.50	36.4	36.4	36.6	0.2
P	12,235[2]	339	387	2.30	38.1	38.1	38.3	0.2
Q	12,945[2]	183	841	1.10	47.9	47.9	48.1	0.2
R	13,560[2]	282	479	1.90	48.0	48.0	48.2	0.2
S	16,300[2]	237	295	1.70	57.2	57.2	57.4	0.2
T	18,370[2]	200	228	2.20	64.0	64.0	64.1	0.1

[1] Feet above confluence with Weamaconk Creek
[2] Feet above Norwood Avenue

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WEMROCK BROOK – WHALE POND BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Whale Pond Brook (continued)								
U	19,471[1]	237	280	1.80	67.2	67.2	67.4	0.2
V	20,451[1]	96	122	4.20	71.7	71.7	71.9	0.2
Whale Pond Brook Tributary 1								
A	1,650[2]	35	76	2.40	38.0	38.0	38.2	0.2
B	2,500[2]	100	264	0.70	42.2	42.2	42.2	0.0
C	3,700[2]	104	180	1.00	43.3	43.3	43.5	0.2
D	5,000[2]	16	59	3.10	48.5	48.5	48.5	0.0
E	5,200[2]	108	225	0.80	48.8	48.8	48.9	0.1
Whale Pond Brook Tributary 2								
A	2,300[2]	68	66	2.70	52.6	52.6	52.8	0.2
B	3,200[2]	71	86	2.10	55.9	55.9	56.1	0.2
C	3,750[2]	75	93	1.90	57.2	57.2	57.4	0.2
D	4,400[2]	92	80	2.20	59.1	59.1	59.3	0.2
E	5,400[2]	90	91	2.00	62.6	62.6	62.8	0.2
Willow Brook								
A	3,510[3]	549	1,785	1.9	41.6	41.6	41.8	0.2
B	4,730[3]	266	1,147	2.4	43.3	43.3	43.5	0.2
C	5,640[3]	267	775	3.5	45.1	45.1	45.2	0.1
D	7,000[3]	272	860	3.2	49.9	49.9	50.0	0.1
E	8,100[3]	181	673	4.1	53.3	53.3	53.4	0.1
F	8,900[1]	229	951	2.9	57.0	57.0	57.2	0.2

[1] Feet above Norwood Avenue
[2] Feet above confluence with Whale Pond Brook
[3] Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WHALE POND BROOK – WHALE POND BROOK TRIBUTARY 1 – WHALE POND BROOK TRIBUTARY 2 – WILLOW BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Willow Brook (continued)								
G	10,250[1]	196	675	4.1	58.2	58.2	58.4	0.2
H	10,500[1]	230	1,411	1.9	60.5	60.5	60.5	0.0
I	13,200[1]	270	963	2.8	65.6	65.6	65.8	0.2
J	14,500[1]	158	788	3.5	69.1	69.1	69.3	0.2
K	15,200[1]	155	789	1.8	73.6	73.6	73.7	0.1
L	15,600[1]	108	612	2.4	73.7	73.7	73.8	0.1
M	15,752[1]	85	416	3.5	73.8	73.8	73.9	0.1
N	16,544[1]	122	251	5.8	74.8	74.8	74.8	0.0
O	17,125[1]	110	245	5.9	77.3	77.3	77.3	0.0
P	17,230[1]	160	525	2.8	79.6	79.6	79.6	0.0
Q	19,606[1]	140	445	2.6	85.3	85.3	85.3	0.0
R	22,194[1]	300	385	2.0	106.1	106.1	106.1	0.0
S	22,299[1]	300	1,495	0.5	109.8	109.8	109.8	0.0
T	24,358[1]	200	162	3.2	124.9	124.9	125.0	0.1
U	26,312[1]	20	75	3.3	136.1	136.1	136.1	0.0
V	28,054[1]	15	30	8.5	207.5	207.5	207.5	0.0
Willow Brook Tributary F								
A	158[2]	279	210	4.80	77.4	77.4	77.4	0.0
B	2,112[2]	100	270	3.70	92.0	92.0	92.0	0.0
C	3,485[2]	100	410	2.50	93.4	93.4	93.4	0.0
D	6,072[2]	1200	225	3.90	98.0	98.0	98.0	0.0
E	8,501[2]	270	475	1.30	107.6	107.6	107.6	0.0
F	8,606[2]	270	220	2.80	112.7	112.7	112.7	0.0
G	11,774[2]	220	270	1.60	131.4	131.4	131.6	0.2

[1] Feet above mouth
[2] Feet above confluence with Willow Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WILLOW BROOK – WILLOW BROOK TRIBUTARY F

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Willow Brook Tributary G								
A	634[1]	20	55	7.70	114.8	114.8	114.9	0.1
B	2,957[1]	10	20	7.40	169.4	169.4	169.4	0.0
Willow Brook East Branch								
A	830[2]	90	195	1.30	80.7	80.7	80.9	0.2
B	1,300[2]	32	82	3.10	81.2	81.2	81.3	0.1
C	2,330[2]	48	70	3.60	84.4	84.4	84.5	0.1
D	3,890[2]	28	62	4.10	99.0	99.0	99.2	0.2
E	4,710[2]	18	56	4.40	106.7	106.7	106.9	0.2
Wreck Pond Brook								
A	4,300[3]	350	1,090	2.60	9.2	9.2	9.4	0.2
B	6,170[3]	273	730	3.90	15.6	15.6	15.6	0.0
C	7,460[3]	338	1,789	1.80	20.3	20.3	20.3	0.0
D	9,080[3]	255	828	5.60	21.6	21.6	21.8	0.2
E	11,000[3]	376	3,093	0.80	28.7	28.7	28.9	0.2
F	12,620[3]	216	861	3.80	30.2	30.2	30.4	0.2
G	14,300[3]	283	861	4.40	33.9	33.9	34.1	0.2
H	15,000[3]	191	815	4.40	39.0	39.0	39.2	0.2
I	17,200[3]	131	334	9.00	41.6	41.6	41.8	0.2
J	18,500[3]	281	1,024	2.50	46.7	46.7	46.8	0.1
K	19,650[3]	264	650	4.10	48.1	48.1	48.3	0.2
L	21,000[3]	138	306	8.30	53.9	53.9	54.1	0.2
M	22,680[3]	313	1,185	1.30	59.7	59.7	59.9	0.2
N	24,400[3]	107	214	7.70	63.0	63.0	63.2	0.2
O	25,374[3]	34	129	7.70	68.4	68.4	68.6	0.2
P	26,900[3]	182	483	3.10	71.5	71.5	71.7	0.2
Q	29,625[3]	50	111	9.00	87.8	87.8	87.8	0.0

[1] Feet above confluence with Willow Brook Tributary F
[2] Feet above confluence with Willow Brook
[3] Feet above Township of Wall corporate limits (corporate limits are approximately 4325 ft below Old Mill Road)

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WILLOW BROOK TRIBUTARY G – WILLOW BROOK EAST BRANCH – WRECK POND BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wreck Pond Brook East Branch								
A	1,025[1]	301	647	1.10	28.7	28.7	28.9	0.2
B	2,424[1]	34	89	4.10	30.9	30.9	31.1	0.2
C	3,100[1]	40	95	3.80	32.2	32.2	32.4	0.2
D	4,950[1]	51	85	6.10	41.7	41.7	41.7	0.0
E	5,350[1]	110	262	1.90	43.1	43.1	43.3	0.2
F	5,773[1]	90	1,694	0.20	47.1	47.1	47.3	0.2
G	6,574[1]	128	196	1.90	47.2	47.2	47.4	0.2
H	7,800[1]	411	2,407	0.10	56.9	56.9	56.9	0.0
I	8,395[1]	191	332	0.80	56.9	56.9	56.9	0.0
J	9,400[1]	47	43	2.80	64.3	64.3	64.5	0.2
Yellow Brook								
A	965[2]	86	851	3.70	39.7	39.7	39.7	0.0
B	2,525[2]	200	1,392	2.30	40.5	40.5	40.5	0.0
C	4,000[2]	216	964	3.30	41.2	41.2	41.3	0.1
D	4,700[2]	228	1,033	1.90	41.9	41.9	42.1	0.2
E	5,100[2]	238	1,147	1.70	42.1	42.1	42.3	0.2
F	6,220[2]	140	573	3.50	42.8	42.8	43.0	0.2
G	6,860[2]	199	948	2.10	46.1	46.1	46.2	0.1
H	8,330[2]	129	490	4.00	47.2	47.2	47.4	0.2
I	8,860[2]	101	599	3.30	50.2	50.2	50.2	0.0
J	10,200[2]	150	538	3.70	51.6	51.6	51.8	0.2
K	11,550[2]	90	287	6.90	55.8	55.8	56.0	0.2
L	12,600[2]	95	397	5.00	60.8	60.8	60.8	0.0
M	15,370[2]	132	564	3.00	69.3	69.3	69.5	0.2
N	17,050[2]	86	328	5.10	72.0	72.0	72.2	0.2

[1] Feet above confluence with Wreck Pond Brook
[2] Feet above mouth

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

WRECK POND BROOK EAST BRANCH – YELLOW BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Yellow Brook (continued)								
O	17,300[1]	174	348	4.80	75.1	75.1	75.1	0.0
P	18,500[1]	169	721	2.30	76.7	76.7	76.9	0.2
Q	19,170[1]	174	697	2.40	77.2	77.2	77.4	0.2
R	19,440[1]	270	2,995	0.60	83.4	83.4	83.4	0.0
S	20,940[1]	162	472	3.60	83.4	83.4	83.4	0.0
T	22,800[1]	210	1,160	0.70	88.2	88.2	88.2	0.0
U	23,450[1]	175	793	1.00	88.2	88.2	88.3	0.1
V	24,380[1]	308	790	1.00	88.3	88.3	88.5	0.2
W	26,970[1]	124	287	2.70	95.4	95.4	95.6	0.2
Yellow Brook 2								
A	30,020[2]	10	75	10.30	98.5	98.5	98.7	0.2
B	30,050[2]	30	193	4.00	100.6	100.6	100.6	0.0
C	30,570[2]	21	165	3.30	101.6	101.6	101.7	0.1
D	30,591[2]	52	231	2.40	101.7	101.7	101.8	0.1
E	31,551[2]	33	129	4.20	102.4	102.4	102.4	0.0
F	32,595[2]	14	75	7.30	108.2	108.2	108.2	0.0
G	32,625[2]	35	159	3.40	109.0	109.0	109.0	0.0
H	34,160[2]	14	75	7.30	114.2	114.2	114.2	0.0
I	34,190[2]	21	69	7.90	114.3	114.3	114.3	0.0
Yellow Brook 2 Tributary								
A	150[3]	30	109	3.50	100.9	99.6[4]	99.8	0.2
B	856[3]	53	270	1.40	107.3	107.3	107.3	0.0
C	886[3]	56	302	1.20	107.3	107.3	107.3	0.0

[1] Feet above mouth
[2] Feet above confluence with Swimming River
[3] Feet above confluence with Yellow Brook 2
[4] Elevation computed without consideration of backwater effects from Yellow Brook 2

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

YELLOW BROOK – YELLOW BROOK 2 – YELLOW BROOK 2 TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Yellow Brook Tributary K								
A	475[1]	230	355	1.90	105.5	105.5	105.6	0.1
B	2,270[1]	300	595	0.80	109.9	109.9	110.1	0.2
C	2,376[1]	300	635	0.70	110.1	110.1	110.2	0.1
D	3,802[1]	250	380	1.00	115.9	115.9	116.1	0.2
E	3,907[1]	250	635	0.60	117.1	117.1	117.1	0.0
F	5,174[1]	20	30	4.40	124.0	124.0	124.1	0.1
G	5,333[1]	20	70	2.00	126.9	126.9	126.9	0.0
H	5,438[1]	20	70	2.00	128.3	128.3	128.3	0.0
I	5,650[1]	50	70	2.00	129.7	129.7	129.7	0.0
J	6,336[1]	40	70	2.00	134.6	134.6	134.8	0.2
Yellow Brook Tributary L								
A	950[1]	90	175	1.80	109.3	109.3	109.3	0.0
B	1,056[1]	90	325	1.00	111.0	111.0	111.0	0.0
C	2,112[1]	200	215	1.50	111.6	111.6	111.8	0.2
D	2,376[1]	230	720	0.40	115.6	115.6	115.8	0.2
E	3,538[1]	15	30	5.70	139.6	139.6	139.6	0.0
F	6,019[1]	30	40	4.40	171.1	171.1	171.1	0.0

[1] Feet above confluence with Yellow Brook

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ (ALL JURISDICTIONS)

FLOODWAY DATA

YELLOW BROOK TRIBUTARY K – YELLOW BROOK TRIBUTARY L

5.0 INSURANCE APPLICATIONS

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

Zone A

Zone A is the flood insurance rate zone that corresponds to the 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 base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

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

Zone AO

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

Zone AR

Area of special flood hazard formerly protected from the 1-percent annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1-percent annual chance or greater flood event.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm

waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, and to 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 base flood elevations or depths are shown within this zone.

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 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 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 1- and 0.2-percent annual chance floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Monmouth County. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community, up to and including this countywide FIS, are presented in Table 13, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Aberdeen, Township of	February 28, 1975	None	March 18, 1985	August 3, 1992 September 25, 2009 June 20, 2018
Allenhurst, Borough of	August 24, 1973	April 30, 1976	March 15, 1979	September 15, 1983 September 25, 2009
Allentown, Borough of	December 21, 1973	February 6, 1976	September 16, 1981	September 25, 2009
Asbury Park, City of	July 13, 1973	April 30, 1976	February 15, 1979	September 15, 1983 September 25, 2009
Atlantic Highlands, Borough of	December 21, 1975	February 20, 1976	August 3, 1981	July 5, 1984 September 25, 2009 June 20, 2018
Avon-By-The-Sea, Borough of	February 1, 1974	May 14, 1976	March 15, 1979	July 5, 1983 September 25, 2009
Belmar, Borough of	May 13, 1972	None	May 13, 1972	July 1, 1974 February 27, 1976 March 1, 1984 September 25, 2009
Bradley Beach, Borough of	December 21, 1973	February 6, 1976	August 1, 1979	June 15, 1983 September 25, 2009
Brielle, Borough of	August 31, 1973	February 11, 1977	April 2, 1979	September 30, 1983 September 25, 2009
Colts Neck, Township of	April 12, 1974	September 17, 1976 February 11, 1977	April 15, 1982	September 25, 2009

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC (ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Deal, Borough of	January 14, 1972	February 21, 1975	March 5, 1976	January 5, 1984 August 6, 2002 September 25, 2009
Eatontown, Borough of	June 21, 1974	February 6, 1976	September 16, 1981	September 25, 2009 June 20, 2018
Englishtown, Borough of	June 21, 1974	November 5, 1976	March 16, 1981	September 25, 2009
Fair Haven, Borough of	July 6, 1973	August 20, 1976	October 16, 1979	September 25, 2009 June 20, 2018
Farmingdale, Borough of	March 15, 1974	February 13, 1976	November 26, 1982	September 25, 2009
Freehold, Borough of [1]	September 25, 2009	None	September 25, 2009	None
Freehold, Township of	February 15, 1974	July 16, 1976	April 4, 1983	September 25, 2009
Hazlet, Township of	January 9, 1974	April 30, 1976	December 1, 1982	September 25, 2009
Highlands, Borough of	December 15, 1970	None	September 3, 1971	July 1, 1974 June 30, 1976 December 22, 1998 September 25, 2009 June 20, 2018
Holmdel, Township of	January 25, 1974	October 17, 1975 April 16, 1976	March 1, 1982	September 25, 2009
Howell, Township of	March 22, 1974	August 27, 1976	January 6, 1983	September 25, 2009

[1] This Community did not have a FIRM prior to the first countywide FIRM for Monmouth County

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC (ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Interlaken, Borough of	March 15, 1974	May 14, 1976	January 2, 1981	September 25, 2009
Keansburg, Borough of	April 20, 1973	February 3, 1978	May 15, 1983	September 25, 2009
Keyport, Borough of	January 23, 1974	February 6, 1976	July 2, 1979	April 18, 1983 July 15, 1992 September 25, 2009
Lake Como, Borough of	February 22, 1974	None	November 28, 1980	November 2, 1995 September 25, 2009
Little Silver, Borough of	August 31, 1973	August 27, 1976	February 1, 1978	December 15, 1982 September 25, 2009 June 20, 2018
Loch Arbour, Village of	November 30, 1973	April 16, 1976	March 15, 1979	September 15, 1983 September 25, 2009
Long Branch, City of	May 31, 1974	None	May 5, 1976	January 13, 1978 January 5, 1984 September 25, 2009 June 20, 2018
Manalapan, Township of	July 20, 1973	None	September 15, 1977	September 25, 2009
Manasquan, Borough of	May 12, 1972	None	May 12, 1972	July 1, 1974 January 16, 1976 December 15, 1983 September 25, 2009

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC (ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Marlboro, Township of	December 28, 1973	None	June 15, 1978	April 9, 1982 September 25, 2009
Matawan, Borough of	March 1, 1974	None	September 30, 1981	September 25, 2009 June 20, 2018
Middletown, Township of	July 19, 1974	July 9, 1976	February 15, 1984	July 15, 1992 September 25, 2009 June 20, 2018
Millstone, Township of	March 29, 1974	May 14, 1976	January 20, 1982	September 25, 2009
Monmouth Beach, Borough of	May 17, 1974	None	May 16, 1977	May 2, 1983 October 16, 1984 July 15, 1992 September 25, 2009 June 20, 2018
Neptune City, Borough of	June 28, 1974	None	August 11, 1978	September 25, 2009
Neptune, Township of	July 13, 1973	September 3, 1976	February 16, 1977	March 1, 1984 September 25, 2009
Ocean, Township of	June 1, 1973	May 31, 1974 September 10, 1976	October 14, 1977	December 18, 1981 July 2, 2003 September 25, 2009
Oceanport, Borough of	May 11, 1973	None	February 16, 1977	September 25, 2009 June 20, 2018
Red Bank, Borough of	March 8, 1974	March 19, 1976	May 19, 1981	September 25, 2009 June 20, 2018

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC (ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Roosevelt, Borough of [1]	September 25, 2009	None	September 25, 2009	None
Rumson, Borough of	December 28, 1973	None	December 28, 1973	July 1, 1974 November 7, 1975 April 23, 1976 December 15, 1982 July 15, 1992 September 25, 2009 June 20, 2018
Sea Bright, Borough of	October 14, 1971	None	October 14, 1971	July 1, 1974 April 23, 1976 November 16, 1983 July 15, 1992 September 25, 2009 June 20, 2018
Sea Girt, Borough of	February 2, 1973	None	February 2, 1973	April 16, 1976 January 5, 1984 September 25, 2009
Shrewsbury, Borough of	June 7, 1974	October 24, 1975	August 1, 1979	September 25, 2009 June 20, 2018
Shrewsbury, Township of [1]	September 25, 2009	None	September 25, 2009	None
Spring Lake, Borough of	May 25, 1973	March 5, 1976 April 9, 1976 January 4, 1980 June 30, 1980	February 17, 1982	March 1, 1984 September 25, 2009

[1] This Community did not have a FIRM prior to the first countywide FIRM for Monmouth County

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Spring Lake Heights, Borough of	May 3, 1974	March 5, 1976	December 15, 1981	September 25, 2009
Tinton Falls, Borough of	April 12, 1974	April 23, 1976 December 31, 1976	April 15, 1982	September 25, 2009
Union Beach, Borough of	December 28, 1973	August 6, 1976	May 15, 1980	March 2, 1983 July 15, 1992 September 25, 2009
Upper Freehold, Township of	March 22, 1974	August 20, 1976 July 29, 1977	October 12, 1979	December 11, 1981
Wall, Township of	June 1, 1973	None	February 16, 1977	September 25, 2009
West Long Branch, Borough of	August 24, 1973	August 20, 1976	January 16, 1981	September 25, 2009

TABLE 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NC (ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

A FIS has been prepared for Ocean County, New Jersey (All Jurisdictions) (FEMA, September 29, 2006). FISs have been prepared for municipalities in Mercer County bordering Monmouth County: Township of East Windsor (FEMA, September 16, 1982) and the Township of Washington (U.S. Department of Housing and Urban Development, March 1978). FISs have also been prepared for municipalities in Middlesex County bordering Monmouth County: Township of Monroe (FEMA, November 6, 1981) and the Township of Old Bridge (FEMA, October 16, 1987). No FISs have been published for the municipalities in Burlington County bordering Monmouth County: the Township of Chesterfield and the Township of North Hanover.

Information pertaining to each jurisdiction within Monmouth County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS Reports, FHBMs, FBFMs, and FIRMs for all jurisdictions within Monmouth County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

9.0 BIBLIOGRAPHY AND REFERENCES

Abrams Aerial Survey. (January 1976). Aerial Contour Maps, Scale 1"=500', Contour Interval 2 Feet: Allenhurst, New Jersey.

Abrams Aerial Survey. (January 1976). Aerial Contour Maps, Scale 1:6,000, Contour Interval 2 Feet: Loch Arbour, New Jersey.

Abrams Aerial Survey. (January 1976). Aerial Contour Maps, Scale 1:6,000, Contour Interval 2 Feet: South Amboy, New Jersey.

Abrams Aerial Survey. (January 1976). Aerial Contour Maps, Scale 1"=500', Contour Interval 2 Feet: Keansburg, New Jersey.

Abrams Aerial Survey. (1976). Aerial Contour Maps, Scale 1:6,000, Contour Interval 2 Feet: Borough of Brielle, New Jersey. Lansing, Michigan.

Abrams Aerial Survey. (1976). Aerial Contour Maps, Scale 1:6,000, Contour Interval 2 Feet: Borough of Union Beach, New Jersey. Lansing, Michigan.

Aero Service Corporation. (December 1964). Topographic Maps. Scale 1:1,200, Contour Interval 2 Feet: Borough of Red Bank, Monmouth County, New Jersey.

American Air Surveys, Inc. Topographic Map of Manasquan River Reservoir Site 1. Scale 1:2,400, Contour Interval 2 Feet.

Atlantic Aerial Survey Co., Inc. (March 5, 1988). Topographic Map, compiled from aerial photography, Scale 1"=200', Contour Interval 2 Feet: Highlands Borough, Monmouth County, New Jersey.

Boss International, Inc. RiverCAD XP for AutoCAD, Release 2007.3 for Windows. (April 12, 2007). Madison, Wisconsin.

Brown, James S. (1971). History of Marlboro Township, prepared for the Battleground Historical Society.

Brown, Robert and Thomas Henlin. Fiftieth Anniversary of Keansburg, New Jersey. The Advisor, Inc.

Buchart-Horn Basco Associates of York, Pennsylvania. (April 2003). Topographic Maps, compiled from aerial photographs.

Candeub, Fleissing and Associates. (1975). Borough of Keyport, Comprehensive Master Plan.

Chow, Ven Te. (1964). Handbook of Applied Hydrology. McGraw Hill: New York.

Chow, Ven Te. (1963). Open-Channel Hydraulics, 5th Edition. McGraw Hill: New York.

Delaware River Basin Commission. (1973). Basin-Wide Program for Floodplain Delineation.

Dewberry & Davis, LLC. (October 1982, Unpublished). Topographic Maps for the Borough of Deal, Monmouth County, New Jersey, prepared for the Federal Emergency Management Agency, Scale 1:2,400, Contour Interval 4 Feet. Fairfax, Virginia.

Dewberry & Davis, LLC. (April 1982, Unpublished). Tidal Flood Profiles for the New Jersey Coastline, prepared for the Federal Emergency Management Agency. Fairfax, Virginia.

Digital Aerial Surveys, Inc. Topographic Map of the Township of Wall, East of Route 35, South of Wall Church Road. Scale 1:2,400, Contour Interval 2 Feet.

Federal Emergency Management Agency. (September 29, 2006). Flood Insurance Study, Ocean County, New Jersey (All Jurisdictions). Washington, D.C.

Federal Emergency Management Agency (July 2, 2003). Flood Insurance Study, Township of Ocean, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency (August 6, 2002). Flood Insurance Study, Borough of Deal, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (December 22, 1998). Flood Insurance Study, Borough of Highlands, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (November 6, 1991). Flood Insurance Study, Township of Monroe, Middlesex County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (1989). Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping.

Federal Emergency Management Agency. (October 16, 1987). Flood Insurance Study, Township of Old Bridge, Middlesex County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (October 16, 1984). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Monmouth Beach, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 18, 1984). Flood Insurance Study, Township of Aberdeen, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (April 17, 1984). Flood Insurance Study, Township of Hamilton, Mercer County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (January 5, 1984). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Atlantic Highlands, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 1, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Belmar, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 1, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Spring Lake, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 1, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Township of Neptune, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (August 15, 1983). Flood Insurance Study, Township of Middletown, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (July 5, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Deal, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (July 5, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Sea Girt, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (July 5, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, City of Long Branch, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (June 15, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Manasquan, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (May 16, 1983). Supplement to Flood Insurance Study – Wave Height Analysis, Borough of Sea Bright, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (March 30, 1983). Flood Insurance Study, Borough of Brielle, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (March 15, 1983). Flood Insurance Study, City of Asbury Park, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (March 15, 1983). Flood Insurance Study, Village of Loch Arbour, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (January 5, 1983). Flood Insurance Study, Borough of Avon-by-the-Sea, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (December 15, 1982). Flood Insurance Study, Borough of Bradley Beach, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (November 16, 1982). Flood Insurance Study, Borough of Keansburg, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (October 18, 1982). Flood Insurance Study, Borough of Keyport, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (October 4, 1982). Flood Insurance Study, Township of Freehold, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 16, 1982). Flood Insurance Study, Township of East Windsor, Mercer County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 2, 1982). Flood Insurance Study, Borough of Union Beach, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (July 6, 1982). Flood Insurance Study, Township of Howell, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (June 15, 1982). Flood Insurance Study – Wave Height Analysis – Borough of Little Silver, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (June 15, 1982). Flood Insurance Study – Wave Height Analysis – Borough of Rumson, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (June 1, 1982). Flood Insurance Study, Township of Hazlet, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (April 1982). Flood Insurance Study, Township of Marlboro, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (October 15, 1981). Flood Insurance Study, Borough of Tinton Falls, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (October 15, 1981). Flood Insurance Study, Township of Colts Neck, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (September 1, 1981). Flood Insurance Study, Township of Holmdel, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (July 20, 1981). Flood Insurance Study, Township of Millstone, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency. (June 15, 1981). Flood Insurance Study, Borough of Spring Lake Heights, Monmouth County, New Jersey. Washington, D.C

Federal Emergency Management Agency. (Revised February 1981). Users Manual for Wave Height Analyses. Washington, D.C.

Federal Emergency Management Agency. (Unpublished). Flood Insurance Study, Borough of Point Pleasant, Ocean County, New Jersey.

Federal Emergency Management Agency. (Unpublished). Flood Insurance Study, Borough of Rumson, Monmouth County, New Jersey.

Federal Emergency Management Agency. (Unpublished). Flood Insurance Study, Township of East Windsor, Middlesex County, New Jersey.

Federal Emergency Management Agency. (Unpublished). Flood Insurance Study, Township of Jackson, Ocean County, New Jersey.

Federal Emergency Management Agency. (Unpublished). Flood Insurance Study, Township of Old Bridge, Middlesex County, New Jersey.

Federal Emergency Management Agency, Federal Insurance Administration. (August 17, 1982). Flood Insurance Study, Borough of Spring Lake, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (December 16, 1981). Flood Insurance Study, Borough of Allentown, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (December 1981). Flood Insurance Study, Township of Ocean, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (July 16, 1981). Flood Insurance Study, Borough of West Long Branch, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (June 1980; Revised April 1981). Users Manual for Wave Height Analysis to Accompany Methodology for Calculating Wave Action Effects Associated with Storm Surges. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (March 30, 1981). Flood Insurance Study, Borough of Matawan, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (March 16, 1981). Flood Insurance Study, Borough of Eatontown, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (February 3, 1981). Flood Insurance Study, Borough of Atlantic Highlands, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (February 1981). Coastal Flooding Storm Surge Model, Methodology, Part 1. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (November 19, 1980). Flood Insurance Study, Borough of Red Bank, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (September 16, 1980). Flood Insurance Study, Borough of Englishtown, Monmouth County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (April 22, 1980). Statement of Work for Modifications of Flood Insurance Studies to Include Wave Crest Elevations. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (September 15, 1976). Flood Insurance Study, Township of Lakewood, Ocean County, New Jersey. Washington, D.C.

Federal Emergency Management Agency, Federal Insurance Administration. (Unpublished). Flood Insurance Study, Borough of Point Pleasant Beach, Ocean County, New Jersey.

Federal Emergency Management Agency, Federal Insurance Administration. (Unpublished). Flood Insurance Study, Township of Monroe, Middlesex County, New Jersey.

Federal Emergency Management Agency, Federal Insurance Administration. (Unpublished). Flood Hazard Boundary Map, Township of Colts Neck, Monmouth County, New Jersey.

Geod Aerial Mapping, Inc. (1978). Photogrammetric Mapping. Scale 1:2,400, Contour Interval 5 Feet. Trenton, New Jersey.

Geod Aerial Mapping, Inc. (1978). Survey of Rocky Brook and Millstone River, Millstone, New Jersey. Trenton, New Jersey.

Geod Aerial Mapping, Inc. (1977). Topographic Maps. Scale 1:2,400, Contour Interval 5 Feet: Colts Neck, New Jersey.

Geod Aerial Mapping, Inc. (May 1974). Topographic Maps. Scale 1:24,000, Contour Interval 5 Feet: Township of Holmdel, New Jersey.

Gray, William C. (1972). A History of Allenhurst, New Jersey, 1898-1972.

Hammer, Green, Siler Associates. (June 1969). Population, Housing and Income Study, Middlesex County Study Area, New Jersey prepared for the Middlesex County Planning Board.

Howell Township Environmental Commission. Streams of Howell Township.

Keystone Aerial Surveys. (April 1979). Aerial Photographs and Aerial Plotting Plates. Scale 1:12,000: Aberdeen, New Jersey. Philadelphia, Pennsylvania.

Keystone Aerial Surveys. (March 1979) Aerial Photographs and Aerial Plotting Plates. Scale 1:12,000: Deal, New Jersey. Philadelphia, Pennsylvania.

Maps Incorporated. (1968). Topographic Maps. Scale 1:1,200, Contour Interval 2 Feet: Borough of New Shrewsbury (Tinton Falls), New Jersey.

Midlantic Surveys. (April 1962; Revised 1980). Topographic Maps Compiled from Aerial Photographs. Scale 1:24,000, Contour Interval 4 Feet.

Midlantic Surveys. (1978). Topographic Map of the Borough of Spring Lake Heights. Scale 1:2,400, Contour Interval 5 Feet.

Midlantic Surveys. (1978). Topographic Map of the Township of Howell. Scale 1:2,400, Contour Interval 5 Feet.

Midlantic Surveys. Topographic Map. Scale 1:2,400, Contour Interval 5 Feet: Township of Freehold, New Jersey. West Caldwell, New Jersey.

Midlantic Surveys. Topographic Map, Borough of Matawan. Scale 1:2,400, Contour Interval 5 Feet. Verona, New Jersey.

Monmouth County Environmental Council. (1975). Natural Features of Monmouth County.

Monmouth County Park System. Shark River Topography, From Route 18 to the Garden State Parkway. Scale 1:2,400, Contour Interval 2 Feet.

Monmouth County Planning Board. (1981). Study of Population, Monmouth County.

Monmouth County Planning Board. (February 1978). Howell Township.

Monmouth County Planning Board. (1978). Aerial Photographs. Scale 1:2,400: Hazlet, New Jersey.

Monmouth County Planning Board. (1976). Borough of Matawan.

Monmouth County Planning Board. (1974). Study of Population, Monmouth County.

National Academy of Sciences. (1977). Methodology for Calculating Wave Action Effects Associated with Storm Surges. Washington, D.C.

National Resources Committee. (1938). Modified Rational Method of Estimating Flood Flows, by M. Bernard. Washington, D.C.

New Jersey Image Warehouse. (Retrieved October 2006). Monmouth County 2002 Digital Orthoimagery. http://njgin.nj.gov/OIT_IW/index.jsp.

Quinn and Associates. (1979). Topographic Maps. Scale 1:2,400, Contour Interval 5 Feet: Borough of Allentown, New Jersey. Horsham, Pennsylvania.

Quinn and Associates. (1978). Aerial Photographs. Scale 1:2,400, Contour Interval 5 Feet: Borough of Allentown, New Jersey. Horsham, Pennsylvania.

Quinn and Associates. (1970; Revised 1976). Topographic Map Sheets, Matchaponix Brook. Scale 1"=200', Contour Interval 5 Feet.

Quinn and Associates. (1969). Topographic Maps. Scale 1:2,400, Contour Interval 5 Feet: Marlboro, New Jersey.

Quinn and Associates. (1968). Aerial Photographs and Photogrammetric Mapping. Scale 1:2,400, Contour Interval 5 Feet: Millstone River, Township of Millstone, New Jersey. Trenton, New Jersey.

Real Estate Data, Inc. (August 1976). Real Estate Atlas of Ocean County, New Jersey, Scale 1"=1000'.

Robinson Aerial Surveys, Inc. (March 20, 1976). Aerial Contour Maps. Scale 1"=50', Contour Interval 1 Foot. Newton, New Jersey.

Robinson Aerial Surveys, Inc. (April 1972). Aerial Contour Maps, Scale 1:2,400, Contour Interval 5 Feet: Borough of Brielle, New Jersey.

Robinson Aerial Surveys, Inc. (1966). Topographic Maps, Scale 1:1,200, Contour Interval 1 Foot: Northeast Monmouth County, New Jersey, prepared for Northeast Monmouth County Regional Sewerage Authority.

Robinson Aerial Surveys, Inc. (April 1962). Detailed Topographic Maps. Scale 1:1,200, Contour Interval 2 Feet: Township of Ocean, New Jersey.

Snyder, John P. (1969). The Story of New Jersey's Civil Boundaries, 1606-1968, New Jersey Bureau of Geology and Topography. Trenton, New Jersey.

State of New Jersey, County of Monmouth, G.I.S. Division, Information Services. (Provided November 2006). County-Wide Topography. Contour Interval 2 Feet.

State of New Jersey, Department of Conservation and Economic Development. (1964). Water Resources Circular No. 14, Flood Depth Frequency in New Jersey. Trenton, New Jersey.

State of New Jersey, Department of Environmental Protection, Bureau of Geology and Topography. (1977). Geology of Monmouth County in Brief by Paul B Dahlgren. Trenton, New Jersey.

State of New Jersey, Department of Environmental Protection, Division of Water Resources. (1974). Special Report 38, Magnitude and Frequency of Floods in New Jersey with Effects of Urbanization by Steven J. Stankowski.

State of New Jersey, Department of Environmental Protection, Division of Water Resources. (March 1973). Flood Hazard Report No. 17, Delineation of Flood Hazard Area, Matchaponix Brook System. Trenton, New Jersey

State of New Jersey, Department of Environmental Protection, Division of Water Resources. (March 1973). Flood Hazard Report No. 8, Delineation of Flood Hazard Area, South River-Manalapan Brook. Trenton, New Jersey

State of New Jersey, Department of Environmental Protection, Division of Water Resources. (February 1973). Flood Hazard Report No. 12, Delineation of Flood Hazard Area, Millstone River, Rocky Brook. Trenton, New Jersey

State of New Jersey, Department of Environmental Protection, Division of Water Resources. (1972). Special Report 37, Floods of August and September 1971 in New Jersey.

State of New Jersey, Department of Labor and Industry. (March 1981). New Jersey 1980 Census Counts of Population – by Race and Spanish Origin. Trenton, New Jersey.

State of New Jersey, Department of Labor and Workforce Development, New Jersey Data Center. (March 2001). Population for the Counties and Municipalities in New Jersey: 1990 and 2000. Trenton, New Jersey.

T & M Associates, Inc. (April 1974). Master Drainage Plan, Township of Middletown, New Jersey.

T & M Associates, Inc. (February 1972). Master Drainage Plan, Borough of Eatontown, New Jersey.

T & M Associates, Inc. Topographic Maps, Scale 1:600, Contour Interval 1 Foot: Keansburg, New Jersey.

Tetra Tech, Inc. (May 1977). Coastal Flooding Handbook, Parts I and II. Prepared for U.S. Department of Housing and Urban Development. Washington, D.C.

Tetra Tech, Inc. (1975). Topographic Maps Compiled by Photogrammetric Methods, Scale 1:1,200, Contour Interval 2 Feet: Hazlet, New Jersey. Pasadena, California.

Topographic Data Consultants Inc. (May 1980). Aerial Photographs, Scale 1:9,00: Township of Aberdeen, Monmouth County, New Jersey.

Topographic Data Consultants, Inc. (Spring 1980). Topographic Maps of Aberdeen, New Jersey, Scale 1"=400', Contour Interval 4 feet. Berlin, New Jersey.

Township of Hazlet, Chamber of Commerce. (1973). One Hundred and Twenty-Fifth Anniversary, 1848-1973. Hazlet, New Jersey.

Township of Marlboro, New Jersey. (December 1970). Master Plan.

Township of Wall. (1967). Tax Map. Scale 1:9,600.

U.S. Army Corps of Engineers. (March 5, 1993). Engineering and Design, Hydrologic Frequency Analysis, Engineer Manual 1110-2-1415.

U.S. Army Corps of Engineers. (January 1962). Statistical Methods in Hydrology, by Leo R. Beard.

U.S. Army Corps of Engineers, Coastal Engineering Research Center. (August 1988). Miscellaneous Paper CERC-88-12, Coastal Processes at Sea Bright to Ocean Township: Volume II: Appendices B-G, p. G23.a

U.S. Army Corps of Engineers, Galveston District. (June 1975). Guidelines for Identifying Coastal High Hazard Zones. Galveston, Texas.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (May 2005). HEC-RAS River Analysis System, Version 3.1.3. Davis, California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (November 2002). HEC-RAS River Analysis System Users Manual. Davis, California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (October 1973, updated November 1976). HEC-2 Water Surface Profiles, Generalized Computer Program. Davis, California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. (May 1974). Floodway Determination Using Computer Program HEC-2, Training Document No. 5. Davis, California.

U.S. Army Corps of Engineers, Hydrologic Engineering Center. HEC-2 Water-Surface Profiles Users Manual.

U.S. Army Corps of Engineers, Philadelphia District. (July 1978). Lake Lefferts Dam – Phase 1 Inspection Report – National Dam Safety Program. Philadelphia, Pennsylvania.

U.S. Army Corps of Engineers, Philadelphia District. (July 1978). Lake Matawan Dam – Phase 1 Inspection Report – National Dam Safety Program. Philadelphia, Pennsylvania.

U.S. Army Corps of Engineers, Philadelphia District. (June 1972). Tidal Flood Plain Information, Toms River Area, Ocean County, New Jersey. Philadelphia, Pennsylvania.

U.S. Army Corps of Engineers, New York District. (1979). Weibull Plotting Positions Analysis for the Battery, Sandy Hook and East Newark. Albany, New York.

U.S. Army Corps of Engineers, New York District. (July 1972). Tidal Flood Plain Information, Sandy Hook Bay and Raritan Bay Shore Areas of Monmouth County, New Jersey. New York, New York.

U.S. Army Corps of Engineers, New York District. (1972). Model Studies of Shrewsbury Inlet. New York.

U.S. Army Corps of Engineers, New York District. (April 1970). Reconnaissance Report for Poplar Brook.

U.S. Army Corps of Engineers, New York District. (June 1969). Elizabeth River Flood Control Project, Elizabeth, New Jersey: General Design Memorandum.

U.S. Army Corps of Engineers, New York District. (November 1960). Raritan Bay and Sandy Hook Bay, New Jersey, Cooperative Beach Erosion Control and Interim Hurricane Study (Survey). New York, New York.

U.S. Army Corps of Engineers, North Atlantic Division. (August 1963). Report on Operation Five High, March 1962 Storm.

U.S. Army Corps of Engineers, Sacramento District. Civil Works Investigations Project CW-151, Statistical Methods in Hydrology.

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

U.S. Department of Agriculture, Soil Conservation Service. (1976). Technical Release No. 20, Computer Program for Project Formulation – Hydrology. Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service. (1964, Revised 1972). National Engineering Handbook. Washington, D.C.

U.S. Department of Commerce, Bureau of the Census. (1981). 1980 Census of Population, Number of Inhabitants, New Jersey. Washington, D.C.

U.S. Department of Commerce, Bureau of the Census. (1971). 1970 Census of Population, Number of Inhabitants, New Jersey. Washington, D.C.

U.S. Department of Commerce, Bureau of Public Roads. (December 1965). Circular No. 5, Hydraulic Charts for the Selection of Highway Culverts. Washington, D.C.

U.S. Department of Commerce, Environmental Science Services Administration. (April 1970). Technical Memorandum WBTM, Hydro 11, Joint Probability Methods of Tide Frequency Analysis applied to Atlantic City and Long Beach Island, New Jersey, by V.A. Myers.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (1967-1977). Climatological Data, New Jersey. Asheville, North Carolina.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (1975). Tropical Cyclone Deck 933. Asheville, North Carolina.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (May 1957). Technical Paper NWD-1S, Some Climatological Characteristics of Hurricanes and Tropical Storms, Gulf and East Coasts of the U.S. by F.P. How et al.

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

U.S. Department of Commerce, Weather Bureau. (1965). Technical Paper No. 55, Tropical Cyclones of the North Atlantic Ocean, 1871-1963 by C.W. Cry.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (April 1979). Flood Insurance Study, Borough of Fair Haven, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (February 1979). Flood Insurance Study, Borough of Shrewsbury, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (December 1978). Flood Insurance Study, Township of Aberdeen, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (September 15, 1978). Flood Insurance Study, Borough of Allenhurst, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (September 1978). Flood Insurance Study, Village of Loch Arbour, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (August 1978). Flood Insurance Study, City of Asbury Park, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (March 1978). Flood Insurance Study, Township of Washington, Mercer County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (September 1977). Flood Insurance Study, Borough of Little Silver, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (July 1977). Flood Insurance Study, Township of Manalapan, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (December 1976). Flood Insurance Study, Borough of Monmouth Beach, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (September 1976). Flood Insurance Study, Township of Wall, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (August 16, 1976). Flood Insurance Study, Township of Neptune, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (August 1976). Flood Insurance Study, Borough of Oceanport, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (August 1976). Flood Insurance Study, Borough of Little Silver, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (April 16, 1976). Flood Insurance Study, Borough of Sea Girt, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (March 1976). Flood Insurance Study, Borough of Deal, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (February 27, 1976). Flood Insurance Study, Borough of Belmar, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (Revised 1976). Code of Federal Regulations, Title 24, Chapter 10, Parts 1910 3A and 3B, Federal Register, Volume 41, No. 207. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (February 1975). Flood Insurance Study, City of Long Branch, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (January 1974). Flood Insurance Study, City of Sea Bright, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (December 1973). Flood Insurance Study, Borough of Spring Lake, Monmouth County, New Jersey, prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (July 1973). Flood Insurance Study, Township of Madison, New Jersey prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (June 1973). Flood Insurance Study, City of Long Branch, New Jersey prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (July 1973). Flood Insurance Study, Township of Old Bridge, New Jersey prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (April 1973). Flood Insurance Study, Borough of Monmouth Beach, New Jersey prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (April 1973). Flood Insurance Study, Borough of Rumson, New Jersey prepared by the U.S. Army Corps of Engineers. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (January 7, 1972). Flood Insurance Study, Borough of Point Pleasant, Ocean County, New Jersey. Washington, D.C.

U.S. Department of Housing and Urban Development, Federal Insurance Administration. (November 12, 1971). Flood Insurance Study, Borough of Manasquan, Monmouth County, New Jersey. Washington, D.C.

U.S. Department of the Interior, Bureau of Reclamation. (1974). Design of Small Dams. Washington, D.C.

U.S. Department of the Interior, Geological Survey. (Retrieved December 2006). Water Resources, USGS 01405303 Manalapan Brook at Charleston Springs, New Jersey. National Water Information System: Web Interface http://waterdata.usgs.gov/nwis/inventory.

U.S. Department of the Interior, Geological Survey. (Retrieved December 2006). Water Resources, USGS 01404310 Manalapan Brook at Millhurst, New Jersey. National Water Information System: Web Interface. http://waterdata.usgs.gov/nwis/inventory.

U.S. Department of the Interior, Geological Survey. (Retrieved December 2006). Water Resources, USGS 01405330 Manalapan Brook near Englishtown, New Jersey. National Water Information System: Web Interface. http://waterdata.usgs.gov/nwis/inventory.

U.S. Department of the Interior, Geological Survey. (Retrieved December 2006). Water Resources, USGS 01405335 Manalapan Brook near Manalapan, New Jersey. National Water Information System: Web Interface. http://waterdata.usgs.gov/nwis/inventory.

U.S. Department of the Interior, Geological Survey. (Retrieved December 2006). Water Resources, USGS 01405400 Manalapan Brook at Spotswood, New Jersey. National Water Information System: Web Interface. http://waterdata.usgs.gov/nwis/inventory.

U.S. Department of the Interior, Geological Survey. (2002). The National Flood Frequency Program, Version 3: A Computer Program for Estimating Magnitude and Frequency of Floods for Ungaged Sites, Water-Resources Investigations Report 02-4168. Reston, Virginia.

U.S. Department of the Interior, Geological Survey. (January 30, 1998). Users Manual for Program PEAKFQ, Annual Flood Frequency Analysis Using Bulleting 17B Guidelines. Reston, Virginia.

U.S. Department of the Interior, Geological Survey. (1994). Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimation of Magnitude and Frequency of Floods for Ungaged Sites, 1993, Water-Resources Investigation Report 94-4002. Reston, Virginia.

U.S. Department of the Interior, Geological Survey, Interagency Advisory Committee. (March 1982). Guidelines for Determining Flood Flow Frequency, Bulletin 17B. Reston, Virginia.

U.S. Department of the Interior, Geological Survey. (1954, Photorevised 1981). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Sandy Hook, New Jersey.

U.S. Department of the Interior, Geological Survey. (August 1978). Log-Pearson Type III Flood Flow Frequency Analysis. Trenton, New Jersey.

U.S. Department of the Interior, Geological Survey. (1974). A Summary of Peak Stages and Discharges for the Flood of August 1973 in New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). Map of Flood-Prone Areas. Scale 1:24,000: Adelphia, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). Map of Flood-Prone Areas. Scale 1:24,000: Farmingdale, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). Map of Flood-Prone Areas. Scale 1:24,000: Freehold, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). Map of Flood-Prone Areas. Scale 1:24,000: Marlboro, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). Map of Flood-Prone Areas. Scale 1:24,000: Roosevelt, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). 7.5-Minute Series Topographic Maps. Scale 1:24,000: Adelphia, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). 7.5-Minute Series Topographic Maps. Scale 1:24,000: Farmingdale, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). 7.5-Minute Series Topographic Maps. Scale 1:24,000: Freehold, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). 7.5-Minute Series Topographic Maps. Scale 1:24,000: Marlboro, New Jersey.

U.S. Department of the Interior, Geological Survey. (1973). 7.5-Minute Series Topographic Maps. Scale 1:24,000: Roosevelt, New Jersey.

U.S. Department of the Interior, Geological Survey. (1953; Photorevised 1972). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Freehold, New Jersey.

U.S. Department of the Interior, Geological Survey. (1972). Map of Flood Prone Areas: Trenton, New Jersey.

U.S. Department of the Interior, Geological Survey. (1953; Photorevised 1971). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Point Pleasant, New Jersey.

U.S. Department of the Interior, Geological Survey. (1970). 7.5-Minute Series Maps, Flood-Prone Area Quadrangle. Scale 1:24,000, Contour Interval 10 Feet: Allentown, New Jersey.

U.S. Department of the Interior, Geological Survey (1957; Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 10 Feet: Allentown, New Jersey.

U.S. Department of the Interior, Geological Survey (1957; Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Jamesburg, New Jersey.

U.S. Department of the Interior, Geological Survey (1954; Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Asbury Park, New Jersey.

U.S. Department of the Interior, Geological Survey. (1954, Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Marlboro, New Jersey.

U.S. Department of the Interior, Geological Survey. (1944-1954; Photorevised 1970). 7.5-Minute Series topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Long Branch, New Jersey.

U.S. Department of the Interior, Geological Survey. (Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 feet: Keyport, NJ-NY.

U.S. Department of the Interior, Geological Survey. (Photorevised 1970). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 feet: South Amboy, NJ-NY.

U.S. Department of the Interior, Geological Survey. (1968). Water Supply Paper 1672, Magnitude and Frequency of Floods in the United States, Part 1-B, North Atlantic Slope Basins, New York to York River.

U.S. Department of the Interior, Geological Survey. (1964). Water Resources Circular No. 13. Washington, D.C.

U.S. Department of the Interior, Geological Survey. (1953). 7.5-Minute Series Topographic Maps. Scale 1:24,000, Contour Interval 20 Feet: Jamesburg, New Jersey.

U.S. Department of the Interior, Geological Survey. (Published annually). Water Resources Data for New Jersey, Part 1, Surface Water Records. Trenton, New Jersey.

U.S. Department of the Interior, Geological Survey. (Published annually). Water Resources Data for Pennsylvania, Part I, Surface Water Records.

U.S. Department of the Interior, Geological Survey, Water Resources Division. (June 1976). Water Resources Data for New Jersey, Water Year 1975 in cooperation with the State of New Jersey.

U.S. Department of Transportation, Federal Highway Administration. (Revised March 1978). Hydraulic Design Series No. 1, Hydraulics of Bridge Waterways. Washington, D.C.

Van Note-Harvey Associates. (1968). Survey of Rocky Brook and Millstone River, Millstone, New Jersey. Trenton, New Jersey.

Water Resources Council. (June 1977). Bulletin 17A, "Guidelines for Determining Flood Flow Frequency". Washington, D.C.

Water Resources Council. (March 1976). Bulletin 17, "Guidelines for Determining Flood Flow Frequency". Washington, D.C.

Water Resources Council. (December 1967). Bulletin 15, "A Uniform Technique for Determining Flood Flow Frequency". Washington, D.C.

(April 12, 1963). Plan of Sanitary Sewerage System for Middletown Township: Topographic Maps. Scale 1"=100', Contour Interval 5 Feet.

(March 1957). National Hurricane Research Project No. 5, "Survey of Meteorological Factors Pertinent to the Reduction of Loss of Life and Property in Hurricane Situations".

10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the September 25, 2009, countywide Flood Insurance Study (FIS) was published. Future revisions may be made that do not result in the republishing of the FIS report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data listed on the FIRM Index. Please also note that as part of this revision the Community Map History table in section 6.0 has been revised.

10.1 June 20, 2018, Revision

Authority and Acknowledgements

The June 20, 2018, revision incorporates the results of coastal analysis for the Boroughs of Highlands, Little Silver, Matawan, and Monmouth Beach in Monmouth Count, NJ. This analysis was performed by Risk Assessment, Mapping, and Planning Partners (RAMPP) for FEMA under contract No. contract No. HSFEHQ-09-D-0369, task order HSFE0209-J-0001. This work was completed in 2012.

Base map information shown on this FIRM was provided in digital format by New Jersey Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS). This information was derived from digital orthophotos produced at a scale of 1:2400 (1”=200’) with a 1 foot pixel resolution from photography dated 2012.

Coordination

For the June 20, 2018, revision, an initial CCO meeting was held on August 19, 2010, and attended by representatives of NJDEP, RAMPP, FEMA, and local officials. The Flood Risk Review (FRR) meeting was held on August 21, 2013.

The results of the study were reviewed at the final CCO meeting held on September 10, 2014, and attended by representatives of NJDEP, RAMPP, and FEMA, and local officials. All concerns raised at that meeting have been addressed in this study for the revised communities.

Area Studied

The June 20, 2018, revision, includes a new coastal analysis and mapping for the shoreline within the Boroughs of Highlands, Little Silver, Matawan, and Monmouth Beach.

This FIS also incorporates the determinations of letters issued by FEMA resulting in map changes (Letter of Map Revision [LOMR], Letter of Map Revision - based on Fill [LOMR-F], and Letter of Map Amendment [LOMA], as shown in the “Incorporated Letters of Map Change” table below.

INCORPORATED LETTERS OF MAP CHANGE

Community	Flooding Source(s)/Project Identifier	Date Issued	Type
Borough of Shrewsbury	Enclave at Shrewsbury, Block 70.02, Lot 6	May 27, 2014	LOMR

Principal Flood Problems

On September 22, 1992, Tropical Storm Danielle produced rainfall across much of New Jersey. The southwest portion of the state experienced over 3 inches of rain. The storm washed out miles of beaches along the coastline. (National Hurricane Center, 1992)

Hurricane Floyd originally made landfall in Cape Fear, North Carolina, as a Category 2 hurricane on September 16, 1999. The storm crossed over North Carolina and southeastern Virginia, before briefly entered the western Atlantic Ocean. The storm reached New Jersey on September 17, 1999. Record breaking flooding was recorded throughout the State of New Jersey. The Raritan River basin experienced record floods of up to 4.5 ft. higher than any previous record flood crest. The areas of Bound Brook and Manville were especially hit hard. A Federal Emergency Declaration was issued on September 17, 1999. Overall damage estimates for Hurricane Floyd, in the State of New Jersey are estimated around $250 million dollars. (National Hurricane Center, 1999)

Hurricane Irene came ashore in Little Egg Inlet in Southern New Jersey; on August 28, 2011. In anticipation of the storm, Governor Chris Christy declared a state of emergency on August 25th, with President Barack Obama reaffirming the declaration on August 27th. Mandatory evacuations of approximate 75,000-100,000 Monmouth County residents were ordered. Wind gusts topped off at 63 mph in Sandy Hook and 52 mph in Belmar overnight, according to the National Weather Service, and rain totals reached over 10 inches in many parts of the state. Massive tidal surges caused significant damage to coastal towns, wrecking the boardwalk in Spring Lake and flooding low-lying bay shore towns, such as Keansburg and Union Beach. More severe damage, however, occurred miles inland, in western Monmouth County near the Manasquan River, which had already flooded as a result of heavy rains the week before. 121,000 Monmouth County residents lost power during the storm. Overall damage estimates, for the State of New Jersey, came to over $1 billion dollars (Associated Press, 2011)

Hurricane Sandy came ashore as an immense tropical storm in Brigantine, New Jersey, on October 29, 2012. Sandy dropped heavy rain on the area; almost a foot in some areas. Wind gust were recorded at 90 mph. A full moon made the high tides 20 percent higher than normal and amplified the storm surge. The New Jersey shore suffered the most damage. Some barrier island communities suffered severe “wash over” including the creation of two temporary inlets. More than 100 homes were

destroyed in Union Beach, including about 30 washed away by the tides. NOAA's gage #8531680 at Sandy Hook, NJ, the high water mark (WHM), which is considered as a stillwater elevation without waves, was 9.21 ft. NAVD88 at 6:00 PM on October 29, 2012. Nearby USGS HWMs are 11.57 and 11.06 ft. NAVD88. Seaside communities were damaged and destroyed up and down the coastline. Some 263,000 households had lost power in Monmouth County. Initial reports suggest that over 12,000 homes and businesses were damaged or destroyed by the storm. Governor Chris Christy declared a state of emergency on October 31. Hurricane Sandy is estimated to cost the State of New Jersey over $36 billion. (Associated Press, 2012)

Flood Protection Measures

Monmouth County has no levee type structure that would require analysis of levee failure and removal under Section D.2.10.3.4.1 of the Draft Atlantic Ocean and Gulf of Mexico Coastal Guidelines update.

In alignment with standard practice used in other FEMA studies, all coastal armoring structures and beach stabilization structures have been included in the analysis without adjusting the analysis to remove the structure or reduce the effects of the structure.

Coastal Analysis

The FEMA, Region II office, initiated a study in 2009 to update the coastal storm surge elevations within the states of New York and New Jersey including the Atlantic Ocean, the Barnegat Bay, the Raritan Bay, the Jamaica Bay, the Long Island Sound and their tributaries. The study replaces outdated coastal analyses as well as previously published storm surge stillwater elevations for Boroughs of Highlands, Little Silver, Matawan, and Monmouth Beach in Monmouth Count, NJ, and serves as the basis for updated FIRMs. The coastal study for the New Jersey Atlantic Ocean coast and New York City coast was conducted for FEMA by RAMPP under contract HSFEHQ-09-D-0369, task order HSFE02-09-J-0001.

The region-wide storm surge modeling system includes the Advanced Circulation Model for Oceanic, Coastal and Estuarine Waters (ADCIRC) for simulation of 2-dimensional hydrodynamics. ADCIRC was dynamically coupled to the unstructured numerical wave model Simulating Waves Nearshore (unSWAN) to calculate the contribution of waves to total storm surge (FEMA, 2010). The resulting model system is typically referred to as SWAN+ADCIRC (FEMA, 2010).

Model skill was assessed by quantitative comparison of model output to wind, wave, water level, and high water mark observations. The model was then used to re-create 30 historical extra-tropical storms and 157 synthetic hurricanes to create a synthetic water elevation record from which the 10-, 2-, 1-, and 0.2- percent annual chance of exceedence elevations were determined.

For the New York and New Jersey surge study, wave setup was determined directly from the coupled wave and storm surge model. The total stillwater elevation (SWEL) including storm surge and wave setup was then used for the erosion and wave modeling.

The total stillwater elevations for the 10-, 2-, 1-, and 0.2- percent annual chance floods determined for the primary sources of flooding in Monmouth County: Atlantic Ocean, Little Silver Creek, Manahassett Creek, Raritan Bay, Sandy Hook Bay, and Shrewsbury River are shown in the Table below, "Revised Transect Data."

The Borough of Highlands is located along the shoreline of Raritan Bay and Sandy Hook Bay and is partially sheltered by the Sandy Hook National Park barrier island. Applicable coastal study transects are Transects 22-23 and 69a. The location of these transects is shown in the Revised Transect Location Map.

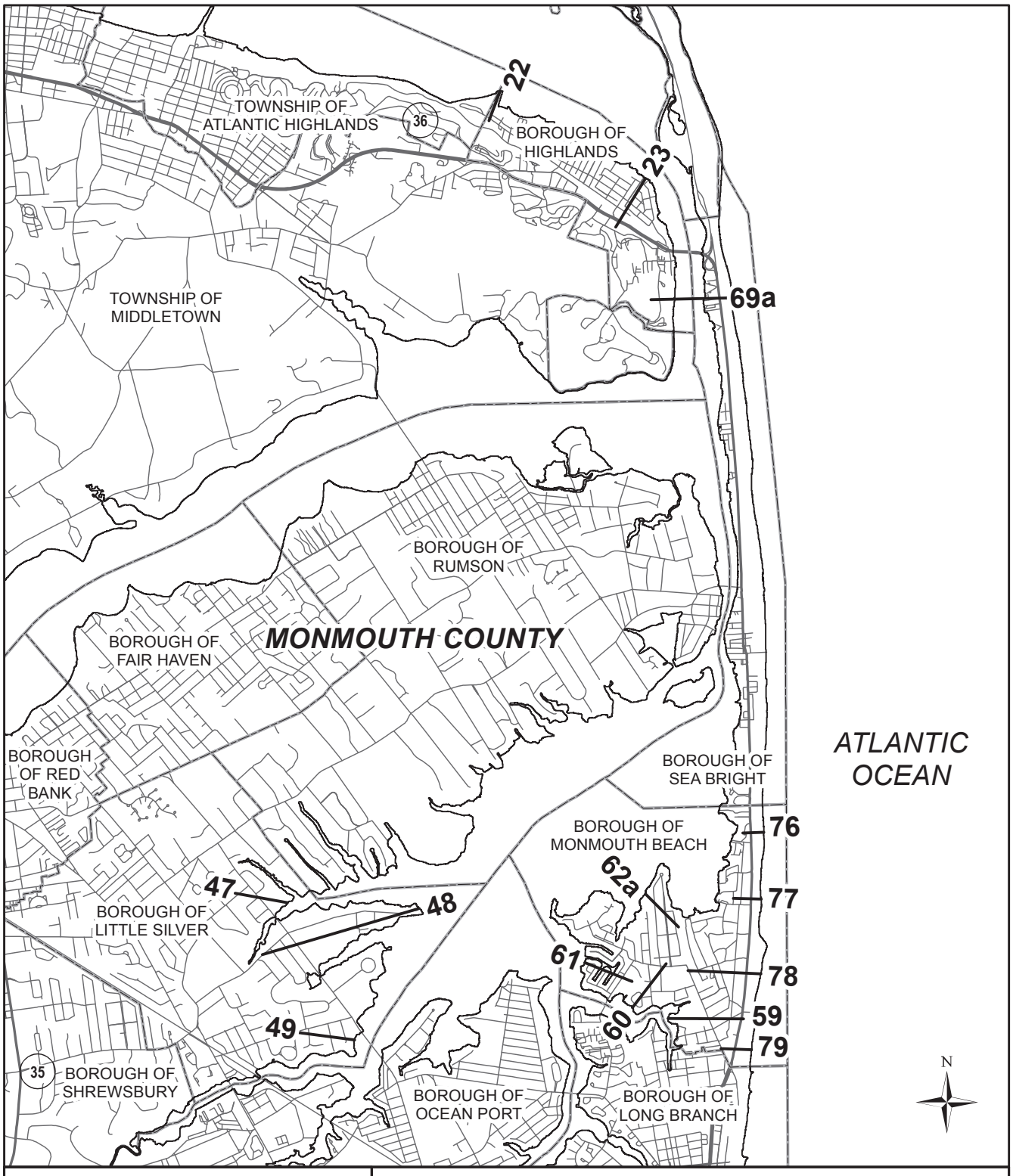
The Borough of Little Silver is located within the back bay area of the Shrewsbury River near Town Neck Creek and Little Silver Creek. Applicable coastal study transects are Transects 47-49. The location of these transects is shown in the Revised Transect Location Map.

The Borough of Matawan is located inland of the Raritan Bay shoreline and does not include coastal study transects within the Borough however, is impacted by coastal flooding that was defined by Transects 3 and 4 that are located along the Raritan Bay shoreline in Aberdeen Township and Keyport Borough. The location of these transects is shown in the Revised Transect Location Map.

The Borough of Monmouth Beach is located along the Atlantic Coast shoreline and the Shrewsbury River and Manahassett Creek back bay shoreline. Applicable coastal study transects include Transects 76-79 along the open coast facing the Atlantic and Transects 59-61 and 62a located along the Shrewsbury River back bay shoreline. The location of these transects is shown in the Revised Transect Location Map.

For the updated coastal study the primary frontal dune (PFD) was delineated and used for erosion modeling along the Atlantic Coast. A review of the geology and shoreline type in Ocean County supported using FEMA's standard erosion methodology for PFDs, referred to as the "540 rule," (FEMA, 2007). Beach profiles collected before and after Hurricane Sandy were also used to qualitatively assess the beach response during an extreme event and found to be in good agreement with standard erosion methodology.

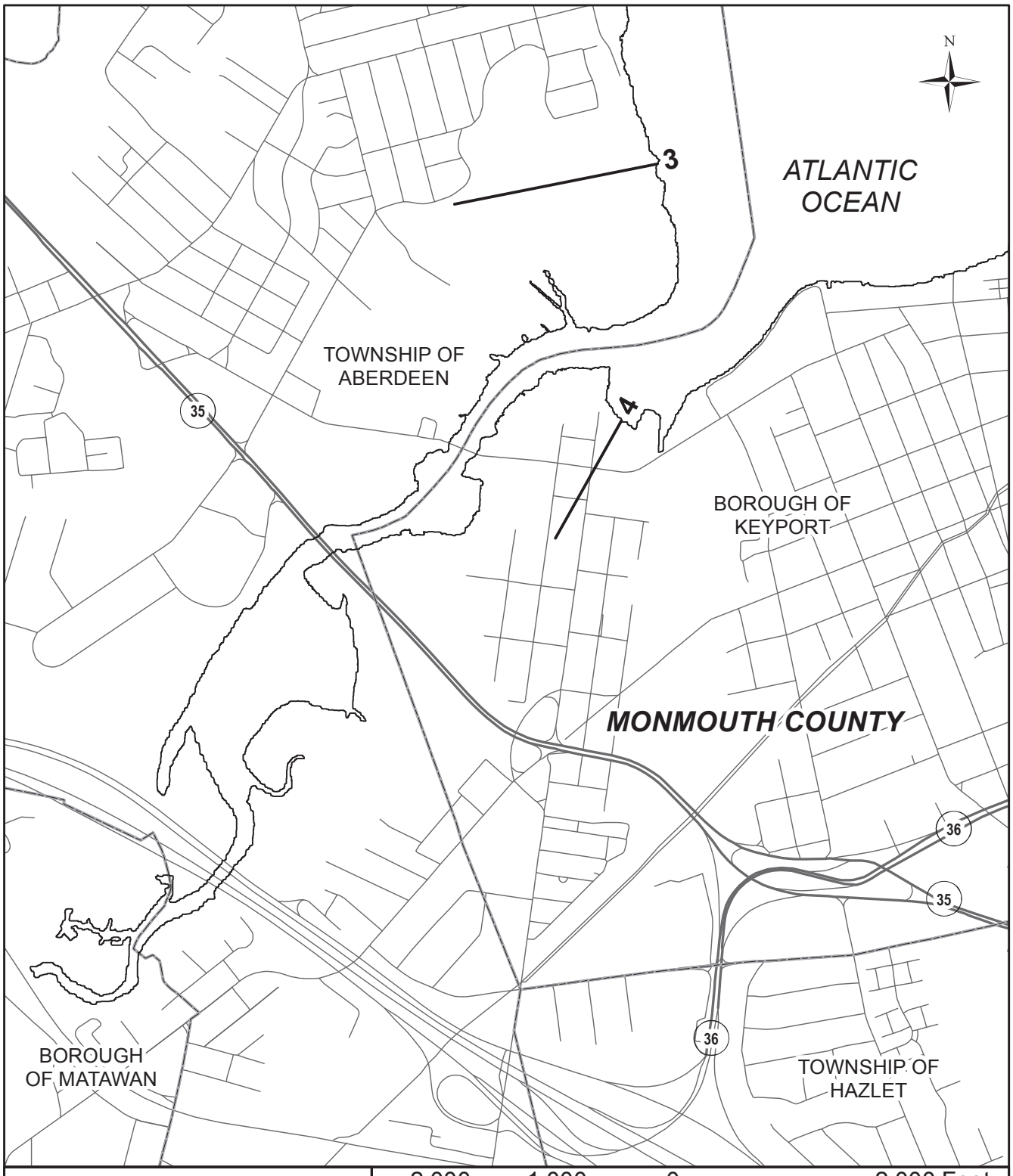
In following revised transect data table, the 10-, 2-, 1-, and 0.2-percent annual chance stillwater elevations for each transect are provided along with the starting wave height and period.



FEDERAL EMERGENCY MANAGEMENT AGENCY

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

REVISED TRANSECT LOCATION MAP (1 of 2)



FEDERAL EMERGENCY MANAGEMENT AGENCY

2,000 1,000 0 2,000 Feet

MONMOUTH COUNTY, NJ
(ALL JURISDICTIONS)

REVISED TRANSECT LOCATION MAP (2 of 2)

REVISED TRANSECT DATA

		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	Coordinates	Significant Wave Height Hs (ft)	Peak Wave Period	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Raritan Bay	3	N 40.442110 W 74.207530	4.31	4.72	8.2 8.2 - 8.3	11.3 11.3 -11.4	12.5 12.4 -12.7	16.0 16.0 - 16.2
Raritan Bay	4	N 40.436054 W 74.208669	3.56	4.40	8.3	11.3	12.7	16.1
Sandy Hook Bay	22	N 40.411452 W 74.000799	3.38	3.17	7.3	9.9	11.1 10.8 - 11.1	14.4 14.3 - 14.4
Sandy Hook Bay	23	N 40.403082 W 73.983908	2.5	2.76	7.0	9.6 9.3 - 9.6	10.8 10.6 - 10.8	14.1 13.8 - 14.1
Little Silver Creek	47	N 40.338419 W 74.029171	1.25	1.97	5.3 5.2-5.3	7.0	7.7 7.6-7.7	9.2 9.1-9.2
Little Silver Creek	48	N 40.337520 W 74.013620	1.94	2.45	5.2 5.0-5.5	6.9 6.8-6.9	7.6 7.5-7.7	9.0 8.9-9.2
Shrewsbury River	49	N 40.325768 W 74.021775	1.34	2.08	5.3 5.3-5.5	7.0 6.9-7.0	7.6 7.5-7.7	9.0 8.9-9.0
Manahassett Creek	59	N 40.326799 W 73.984531	0.87	1.61	5.2	6.8 6.7 - 6.8	7.5 7.3 – 9.0	8.9 8.8 - 9.3
Manahassett Creek	60	N 40.327868 W 73.988719	0.94	1.76	5.2	6.9 6.7 - 6.9	7.5 7.2 - 7.6	8.9 8.7 - 8.9
Manahassett Creek	61	N 40.332107 W 73.994179	1.88	2.38	5.2 5.1 - 5.2	6.9 6.7 - 6.9	7.5 7.2 - 7.6	8.9 8.7 - 8.9

		Starting Wave Conditions for the 1% Annual Chance			Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)			
Flood Source	Transect	Coordinates	Significant Wave Height Hs (ft)	Peak Wave Period	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Shrewsbury River	62a	N 40.338154 W 73.986729	1.84	2.52	5.1	6.7	7.4 7.1 - 7.4	8.8 8.6 - 8.8
Atlantic Ocean	69a	N 40.391966 W 73.974095	5.01	11.92	6.8 6.1-6.9	9.3 9.3 – 9.8	10.5 9.3 – 10.8	13.3 11.7 – 13.8
Atlantic Ocean	76	N 40.343408 W 73.972439	4.74	12.56	6.6 5.1-6.6	8.9 6.5-7.89	9.9 7.2-9.9	12.5 8.5-12.7
Atlantic Ocean	77	N 40.337336 W 73.973017	4.96	12.76	6.9 5.1-7.1	8.9 6.6-8.9	10.4 7.1-10.5	12.9 8.7-13.0
Atlantic Ocean	78	N 40.330540 W 73.973335	4.85	12.53	6.8 5.2-6.8	9.1 6.7-9.1	10.1 7.2-10.1	12.7 8.7-12.7
Atlantic Ocean	79	N 40.323710 W 73.974741	5.11	12.58	6.9 6.7-7.0	9.2 6.7-9.2	10.7 8.9-10.9	13.5 9.3-13.8

Each transect defined within the Region II study area was evaluated for the applicability of wave runup, and if necessary, the appropriate runup methodology was selected and applied to each transect. Runup elevations were then compared to WHAFIS results to determine the dominant process affecting BFEs and associated flood hazard levels. Based on wave runup rates, wave overtopping was computed following the FEMA 2007 Guidelines and Specifications (FEMA, 2007).

The 3-foot wave has been determined to be the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures. The one exception to the 3-foot wave criteria is where a PFD exists. The limit of the coastal high hazard area then becomes the landward toe of the PFD or where a 3-foot or greater breaking wave exists, whichever is most landward.

Post-storm field visits and laboratory tests have confirmed that wave heights as small as 1.5 feet can cause significant damage to structures when constructed without consideration to the coastal hazards. Additional flood hazards associated with coastal waves include floating debris, high velocity flow, erosion, and scour which can cause damage to Zone AE-type construction in these coastal areas. To help community officials and property owners recognize this increased potential for damage due to wave action in the AE zone, FEMA issued guidance in December 2008 on identifying and mapping the 1.5-foot wave height line, referred to as the Limit of Moderate Wave Action (LiMWA). See Updated Transect Schematic below.

Coastal analysis results from Transects 3 and 4 located along the shoreline of Raritan Bay in Aberdeen Township and Keyport Borough were used to map the coastal hazard areas within the Borough of Matawan. Wave Height Analysis for Flood Insurance Study (WHAFIS) results for these transects were used to map the offshore and overland coastal flood zones and associated Base Flood Elevations (BFEs).

The 1-percent annual chance boundary was delineated at the inland extent of the 1-percent annual chance 192tillwater elevation. LiMWA was delineated at the inland extent of the 1.5 foot wave within the Coastal AE 14.

Coastal analysis results from Transects 22-23 and 69a were used to map the coastal hazard areas within the Borough of Highlands Borough. WHAFIS results for these transects were used to map the offshore and overland coastal flood zones and associated BFEs.

The 1-percent annual chance boundary was delineated at the inland extent of the 1-percent annual chance 192tillwater elevation. LiMWA was delineated at the inland extent of the 1.5 foot wave within the Coastal AE13 and 12.

Coastal analysis results from Transects 47-49 were used to map the coastal hazard areas within the Borough of Little Silver. WHAFIS results for these transects were used to map the offshore and overland coastal flood zones and associated BFEs.

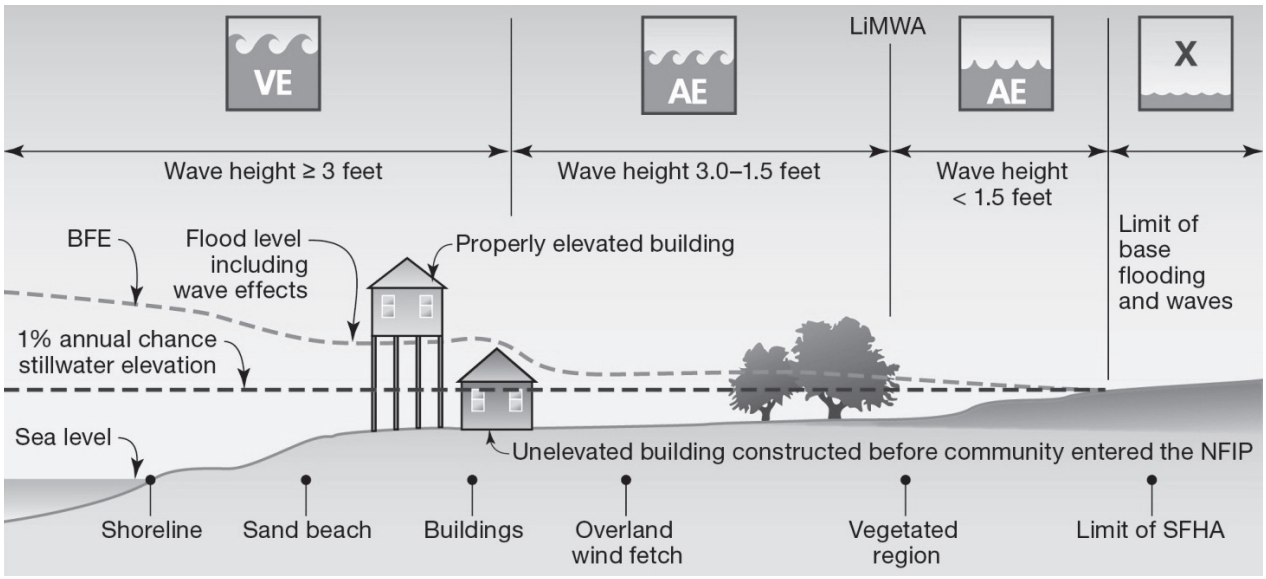
The 1-percent annual chance boundary was delineated at the inland extent of the 1-percent annual chance 193tillwater elevation. LiMWA was delineated at the inland extent of the 1.5 foot wave within the Coastal AE 9 and along the boundary of the AE10/AE8.

Coastal analysis results from Transects 76-79 were used to map the coastal hazard areas along the Atlantic Coast within the Borough of Monmouth Beach. Wave Runup elevations were mapped and overtopping was calculated and mapped where applicable (AO zone mapped between Transect 78 and 79) along the Atlantic Coast.

The 1% boundary was delineated to the Runup elevation or PFD whichever was more conservative. Runup transition zones (between changing BFEs) offshore are mapped as perpendicular lines extending from the inland extent of the VE zone offshore. LiMWA was delineated along the 1-percent annual chance boundary.

Coastal analysis from Transects 59-62, and 62a were used to map the coastal hazard areas along the Shrewsbury River within the Borough of Monmouth Beach . WHAFIS results for these transects were used to map the offshore and overland coastal flood zones and associated BFEs.

The 1-percent annual chance boundary was delineated at the inland extent of the 1-percent annual chance stillwater elevation. LiMWA was delineated at the inland extent of the 1.5 foot wave within the Coastal AE 8 and along the boundary of the AE9/AE8.



Updated Transect Schematic

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This disagreement in datum may result in apparent differences in base flood elevations across the corporate limits between the communities for equivalent flood depths.

Prior versions of the FIS report and FIRM were referenced to NGVD 29. The elevations shown in the FIS report and on the FIRMs for Monmouth County are referenced to NAVD 88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor. The conversion factor to NGVD 29 is +1.1. The conversion between the datums may be expressed as an equation:

NAVD 88 + 1.1 feet = NGVD 29

The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in this FIS to NGVD 29 should apply the stated conversion factor(s) to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA20/June 1992, or contact the Spatial Reference System Division, National

Geodetic Survey, NOAA, Silver Spring Metro Center, 1315 East-West Highway, Silver Spring, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Bibliography and References

Associated Press, (2011) www.ap.org

Associated Press, (2012) www.ap.org

Federal Emergency Management Agency, Region II Coastal Storm Surge Study Reports, 2010.

Federal Emergency Management Agency. Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix D: Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update, 2007.

National Hurricane Center. (1992) Tropical Strom Danielle Report.

National Hurricane Center. (1999) Hurricane Floyd Report.