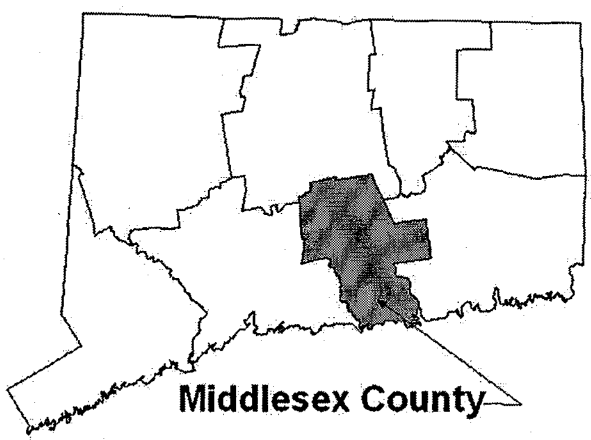
FLOOD INSURANCE STUDY

MIDDLESEX COUNTY, CONNECTICUT
AND INCORPORATED AREAS

VOLUME 1 OF 3

Community Name	Community Number
CHESTER, TOWN OF	090060
CLINTON, TOWN OF	090061
CROMWELL, TOWN OF	090123
DEEP RIVER, TOWN OF	090062
DURHAM, TOWN OF	090185
EAST HADDAM, TOWN OF	090063
EAST HAMPTON, TOWN OF	090064
ESSEX, TOWN OF	090065
FENWICK, BOROUGH OF	090187
HADDAM, TOWN OF	090066
KILLINGWORTH, TOWN OF	090174
MIDDLEFIELD, TOWN OF	090067
MIDDLETOWN, CITY OF	090068
OLD SAYBROOK, TOWN OF	090069
PORTLAND, TOWN OF	090130
WESTBROOK, TOWN OF	090070



Effective:
August 28, 2008

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
09007CV001A

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 this 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: August 28, 2008

Revised Countywide FIS Dates:

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FLOOD INSURANCE STUDY
MIDDLESEX COUNTY, CONNECTICUT
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Middlesex County, Connecticut including the Towns of Chester, Clinton, Cromwell, Deep River, Durham, East Haddam, East Hampton, Essex, Haddam, Killingworth, Middlefield, Old Saybrook, Portland, and Westbrook; the City of Middletown; and the Borough of Fenwick, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the county that will be used to establish actuarial flood insurance rates. This information will also be used by the communities of Middlesex County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in 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.

The community based FIS reports prior to 1979 were prepared for the Federal Insurance Administration (FIA). In 1979, an executive order merged the FIA into the newly formed Federal Emergency Management Agency (FEMA). Reports from that date forward were prepared for FEMA.

This FIS was prepared to include the incorporated communities within Middlesex County in a countywide FIS. 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:

Chester, Town of	The hydrologic and hydraulic analyses for the February 2, 1990 study represent a revision of the original analyses prepared by CE Maguire, Inc., dated July 1980, for the Federal Emergency Management Agency (FEMA), under Contract No. H-4560. The hydrologic and hydraulic analyses for this updated study were prepared by the U.S.

Chester, Town of (cont.)	Geological Survey (USGS) for FEMA under Inter-Agency Agreement No. EMW-85-E-1923, Project Order No. 3. This work was completed in August 1987.
Clinton, Town of	For the original March 1980 FIS report and the September 30, 1980, FIRM (collectively referred to as the 1980 FIS), the hydrologic and hydraulic analyses were prepared by CE Maguire, Inc., for the Federal Insurance Administration (FIA) under Contract No. H-4560. That work was completed in January 1979. For the December 1, 1983, Wave Height Analysis Supplement to the FIS report and the June 1, 1984, FIRM (collectively referred to as the 1984 FIS), the wave height analyses were prepared by Dewberry & Davis for FEMA under Contract No. EMW-C-0543. This work was completed in January 1983. For the January 17, 1997 revision, the hydrologic and hydraulic analyses were prepared by the U.S. Geological Survey (USGS), Water Resources Division, for FEMA under Inter-Agency Agreement No. EMW-93-E-4116, Project Order No. 1. This work was completed in February 1995.
Cromwell, Town of	For the original, December 15, 1977, FIS report and June 15, 1978, FIRM (collectively referred to as the 1978 FIS), the hydrologic and hydraulic analyses were prepared by Anderson-Nichols & Company, Inc., for FEMA, under Contract No. H-3862. That work was completed in February 1977. For the June 2, 1992, FIS, the hydrologic and hydraulic analyses for the Mattabesset River upstream of State Route 72 were taken from the contiguous FIS for the Town of Berlin, Connecticut, and prepared by Dewberry & Davis for FEMA. This work was completed in March 1991. For the September 17, 1997 revision, the hydrologic and hydraulic analyses for the Mattabesset River for its entire length within the Town of Cromwell were prepared by Roald Haestad, Inc., for FEMA, under Contract No. EMW-94-C-4405. This work was completed in July 1995.
Deep River, Town of	The hydrologic and hydraulic analyses for the July 16, 1980 study were prepared by CE Maguire, Inc., for the FIA, under Contract No. H-4560. This work, which was completed in January 1979, covered all significant flooding sources in the Town of Deep River.
Durham, Town of	The hydrologic and hydraulic analyses for the October 1, 1981 study were prepared by the USGS for FEMA, under Inter-Agency Agreement No. IAA-H-14-78. This work was completed in March 1980.

East Haddam, Town of	The hydrologic and hydraulic analyses for the May 1979 study were performed by Anderson-Nichols & Company, Inc. for the FIA, under Contract No. H-3862. This work, which was completed in October 1977, covered all significant flooding sources affecting the Town of East Haddam.
East Hampton, Town of	The hydrologic and hydraulic analyses for the April 1979 study were performed by Anderson-Nichols & Company, Inc. for the FIA, under Contract No. H-3862. This work, which was completed in October 1977, covered all significant flooding sources affecting the Town of East Hampton.
Essex, Town of	The hydrologic and hydraulic analyses for the March 4, 1986 study represent a revision of the original analyses performed by CE Maguire, Inc., for FEMA, under Contract No. H-4560. The original work, which included the Connecticut River analysis, was completed in February 1979. The revised analysis for the Falls River was prepared by the New England District of the U. S. Army Corps of Engineers (USACE) for FEMA, under Inter-Agency Agreement No. EMW-E-0941. This updated analysis was completed in March 1984.
Fenwick, Borough of	The hydrologic and hydraulic analyses for the Borough of Fenwick was originally included in the FIS for the Town of Old Saybrook completed in May 1977 (see Town of Old Saybrook). The wave height analysis in the July 18, 1983 study represents a supplement to the Old Saybrook FIS to include the Borough of Fenwick. This study was prepared by Dewberry & Davis for FEMA, under contract No. EMW-C-0543. This work was completed in January 1983.
Haddam, Town of	The hydrologic and hydraulic analyses for the July 1979 study were performed by Anderson & Nichols Co., Inc., for the FIA, under Contract No. H-3862. This work, which was completed in November 1977, covered all significant flooding sources affecting the Town of Haddam.
Killingworth, Town of	The hydrologic and hydraulic analyses for the original study were prepared by the U. S. Geological Survey (USGS) for FEMA, under Inter-Agency Agreement No. IAA-H-14-78. That work was completed in March 1980. The hydrologic and hydraulic analyses for the September 30, 1992 revision were taken from the Flood Insurance Study for the Town of Madison.
Middlefield, Town of	The hydrologic and hydraulic analyses for the September 1979 study were performed by the USGS for the FIA, under Inter-Agency Agreement No. IAA-H-8-76,

Middlefield, Town of (cont.)	Project 19 Order No. 7. This work, which was completed in October 77, covered all significant flooding sources affecting the Town of Middlefield.
Middletown, City of	For the original June 16, 1980, FIS report, and the December 16, 1980, FIRM (collectively referred to as the 1980 FIS), the hydrologic and hydraulic analyses were prepared by the New England District of the USACE, for FEMA, under Inter-Agency Agreement No. IAA-H-2-73, Project Order No. 2. That work was completed in February 1975. For the July 16, 1990, FIS, the hydrologic and hydraulic analyses were prepared by USACE for FEMA under Inter-Agency Agreement No. EMW-E-0941. That work was completed in September 1988. For the March 7, 2001 revision, the hydrologic and hydraulic analyses for the Mattabesset River were prepared by Roald Haestad, Inc., for FEMA, under Contract No. EMW-94-C-4405. This work was completed in August 1995. The hydraulic analyses for Longhill Brook and the Longhill Brook Diversion Channel were prepared by Green International Affiliates, Inc. for FEMA under Contract Number EMB-96-CO-0403. This work was completed in October 1998.
Old Saybrook, Town of	The hydrologic and hydraulic analyses for the January 1978 study were performed by the New England District of the USACE, for the FIA, under Inter-Agency Agreement No. IAA-H-02-73, Project Order No. 4. This work, which was completed in May 1977, covered all significant flooding sources affecting the Town of Old Saybrook. The supplemental wave height analysis for the January 5, 1984 study was prepared by Dewberry & Davis for FEMA, under Contract No. EMW-C-0543. This work was completed in January 1983.
Portland, Town of	The hydrologic and hydraulic analyses for the January 1978 study were performed by Anderson-Nichols & Company, Inc., for the FIA under Contract Number H-3862. This work, which was completed in May 1977, covered all significant flooding sources in the Town of Portland.
Westbrook, Town of	The hydrologic and hydraulic analyses in the February 19, 1986 study represent a revision of the original analyses performed by CE Maguire, Inc., for FEMA, under Contract No. H-4560. The original work was completed in November 1978. The updated version was prepared by the New England Division of the USACE for FEMA, under Inter-Agency Agreement No. EMW-E-0941. This work was completed in October 1983.

For this countywide study, the hydraulic analysis for the revised portions of the Connecticut River were prepared by Roald Haestad, Inc., for FEMA under Contract No. EME-2003-CO-0338. This work was completed in September 2006. The peak discharges for the restudy of the Connecticut River were developed by the United States Geological Survey (USGS) for FEMA under a separate contract. The USGS report entitled, "Estimates of the Magnitude and Frequency of Flood Flows in the Connecticut River in Connecticut, Open-File Report 2005-1369" was completed in 2005.

Base map information shown on this FIRM was derived from State of Connecticut Digital Orthophotos produced at a scale of 1:12,000 from photography dated Spring 2004 or later. The projection used in the preparation of this map was Connecticut State Plane, FIPS Zone 0600. The horizontal datum used was North American Datum of 1983 (NAD 83).

1.3 Coordination

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

The dates of the most recent initial and final CCO meetings held for all jurisdictions within Middlesex County are shown in Table 1.

TABLE 1 - INITIAL AND FINAL CCO MEETINGS

Community Name	Initial CCO Date	Final CCO Date
Chester, Town of	December 6, 1984	February 24, 1989
Clinton, Town of	October 12, 1990	December 1, 1995
Cromwell, Town of	August 9, 1993	September 20, 1996
Deep River, Town of	June 2, 1977	July 25, 1979
Durham, Town of	April 21, 1978	May 13, 1981
East Haddam, Town of	June 1976	October 12, 1978
East Hampton, Town of	January 1976	October 24, 1978
Essex, Town of	August 12, 1982	January 22, 1985
Fenwick, Borough of	*	*
Haddam, Town of	January 1976	December 6, 1978
Killingworth, Town of	September 3, 1991[1]	November 6, 1991
Middlefield, Town of	July 8, 1976	March 7, 1979
Middletown, City of	August 9, 1993	October 14, 1999
Old Saybrook, Town of	*	July 7, 1976
Portland, Town of	May 1975	July 12, 1977
Westbrook, Town of	August 12, 1982	February 6, 1985

**Data not available*

[1] FEMA approved the initiation of a Flood Insurance Study

For this countywide study, letters were sent to all communities within the county notifying them of the scope of the FIS, and soliciting pertinent information from them. Letters were mailed on April 10 and 17, 2006. The results of this countywide study were reviewed at the final CCO meetings held on July 17 and 18, 2007, and attended by representatives of the communities, the Connecticut Department of Environmental Protection, Dewberry, and FEMA. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Middlesex County, Connecticut.

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

All or portions of the flooding sources listed in Table 2 were studied by detailed methods.

TABLE 2 - FLOODING SOURCES STUDIED BY DETAILED METHODS

Allyn Brook	Falls River	Pocotopaug Creek
Ball Brook	Fishing Brook	Pond Meadow Brook
Beaver Meadow Brook	Great Brook	Ponset Brook
Bible Rock Brook	Hales Brook	Reservoir Brook
Boulder Lake Brook	Hammonasset River	Roundhill Brook
Candlewood Hill Brook	Hersig Brook	Salmon River
Carr Brook	Indian River	Sawmill Brook
Carr Brook Tributary A	Lane District Brook	Shunpike Creek
Chester Creek	Longhill Brook	South Branch Great Brook
Chestnut Brook	Longhill Brook Diversion Channel	Spencer Hill Brook
Coginchaug River	Long Island Sound	Succor Brook
Coles Road Brook	Mattabesset River	Sumner Brook
Connecticut River	Menunketesuck River	Swamp Brook
Cromwell Creek	Mill Creek	West Branch Boulder Lake Brook
Deep River	Miner Brook	West Miner Brook
East Miner Brook	Moodus River	West Roundhill Brook
East Roundhill Brook	Old Nod Brook	West Swamp Brook
East Swamp Brook	Parmalee Brook	Willow Brook
Eightmile River	Patchogue River	
Ellen Doyle Brook	Pattaconk Brook	

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

TABLE 3 - STREAM NAME CHANGES

Community	Old Name	New Names
Town of Portland	Tributary A	Carr Brook Tributary A

As part of this countywide FIS, a revised detailed analysis was included for the Connecticut River, from the East Haddam downstream corporate limits to the upstream county boundary.

This countywide FIS also incorporates the determination 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 Change."

TABLE 4 - LETTERS OF MAP CHANGE

Community Name	LOMC Type	Case Number	Effective Date	Project Identifier	New Panel No.	New Zone
Cromwell, Town of	LOMR	00-01-017P	1/8/2001	Cromwell Creek - Connecticut River approximately 440 feet upstream of New Lane	107	AE
Middletown, City of	LOMR	02-01-045P	9/3/2002	Longhill Brook - From a point approximately 200 feet upstream of Brown Street to a point approximately 425 feet upstream of Wesleyan Road	118	AE

All or portions of the following flooding sources were studied by approximate methods: Axelson Brook, Bashan Lake, Beaver Meadow Brook, Bible Rock Brook, Birch Mill Pond, Boones Brook, Boulder Lake Brook, Candlewood Hill Brook, Cattle Lot Brook, Cedar Lake, Cedar Swamp, Chatfield Hollow Brook, Chestnut Brook, Coles Road Brook, Comstock Pond, Cromwell Creek, Dee Pond, Deep Hollow Reservoir, Deep River, Early Brook, East Branch Eightmile River, Eightmile River, Hales Brook, Hammonasset River, Hemlock Valley Brook, Hidden Lake, Hungerford Brook, Indian River, Jobs Pond, Johnson Pond, Kelseytown Reservoir, Lake Hayward, Lake Hayward Brook, Lampes Pond, Lord Pond, Mattabassett River, McVeagh Pond, Menunketesuck River, Messerschmidt Pond, Mine Brook, Mine Swamp, Molley Brook, Moodus Reservoir, Mud River, New Pond, Old Nod Brook, Patchogue River, Pattaconk Reservoir, Pearson Pond, Pine Brook, Plane Brook, Ponset Brook, Rintoul Pond, Roaring Brook, Shady Brook, Succor Brook, Tributary A, Tributary B, Tributary C, Tributary D, Tributary 1, Trout Brook, Turkey Hill Brook, Vincent Pond, Vinney Hill Brook, Waterhouse Pond, Willow Brook, and Wrights Pond. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the individual communities within Middlesex County.

2.2 Community Description

Middlesex County is located in south-central Connecticut. In Middlesex County, there are 16 communities. The Towns of Chester, Clinton, Deep River, Essex, Killingworth, Old Saybrook, and Westbrook are located in the southern portion of the county. The Towns of Cromwell, East Hampton, Middlefield, and Portland, and the City of Middletown are located in the northern portion of the county. The Towns of Durham, Haddam, and East Haddam are located in the center of Middlesex County. The Borough of Fenwick is a section of Old Saybrook, located at the mouth of the

Connecticut River.

Middlesex County is bordered to the north by the Towns of Berlin, Rocky Hill and Glastonbury. To the west, the county is bordered by the Towns of Wallingford, North Branford, Guilford and Madison and the City of Meriden. It is bordered to the east by the Towns of Marlborough, Colchester, Salem, Lyme, and Old Lyme. To the south, the county is bordered by Long Island Sound.

The nearest large city is the City of Hartford, located approximately 9 miles north of the Middlesex/Hartford County limit.

According to the 2000 US Census, the land area in Middlesex County was 369 square miles and the population of Middlesex County was 155,071 in 2000 (US Census Bureau, 2005). The county is primarily rural with the only urban area being the City of Middletown. Most of the development in the county is residential with pockets of commercial and light industrial development.

The topography of Middlesex County is mostly upland terrain, with river valleys and coastal lowlands. The soil is predominantly well drained glacial till and generally falls into one of two categories, New England Upland or Connecticut Valley Lowlands soils. The elevations range from near sea level at Long Island Sound to 700 feet above mean sea level in the upland areas to the west.

The climate of the county is relatively mild compared to the rest of New England, with relatively mild winters and warm summers. The average temperatures during the month of July range from a high of 84 degrees Fahrenheit (°F) to a low of 63°F. The average temperatures during the month of January range from a high of 35°F to a low of 18°F. The average annual precipitation is 47 inches.

The county contains one major river, the Connecticut River. The river bisects the northern portion of the county, but shifts to the west, to form the western county limit for the southern portion. The Connecticut River drains to Long Island Sound. Its floodplain is low and wide, and development consists mostly of a residential and marine industry nature, within the county.

2.3 Principal Flood Problems

Flooding in Middlesex County results from tidal surge and waves associated with a northeaster, hurricane, or tropical storm activity and from overflow of streams associated with rainfall runoff. Major rainfall events occur from hurricanes, tropical storms, and thundershowers associated with frontal systems.

Floods have occurred in every season of the year. Some of the most severe flooding occurs in early spring as a result of snow melt and heavy rains. Late summer and autumn are another critical season for flood danger due to heavy rainfall and the possibility of hurricanes and tropical storms. Winter floods result from occasional thaws, particularly in years of heavy snowfall.

Ice jams have contributed to flooding problems on the Salmon River and other streams of Haddam and East Haddam. The high water levels attained during the 1936 flood on the Salmon River were augmented by ice blockage. More recent floods on the streams of the Haddam area have also been intensified by ice jams as reported in the U.S. Department of the Interior, Geological Survey water-supply papers; 1671, Magnitude and Frequency of Floods in the United States: Part 1-A, North Atlantic Slope Basins, Maine to Connecticut, and Surface Water Supply of the United States, 1961-65. Part 1, North Atlantic Slope Basins, Maine to Connecticut.

Damaging floods have been experienced in the Connecticut River basin since the earliest settlements with early reference to floods dating back to 1639. Reliable records kept for over 100 years indicate serious flooding has occurred in 1814, 1848, 1854, 1860, April 1863, November 1927, March 1936, September 1938, August and October 1955, January 1978, and June 1982.

On the Connecticut River, the greatest flood of record occurred in March 1936, and resulted from a combination of heavy precipitation and extreme snow melt due to unseasonably warm weather. Based on about 60 years of peak flow data collected at the Middletown Gaging Station (No. 01193000), it is estimated that the 1936 peak flood discharge has a return frequency of greater than 200 years.

In addition to riverine flooding, the coastal communities of Middlesex County experience flooding due to high tides. Severe high tides along the Connecticut shore are caused mainly by hurricanes, violent storms of tropical origin. They rarely occur with enough force to travel along paths that cause serious damage in Connecticut. However, when they do, their effects can be devastating, as accounts of hurricane damage in the past indicate.

The most severe hurricane in recent history occurred in September of 1938. During the flood of 1938, the maximum flood level on the Connecticut River crested only slightly lower than the 1936 elevation, and serious flooding along the river occurred once again.

More recently, during January 1978, a winter rain storm caused severe flooding due to excessive rainfall and snowmelt combined with frozen ground conditions and a high tide. The Falls River and Deep River, which had caused only minimal problems during the floods of 1936 and 1938, overflowed and caused extensive flooding along their banks. In June 1982, extensive flooding was caused by a severe convective-type storm lasting three days. In addition to inundation damage, several bridges over Pattaconk Brook were destroyed and several small dams failed along the Falls River.

Table 5, summarizes the gaging stations in Middlesex County with streamflow records and the gage period of operation. The available streamflow data can be downloaded from the United States Geological Survey website using the following link, http://waterdata.usgs.gov/nwis.

TABLE 5 - USGS STREAM GAGES

Gage Location	Number	Period of Record	Gage Still Active
Eightmile River at North Plain, CT	01194000	1938 - 1984	No
Hemlock Valley Brook at Hadlyme, CT	01193800	1960 - 1976	No
East Branch Eightmile River near North Lyme, CT	01194500	1938 - 2002	Yes
Salmon River near East Hampton, CT	01193500	1929 - 2003	Yes
Bunnell (Burlington) Brook near Burlington, CT	01188000	1932 - 2003	Yes
South Branch Salmon Brook at Buckingham, CT	01192600	1961 - 1976	No
Mill Brook at Newington, CT	01190200	1955 - 1983	No
Mattabesset River at East Berlin, CT	01192700	1962 - 1979	No
Coginchaug River at Rockfall, CT	01192890	1962 - 1980	No
Connecticut River at Middletown, CT	01193000	1947 - 2004	Yes

2.4 Flood Protection Measures

The impact of the flood control structures in the Connecticut River Basin on the Connecticut River peak discharges has been investigated by the USGS and documented in the Open-File Report 2005-1369, entitled, "Estimates of the Magnitude and Frequency of Flood Flows in the Connecticut River in Connecticut", dated 2005. The open-file report included information from three USGS gaging stations along the Connecticut River. They are Thompsonville (No. 01184000) in Suffield, CT; Hartford (No. 01190070) in Hartford, CT; and Middletown (No. 01193000) in Middletown, CT; and have been listed in order from upstream to downstream. The report concluded that the flood control structures do not appreciably alter the magnitudes of the Connecticut River peak discharges within Connecticut. The following paragraphs, taken from the USGS reports, summarize their analysis and findings.

"Between 1940 and 1971, the U.S. Army Corps of Engineers (USACE) built 16-flood-control dams in the Connecticut River Basin. The majority of the dams were in operation by 1965. The 16 dams, which are located on headwater streams, control storm runoff from about 15 percent of the basin's drainage area. Conversely, storm runoff from 85 percent of the Connecticut River drainage area at Thompsonville (about 8,200 mi^2) is uncontrolled. The effects of the flood-control dams on the magnitudes of the peak flows in the Lower Connecticut River may not persist as far downstream as Thompsonville and Hartford depending on the spatial and temporal source of the runoff generating the peak flows.

A study of streams in humid areas by the USGS found that the magnitudes of the annual peak flows are affected by less than 10 percent when the storage in a basin is less than 103 acre-feet per square mile (acre-ft/mi^2) (Benson, 1962). At Thompsonville, the flood-control storage associated with the USACE dams is about 50-acre-ft/mi^2. Because the flood-control storage at Thompsonville is considerably less than 103 acre-ft/mi^2, it is assumed for the frequency analyses that the effects of the flood-control dams do not appreciably alter the magnitudes of the peak flows on the Connecticut River at

Thompsonville, Hartford, and Middletown."

The only flood control structures considered in the Middlesex County study are two dams in Clinton: the Boulder Lake Dam and a dam on Old Nod Brook just downstream of Airline Road.

Pocotopaug Lake, which is operated in conjunction with a smaller reservoir downstream, is used as a recreational facility. The operation of these structures comes under the control of the Bevins Brothers Manufacturing Company in East Hampton. While not being considered as a flood control reservoir in this study, for the reasons detailed below, the level of the lake is lowered prior to any major anticipated storm to increase the storage capacity of the lake. The Bevins Brothers Manufacturing Company, a private entity, controls the lake level, therefore Pocotopaug Lake is not considered a flood control structure. This study considered only the surcharge storage above the spillway and thus additional induced storage will serve to further minimize potential flood damage. The induced storage was not considered in the report due to the uncertainty of establishing how much additional storage would be available for any given storm. Thus, the conservative approach was to only consider surcharge storage and recognize this as a worse case. The emergency relief bypass channel from the lower dam on Pocotopaug Creek still exists although overgrown with low brush. It could be reactivated if needed but the improved control of Lake Pocotopaug reduces the probability of that requirement.

At this time, there are no additional flood protection measures planned along any of the watercourses in the county.

While Essex, Killingworth, Middlefield and East Haddam have several dams, none of them is used for flood control. Flooding is lessened only as a result of the natural storage properties of these reservoirs.

Flood protection of the coastal communities is provided by seawalls, most of them privately owned, and breakwaters and jetties in Long Island Sound at the mouth of the Connecticut River. These structures offer protection from wave damage and shore erosion.

To protect the flood plains, many of the communities have adopted flood plain ordinances or other legal restrictions and regulations concerning development in or around these areas.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that is 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 that equals or exceeds the 100-year flood (1-percent-annual-chance exceedence) in any 50-year period is approximately 40 percent (4 in 10); 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 study. Maps and flood elevations will be amended periodically to reflect future changes. Riverine and coastal analyses are discussed separately in the following sections.

3.1 Riverine Hydrologic Analyses

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

For each community within Middlesex County that has a previously printed FIS report, the hydrologic analyses described in those reports have been compiled and are summarized below.

Precountywide Analyses

In the Towns of Westbrook and Deep River FIS's and the Town of Clinton 1980 FIS, for the Patchogue, Menunketesuck, Indian, and Deep Rivers, a regional frequency method was used to compute peak discharges (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975, rev. Dec. 1977). Due to the possibility of a large standard error in this method, a comparison of discharge computations was performed. A rainfall-runoff technique based on a synthetic triangular unit hydrograph and SCS methodology were utilized to assist in the adoption of discharges for various frequencies in a smooth curve (US Dept of Agriculture, Technical Paper 149, A Method for Estimating Volume and Rate of Runoff in Small Watersheds, April 1973 and Technical Release No. 55, Urban Hydrology for small Watersheds, January 1975).

In the Town of Clinton 1980 FIS, for the Hammonasset River, peak discharges were similarly computed and compared with peak discharges published in the FIS for the adjacent Town of Madison. To maintain uniformity in the FIS's from one community to the next, and because the computed discharges compared favorably to the upstream published discharges, the published discharges were adopted for use. These discharges were adjusted downstream of the Town of Madison by a method developed by the SCS utilizing a discharge-area relationship (National Engineering Handbook, US Dept of Agriculture, August 1972).

In the 1997 revision of the Town of Clinton FIS, for the 100-year flood event, discharges were based on equations developed from a report on flood magnitude and frequency of Connecticut streams (CT DEP Evaluation and Design of a Streamflow Network for CT, Bulletin No. 36, L.A. Weiss, 1983). This regional method related drainage area, area of stratified drift, and 24-hour rainfall intensity values to the peak discharge by regression equations.

The discharges along the Mattabesset River in the Town of Cromwell were determined by a Log-Pearson Type II analysis of the stream flow data for the Mattabesset River gage at East Berlin using Connecticut River Basin regional skew of 1.0 (Guidelines for

Determining Flood Flow Frequency, Bulletin 17B, Water Resources Council, rev. Sept 1981); Log-Pearson Type III analyses were performed at the nearby gaging stations of Salmon Brook at Buckingham and Mill Brook at Newington (No. 01190200), both with 10 years of record. Frequency discharge data for Cromwell Creek and Coles Road Brook were developed by comparison with these gages using the discharge-drainage area ratio formula:

$$\frac{Q1}{Q2}=\left(\frac{A1}{A2}\right)^{0.75}$$

where Q1 and Q2 are the discharges at specific locations, and A1 and A2 are the drainage areas at these locations (Elements of Applied Hydrology, D. Johnstone and W.P. Cross, 1949). The peak flows obtained from the transposition of gage records were then compared to and weighted against peak flow predictions obtained from Weiss's regional equations for Connecticut (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975).

For the 1997 revision of the Town of Cromwell FIS and the 2001 revision of the City of Middletown FIS, the peak discharges for the Mattabesset River were obtained from the USGS gage in East Berlin (Discharge Frequency Analysis of Mattabesset River Gauging Station in East Berlin, US Dept of the Interior). Peak discharges at various points along the river were calculated using the same discharge-drainage area ratio formula (D. Johnstone and W.P. Cross, 1949). The drainage areas along the Mattabesset River were obtained from the publication entitled "Ga zetteer of Natural Drainage Areas of Streams and Water Bodies within the State of Connecticut, Bulletin No. 1," prepared by the USGS and the Connecticut Department of Environmental Protection, dated 1972.

The discharge along the Mattabesset River and East Swamp Brook in the Town of Middlefield were determined by Log-Pearson Type III analysis of the streamflow data for the Mattabesset River gage at East Berlin, using the Connecticut River basin regional skew of 1.0 (Guidelines for Determining Flood Flow Frequency, Bulletin 17B, Water Resources Council, rev. Sept. 1981).

For the Coginchaug River, in the Towns of Durham and Middlefield, flood flow frequency data were based on statistical analyses of stream flow records for the USGS gaging station (No. 01192890) in Middlefield, for the period beginning in October 1961 to 1980. The flood flow frequency analysis followed the standard Log-Pearson Type III method as outlined by the Water Resources Council (Guidelines for Determining Flood Flow Frequency, Bulletin 17, Water Resources Council, March 1976).

The Coginchaug River discharges, in the City of Middletown, were based on a Log-Pearson Type III analysis of peak flow data for the Coginchaug River gage at Rockfall (Hydrologic Engineering Input to Phase I of Connecticut River Supplemental Study, USACE, Dec. 1973).

Peak discharges for the 10-, 50-, 100-, and 500-year floods at the spillway of Moodus Reservoir were determined by hydrologic routing methods (National Engineering Handbook, US Dept of Agriculture, August 1972). The routings accounted for the moderating influence of the available lake storage on the storm flood out of Moodus

Reservoir. Independent routings were first performed on Bashan Lake and Pickerel Lake, which empty into Moodus Reservoir. The outflows from Bashan and Pickerel Lakes were then input as inflows in the routing of Moodus Reservoir. In each routing, it was assumed that the lake was full to the top of the spillway before the storm runoff began entering the lake. This assumption was made because none of the lakes are regulated to control floods and it was desired to start with the worst possible conditions. Calculations were made to determine a lake storage curve, a rating curve for the spillway, and an inflow hydrograph. From these working curves, discharges for the 10-, 50-, 100-, and 500-year floods were developed. The peak values taken from each of the four flood hydrographs represented the moderation of the storm flood due to lake storage.

Flows for Succor Brook and incremental flows for Moodus River below the reservoir spillway were developed using a regional equation. The regional equation is based on a regression analysis of stream flow records from 105 gaging stations in Connecticut and from precipitation records obtained at 28 gaging stations of the National Weather Service. The regression analysis relates stream flow to rainfall data and topographic parameters (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975).

The 10-, 50-, 100-, and 500-year peak discharges for the Eightmile River and the Salmon River were derived from stream gage data. The published gages used and the years of record for each are as follows: The Salmon River near East Hampton (No. 01193500) with 49 years of record, and the Eightmile River at North Plain (No. 01194000) with 39 years of record; at the time of analysis. A Log-Pearson Type III frequency analysis of the gage data was employed to develop the 10-, 50-, 100-, and 500-year peak flows for the gage sites (Guidelines for Determining Flood Flow Frequency, Bulletin 17, Water Resources Council, March 1976). The frequency analysis included the use of a regional skew. Peak discharges for the individual stream stations were calculated by transposing the gage-based peak flows according to the discharge-drainage area ratio formula (D. Johnstone and W.P. Cross, 1949).

For the ungaged Pocotopaug Creek, values of the 10-, 50-, 100-, and 500- year peak discharges below the Pocotopaug Lake spillway were developed using a regional equation based on a regression analysis of streamflow records from 105 gaging stations in Connecticut and 28 precipitation gaging stations of the National Weather Service (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975). This regional equation is based on the parameters of drainage area, rainfall, main channel length, main channel slope, and extent of storm sewers. At the spillway of Pocotopaug Lake, the peak discharges were determined by hydrologic routing methods. The routing accounted for the moderating influence of the available lake storage on the storm flood out of Pocotopaug Lake. Calculations were made to determine a lake storage curve, a rating curve for the- spillway, and an inflow hydrograph. From these working curves, outflow discharges for the 10, 50-, 100-, and 500-year floods were developed (National Engineering Handbook, US Dept of Agriculture, August 1972).

In the Town of Killingworth 1981 FIS, the flood-flow frequency analyses for Pond Meadow Brook and Lane District Brook followed the standard Log-Pearson Type III method as outlined by the Water Resources Council (Guidelines for Determining Flood

Flow Frequency, Bulletin 17, Water Resources Council, March 1976). The 10-, 50-, 100-, and 500-year peak discharges were determined by a regression analysis. Discharges were related to basin characteristics such as drainage area, stream length, streambed slope, and rainfall parameters as described in a statewide flood-flow formula determination (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975). Discharges for the Hammonasset River were adopted from the Flood Insurance Study for the Town of Madison. The Soil Conservation Service synthetic rainfall-runoff method was used to determine these discharges (Technical Release No. 20, US Dept of Agriculture, 1965).

In the 1992 revision of the Town of Killingworth FIS, for the Hammonasset River, except for the dam computation described below, the 100-year flood discharges were based on equations developed from a report on flood magnitude and frequency of Connecticut streams (CT DEP Evaluation and Design of a Streamflow Network for CT, Bulletin No. 36, L.A. Weiss, 1983). This regional method relates drainage area, area of stratified drift, and 24-hour rainfall intensity values to the peak discharge by regression equations. The USGS surveyed to NGVD 29 high-water marks of the June 1982 flood (equivalent to a 100-year flood) at Hammonasset Reservoir Dam on the Hammonasset River. The 100-year flood discharge was then computed using the surveyed head on the dam together with the dam shape and geometry as described in a USGS publication, "Measurement of Peak Discharge at Dams by Indirect Methods" (US Dept of Interior, 1967).

Discharge-frequency relationships for various points along Fishing Brook were computed using the Soil Conservation Service Tabular Flood Routing Method (Technical Note, Engineering UD-20, US Soil Conservation Service, Jan 1972). Subsequently, hydraulic analysis indicated significant storage of peak flow volumes occurs due to backwater effects upstream of the Connecticut Turnpike culvert, which significantly reduces peak flows. An adjusted discharge-frequency relationship for this location was then computed taking these storage effects into account. Estimates of 100-year flood flows on streams studied by approximate methods in the community of Old Saybrook were estimated by calculations based on drainage area.

There are no streamflow records for the Falls River. However, the East Branch Eightmile River, a gaged stream with similar hydrologic characteristics, is located 5 miles northeast of Essex. The East Branch Eightmile River has a drainage area of 22.3 square miles. Discharge frequencies for the East Branch Eightmile River at North Lyme were developed by a statistical analysis of 45 years of streamflow records up to the time of analysis using a Log-Pearson Type III distribution and including the estimated recent June 1982 flood peak (Guidelines for Determining Flood Flow Frequency, Bulletin 17B, Water Resources Council, rev. Sept. 1981). The resulting peak discharges for the 10-, 50-, 100-, and 500-year frequency floods were used to compute estimated Falls River flows at Falls River Pond Dam (drainage area 17.2 square miles) by direct drainage area ratio. Flows were developed at other upstream locations on the Falls River by drainage area ratio to the 0.7 exponential power.

In the Town of Chester FIS, peak discharges for streams, except the Connecticut River, were determined using a USGS regional method (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975, rev. Dec 1977).

For streams in the Town of Portland, Log-Pearson Type III analyses were performed at the nearby gaging stations of Hemlock Valley Brook at Hadlyme (No. 01193800), which had a length of record of 14 years at the time of the analysis and Burlington Brook near Burlington, now called Bunnell (Burlington) Brook, (No. 01188000), which had a length of record of 44 years at the time of the analysis. Frequency-discharge data for Hales Brook, Reservoir Brook, Carr Brook, and Carr Brook Tributary A were developed by comparison with these gages using the discharge-drainage area ratio formula (D. Johnstone and W.P. Cross, 1949). The peak flows gained from the transposition of gage records were then compared to and weighted against peak flow predictions obtained from Weiss's regional equations for flood flows in Connecticut (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975).

For the following tributaries studied in detail with drainage areas greater than one square mile, Ponset Brook, Mill Creek, Bible Rock Brook, Candlewood Hill Brook, Beaver Meadow Brook, Ellen Doyle Brook, Allyn Brook, Ball Brook, Hersig Brook, Parmalee Brook, peak discharges were obtained using a regional equation. This regional equation is based on a regression analysis of stream flow records from 105 gaging stations in Connecticut and 28 precipitation gaging stations of the National Weather Service (Flood Flow Formulas for Urbanized and Non-urbanized Areas of CT, L.A. Weiss, 1975). The equation relates stream flow to the parameters of drainage area, rainfall, main channel length, main channel slope, and extent of storm sewers.

Chestnut Brook, Shunpike Creek, and Willow Brook all contained drainage areas that were less than one square mile. For these areas, the rational method was used to establish peak discharges.

The elevations for the Connecticut River from Deep River to Long Island Sound were adopted from a USACE publication (Interim Memo No. COE 2, Long Island Sound, Tidal Hydrology, June 1973). These elevations were extended into Deep River until they intersected the riverine stage for the appropriate frequency event.

Countywide Analyses

The peak flood discharges for this restudy of the Connecticut River were developed by the U.S. Geological Survey under a separate contract with FEMA and were published in a report entitled, "Estimates of the Magnitude and Frequency of Flood Flows in the Connecticut River in Connecticut", Open-File Report 2005-1369, dated 2005. The report gives the 10-, 25-, 50-, 100-, and 500-year peak discharges for the Thompsonville, Hartford, and Middletown gaging stations on the Connecticut River. A Log Pearson Type III Frequency Analysis of the annual peak flow data for the gages was used for the study.

The peak discharges for the Connecticut River at the confluence of major tributaries were interpolated from the values published in the USGS Report based on watershed areas. The watershed areas were taken from "Gazetteer of Drainage Areas in Connecticut" Water Resources Bulletin Number 45 (Connecticut Department of Environmental Protection, 1997). As there are no gages downstream of Middletown, the increases in flow in cfs/square mile between the Hartford and Middletown gaging stations were used to extrapolate flows downstream to the East Haddam Town Line.

These flows were 10 cfs/square mile for the 10-Year Flood, 22.5 cfs/square mile for the 50-Year Flood, 27.5 cfs/square mile for the 100-Year Flood, and 55 cfs/square mile for the 500- Year Flood.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 6, "Summary of Discharges."

TABLE 6 - SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
ALLYN BROOK					
Upstream of State Route 68	5.60	450	900	1,350	1,850
Upstream of High School Drive	1.64	335	670	1,000	1,400
BALL BROOK					
Confluence with Allyn Brook	1.87	160	320	480	670
BEAVER MEADOW BROOK					
Upstream from Pole Bridge Brook	2.1	280	460	580	850
Downstream State Route 9 northbound exit ramp (Sect. C)	2.0	250	420	525	790
BIBLE ROCK BROOK					
At confluence with Ponset Brook	5.4	560	910	1,090	1,550
At driveway bridge located 860 ft upstream of Thayer Road Extension (Sect. E)	4.0	515	860	1,045	1,500
BOULDER LAKE BROOK					
At confluence with the Hammonasset River	0.96	*	*	300	*
Above confluence of West Branch Boulder Lake Brook	0.60	*	*	200	*
CANDLEWOOD HILL BROOK					
At confluence with Ponset Brook	7.1	690	1,130	1,330	1,850
1030 ft upstream of intersection of Wiese Albert Road (Sect. U)	3.2	610	1,020	1,200	1,700
70 ft downstream of Candlewood Hill Road (Sect. W)	1.8	410	735	895	1,360

** Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
CARR BROOK					
At junction with Connecticut River	6.5	744	1,379	1,760	2,790
At Kelseys Pond	2.3	254	501	650	1,103
CARR BROOK TRIBUTARY A					
At junction with Carr Brook	1.0	133	272	351	603
CHESTER CREEK					
At confluence with Connecticut River	14.34	1,120	1,520	1,750	2,450
Downstream of confluence of Great Brook and Pattaconk Brook	13.62	1,081	1,467	1,689	2,364
CHESTNUT BROOK					
At confluence with Mattabesset River	1.0	151	269	335	500
COGINCHAUG RIVER					
At confluence with Mattabesset River	30.0	*	*	3,000	*
At Middlefield/Middletown corporate limits	34.7	1,800	2,900	3,500	5,000
At Durham/Middlefield corporate limits	23.8	1,500	2,500	3,000	4,500
Upstream of Parmalee Brook	7.32	1,050	1,600	1,900	2,650
Upstream of Parmalee Road	6.21	500	850	1,100	1,650
Upstream of Meeting House Hill Road	4.56	360	680	1,000	1,500
COLES ROAD BROOK					
At confluence with Mattabesset River	2.9	360	612	815	1,080
CONNECTICUT RIVER					
At confluence with Roaring Brook (Hartford County)	10,715	141,000	186,000	206,000	256,000
At confluence with Mattabesset River	10,867	142,000	190,000	211,000	265,000
At confluence with Salmon River	11,088	144,000	195,000	217,000	276,000

* *Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
CROMWELL CREEK					
At confluence with Connecticut River	1.2	182	330	408	610
DEEP RIVER					
Near confluence with Connecticut River at Connecticut Valley Railroad	7.12	720	1,010	1,300	1,800
At Spring Street crossing	6.49	672	943	1,214	1,681
Downstream of State Route 9 crossing	5.62	604	847	1,090	1,509
At Pratt Read Reservoir	4.94	547	768	988	1,368
EAST MINER BROOK					
At confluence with Miner Brook	0.4	*	*	410	*
EAST ROUNDHILL BROOK					
At confluence with Roundhill Brook	0.7	*	*	420	*
EAST SWAMP BROOK					
At confluence with Swamp Brook	0.8	*	*	270	*
EIGHTMILE RIVER					
Lyme/East Haddam corporate limits	20.5	1,460	2,420	2,920	4,380
630 ft downstream of State Route 82	20.1	1,440	2,380	2,880	4,320
Three Bridges Road	18.1	1,330	2,200	2,660	3,990
50 ft downstream of Dolbia Hill Road	16.8	1,260	2,080	2,520	3,780
ELLEN DOYLE BROOK					
Mouth at Coginchaug River	2.79	125	205	250	360
Outlet of Beseck Lake	2.10	125	205	250	360

* *Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
FALLS RIVER					
At Falls River Pond Dam	17.18	1,140	2,050	2,580	5,070
Downstream of State Route 9	14.21	1,000	1,790	2,250	4,430
Downstream of Middlesex Turnpike	11.27	850	1,530	1,920	3,780
Upstream of Pratt-Read Factory	7.57	640	1,160	1,450	2,870
At the outlet of Wrights Pond	5.0	480	860	1,080	2,130
At the outlet of Messerschmidt Pond	4. 0	410	740	930	1,830
FISHING BROOK					
Crystal Lake Dam	1.87	720	1,055	1,235	1,565
Dam at pond outlet just below the Connecticut Turnpike (I-95)	2.80	555	695	780	940
GREAT BROOK					
Upstream of confluence with Chester Creek and Pattaconk Brook	5.34	400	650	900	1,400
Downstream of Deuses Pond	4.28	240	380	525	850
Upstream of Deuses Pond	3.84	400	650	900	1,400
HALES BROOK					
At junction with Connecticut River	3.7	433	839	1,079	1,762
At Isinglass Hill Road	1.0	126	250	330	559
HAMMONASSET RIVER					
At Boston Post Road	47.13	2,500	3,700	4,300	5,600
At Interstate Route 95	43.86	2,393	3,542	4,116	5,360
At Clinton/Killingworth corporate limits	39.97	2,261	3,346	3,888	5,064
Above Chestnut Hill Road	24.80	1,700	2,550	2,900	3,950
Above State Route 80	20.50	1,650	2,500	2,850	3,900

* *Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
HAMMONASSET RIVER (continued)					
At Killingworth/Madison corporate limits	20.50	*	*	2,900	*
Above confluence of unnamed Tributary	14.80	*	*	2,300	*
Upstream of confluence of Arrigoni Pond Brook	1.70	*	*	620	*
HERSIG BROOK					
At confluence with Allyn Brook	3.96	175	350	520	730
INDIAN RIVER					
At Boston Post Road	7.53	680	1,010	1,190	1,600
At Glenwood Road	6.41	604	897	1,057	1,421
At Hurd Bridge Road	5.58	544	808	952	1,280
LANE DISTRICT BROOK					
At confluence with Pond Meadow Brook	1.60	100	250	300	450
LONGHILL BROOK					
At confluence with Sumner Brook	4.5	775	1,550	2,090	3,500
LONGHILL BROOK DIVERSION CHANNEL					
At confluence with Longhill Brook	†	*	*	2,090	*
MATTABESSET RIVER					
At confluence with Connecticut River	108.0	5,600	8,800	10,400	15,100
Upstream of confluence of Coginchaug River	68.8	4,000	6,300	7,400	10,800
Upstream of confluence of Swamp Brook	63.7	3,800	5,900	7,000	10,200
Upstream of confluence of Minor and Unnamed Brooks	56.7	3,400	5,400	6,400	9,300
Upstream of confluence of Sawmill Brook	49.3	3,100	4,900	5,800	8,400

* *Data not available*
† *Drainage area not listed in existing report*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
MENUNKETESUCK RIVER					
At Boston Post Road	17.39	1,276	1,868	2,123	2,842
Just downstream of the confluence of Gatchen Creek	16.74	1,244	1,820	2,069	2,770
At Westbrook/Clinton corporate limits	15.22	1,166	1,706	1,940	2,597
Downstream of confluence of Plane Brook	13.98	1,100	1,610	1,830	2,450
Downstream of confluence of Carter Hill Brook	13.27	1,061	1,553	1,765	2,363
At Kelseytown Road	10.70	913	1,336	1,519	2,033
MILL CREEK					
At confluence with Connecticut River	7.0	700	1,200	1,360	1,950
Upstream from Turkey Hill Brook	4.3	515	860	1,030	1,480
1130 ft upstream of Bamforth Road (Sect. I)	3.6	465	790	945	1,370
Downstream from Pole Bridge Brook	3.2	430	735	880	1,280
MINER BROOK					
At confluence with Mattabesset River	1.6	*	*	780	*
MOODUS RIVER					
At confluence with Salmon River	17.8	1,100	2,200	2,700	4,500
At Johnsonville Road (Sect. B)	15.7	1,000	1,800	2,300	3,600
660 ft downstream of North Moodus Road Bridge (Abandoned) (Sect. L)	13.6	690	1,300	1,700	2,900
2000 ft downstream of Falls Road (Sect. V)	12.1	520	1,000	1,300	2,300
320 ft downstream of Falls Bashan Road	10.5	360	620	790	1,500
OLD NOD BROOK					
At confluence with Hammonasset River	0.61	*	*	163	*

** Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
PARMALEE BROOK					
At mouth	4.68	1,050	1,600	1,900	2,650
Upstream of Parmalee Road	2.79	400	620	740	1,000
PATCHOGUE RIVER					
At Boston Post Road	7.53	540	920	1,100	1,600
At Interstate Route 95	6.52	486	827	989	1,439
PATTACONK BROOK					
Upstream of confluence with Chester Creek and Great Brook	8.50	950	1,620	2,300	3,160
Downstream of Jennings Pond	8.41	550	960	1,380	1,760
At Hoopole Hill Road	7.63	500	900	1,250	1,600
Upstream of Cedar Lake	5.34	600	1,090	1,540	1,940
POCOTOPAUG CREEK					
Old Chestnut Hill Road	3.24	478	747	866	1,242
850 ft downstream of Skimmer Street	2.46	438	712	836	1,212
100 ft upstream of Skimmer Street	1.27	253	412	471	672
200 ft upstream of Middletown Avenue	1.03	218	332	391	572
POND MEADOW BROOK					
At Kroopa Pond	5 92	400	750	1,000	1,450
Upstream of Lane District Brook Confluence	3.89	300	500	700	1,000
PONSET BROOK					
At confluence with Connecticut River	19.8	1,780	2,850	3,340	4,660
Upstream from Bible Rock Brook	14.2	1,025	1,400	1,555	1,970
Upstream from Candlewood Hill Brook	7.1	615	995	1,170	1,650
50 ft downstream from Skinner Road bridge	5.7	570	935	1,110	1,590
At Dam 100 ft downstream of State Route 9 northbound entrance ramp (Sect. M)	5.3	530	895	1,060	1,530

* *Data not available*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs)			
		10-Year	50-Year	100-Year	500-Year
PONSET BROOK (cont.)					
At footbridge 600 ft upstream of State Route 9 southbound exit ramp (Sect. Q)	4.5	500	840	1,000	1,440
90 ft downstream of Little City Road (Sect. T)	3.6	460	770	930	1,340
RESERVOIR BROOK					
At junction with Connecticut River	6.5	736	1,427	1,805	2,871
At Portland Reservoir	3.6	521	1,032	1,331	2,206
ROUNDHILL BROOK					
At confluence with Longhill Brook	1.5	*	*	865	*
SALMON RIVER					
Confluence with Connecticut River	150	7,450	13,100	16,300	24,600
2220 ft upstream from Moodus River (Sect. B)	130	6,690	11,800	14,600	22,100
2650 ft upstream from Pine Brook (Sect. C)	114	6,060	10,700	13,300	20,000
Downstream of Leesville Road (Sect. D)	108	5,820	10,300	12,700	19,200
SAWMILL BROOK					
At confluence with Mattabesset River	6.5	*	*	3,380	*
SHUNPIKE CREEK					
At confluence with Mattabesset River	0.7	140	247	314	399
SOUTH BRANCH GREAT BROOK					
Upstream of confluence with Great Brook	†	240	380	525	850
SPENCER HILL BROOK					
At confluence with Hammonasset River	0.30	*	*	92	*

* *Data not available*

† *Drainage area not listed in existing report*

TABLE 6 - SUMMARY OF DISCHARGES (continued)

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
SUCCOR BROOK					
At confluence with Connecticut River	3.36	330	550	650	940
SUMNER BROOK					
At confluence with Connecticut River	12.3	*	*	7,400	*
SWAMP BROOK					
At confluence with Mattabesset River	3.1	*	*	825	*
WEST BRANCH BOULDER LAKE BROOK					
At confluence with Boulder Lake Brook	0.36	*	*	100	*
WEST MINER BROOK					
At confluence with Miner Brook	0.3	*	*	240	*
WEST ROUNDHILL BROOK					
At confluence with Roundhill Brook	0.4	*	*	410	*
WEST SWAMP BROOK					
At confluence with Swamp Brook	1.9	*	*	600	*
WILLOW BROOK					
At confluence with Mattabesset River	0.9	255	470	590	751

* *Data not available*

The stillwater elevations for the 10-, 50-, 100-, 500-year floods have been determined for the Connecticut River and the Menunketesuck River and are summarized in Table 7, "Summary of Stillwater Elevations". Stillwater elevations for the Connecticut River in Essex, Deep River and East Haddam, and the Menuketesuck River in Westbrook were determined by a routing analysis using information from the U.S. Army Corps of Engineers, Long Island Sound Interim Memo No. COE 2, June 1973.

TABLE 7 - SUMMARY OF STILLWATER ELEVATIONS

Flooding Source and Location	Elevations (ft)* 10-Year	50-Year	100-Year	500-Year
CONNECTICUT RIVER				
At Haddam/Chester corporate limits	6.2	8.7	10.0	16.4
At East Haddam	6.2	8.7	10.0	16.4
At Chester/Deep River corporate limits	6.0	8.6	9.8	16.0
At Deep River/Essex corporate limits	5.7	8.2	9.5	14.0
At North Cove in Essex	5.7	8.2	9.5	14.0
MENUNKETESUCK RIVER				
Upstream of Conrail bridge	4.5	5.2	5.7	11.4

* North American Vertical Datum of 1988 (NAVD 88)

3.2 Riverine Hydraulic Analyses

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

Cross sections were determined from topographic maps and field surveys. For flooding sources studied by the Detailed Method, all bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. All topographic mapping, used to determine cross sections, is referenced in Section 4.1.

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

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

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

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 http://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.

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the streams and floodplain areas. Roughness factors for all streams studied by detailed methods are shown in Table 8.

TABLE 8 - MANNING'S "n" VALUES

Flooding Source	Roughness Coefficients Channel "n"	Overbank "n"
Allyn Brook	0.025-0.035	0.055-0.080
Ball Brook	0.030-0.035	0.045-0.075
Beaver Meadow Brook	0.012-0.070	0.016-0.110
Bible Rock Brook	0.012-0.070	0.016-0.110
Boulder Lake Brook	0.040-0.050	0.030-0.120
Candlewood Hill Brook	0.012-0.070	0.016-0.110
Carr Brook	0.030-0.080	0.035-0.100
Carr Brook Tributary A	0.030-0.080	0.035-0.100
Chester Creek	0.025-0.040	0.015-0.085
Chestnut Brook	0.030-0.080	0.035-0.100
Coginchaug River	0.025-0.050	0.025-0.100
Coles Road Brook	0.030-0.080	0.035-0.100
Connecticut River	0.030	0.010-0.200
Cromwell Creek	0.030-0.080	0.035-0.100
Deep River	0.015-0.055	0.015-0.125
East Miner Brook	0.025	0.050-0.080
East Roundhill Brook	0.025	0.050-0.080
East Swamp Brook	0.025	0.050-0.080
Eightmile River	0.010-0.070	0.016-0.120
Ellen Doyle Brook	0.030-0.040	0.030-0.095
Falls River	0.050	0.080
Fishing Brook	0.020-0.080	0.020-0.080
Great Brook	0.025-0.070	0.015-0.095
Hales Brook	0.030-0.080	0.035-0.100
Hammonasset River	0.025-0.055	0.015-0.160
Hersig Brook	0.030-0.035	0.050-0.070
Indian River	0.025-0.100	0.025-0.170
Lane District Brook	0.025-0.035	0.025-0.080
Longhill Brook	0.030-0.050	0.050-0.090
Longhill Brook Diversion Channel	0.030-0.050	0.050-0.090
Mattabesset River	0.040-0.060	0.050-0.200
Menunketesuck River	0.025-0.060	0.030-0.160
Mill Creek	0.012-0.070	0.016-0.110
Miner Brook	0.025	0.050-0.080
Moodus River	0.010-0.070	0.016-0.120
Old Nod Brook	0.040-0.070	0.030-0.120
Parmalee Brook	0.025-0.035	0.050-0.080
Patchogue River	0.025	0.050-0.100
Pattaconk Brook	0.015-0.045	0.015-0.120
Pocotopaug Creek	0.010-0.050	0.040-0.120
Pond Meadow Brook	0.030-0.040	0.060-0.080
Ponset Brook	0.012-0.070	0.016-0.110
Reservoir Brook	0.030-0.080	0.035-0.100

TABLE 8 - MANNING'S "n" VALUES
(continued)

Flooding Source	Roughness Coefficients Channel "n"	Overbank "n"
Roundhill Brook	0.025	0.050-0.080
Salmon River	0.010-0.070	0.016-0.120
Sawmill Brook	0.025	0.050-0.080
Shunpike Creek	0.030-0.080	0.035-0.100
South Branch Great Brook	0.025-0.070	0.015-0.095
Spencer Hill Brook	0.0450	0.050-0.110
Succor Brook	0.010-0.070	0.016-0.120
Sumner Brook	0.025	0.050-0.080
Swamp Brook	0.025	0.050-0.080
West Branch Boulder Lake Brook	0.040	0.100-0.120
West Miner Brook	0.025	0.050-0.080
West Roundhill Brook	0.025	0.050-0.080
West Swamp Brook	0.025	0.050-0.080
Willow Brook	0.030-0.080	0.035-0.100

Precountywide Analyses

For each community within Middlesex County that has a previously printed FIS report, the hydraulic analyses described in those reports have been compiled and are summarized below.

For the 1990 FIS for the Town of Chester, cross-section data for Chester Creek, Pattaconk Brook, Great Brook, South Branch Great Brook, and Deep River were obtained by field measurements and aerial photogrammetry by the Town of Chester, CT, 1977. Bridge plans were utilized to obtain elevation data and structural geometry. All bridges and culverts for which plans were unavailable or out of date were field surveyed.

For the 1980 FIS for the Town of Clinton, cross-section data for Menunketesuck River, Hammonasset River, Indian River, Boulder Lake Brook, Old Nod Brook, West Branch Boulder Lake Brook, and Spencer Hill Brook were obtained by field measurements and aerial photogrammetry. Bridge plans were utilized to obtain elevation data and structural geometry. All bridges and culverts for which plans were unavailable or out of date were field surveyed.

For the 1978 FIS for the Town of Cromwell, the valley portions of the cross section data for Cromwell Creek, Chestnut Brook, Shunpike Creek, Willow Brook and Coles Road Brook were obtained from photogrammetrically prepared maps at a scale of 1:2,400, with a 5 foot contour interval (Geod Aerial Mapping, Inc., 1975); the below-water portions were obtained by field measurement. For the 1992 revision, cross sections were field surveyed for the Mattabesset River upstream of State Route 72. For the 1997 revision, cross section data for the backwater analysis along the Mattabesset River were compiled using verified field topographic maps at scale of 1:1,200 with a contour interval of 2 feet (Aerial Cartographic Technology, Inc., 1983, in Cromwell, and Aerial Data Reduction Associates, Inc., 1980, in Middletown). The main channel at each section from Stream Station 134+00 to Station 301+00, and all bridges, culverts and dams were field surveyed to obtain or verify elevation data and structural geometry. The main channel at each section from Stream Station 33+20 to Station 120+00 was field surveyed by approximate methods. Maps provided by the Town of Cromwell (Chas H. Sells, Inc., 1994) were used to identify changes along the Mattabesset River and floodplain between 1980 and 1997.

For the 1979 FIS's for the Towns of East Haddam and East Hampton, the valley portions of the cross section data for the Salmon River, Moodus River, Succor Brook, Eightmile River, and Pocotopaug Creek were obtained from topographic mapping prepared photogrammetrically (Geod Aerial Mapping, Inc., 1977 and Relocation of CT Rte 82, Feb. 1967 and Relocation of CT Rte 149, Dec. 1958, by CT DOT). The channel bottom sections were obtained by field measurements. Bridge plans were utilized to obtain elevation data and structural geometry. All bridges and culverts were surveyed for where plans were unavailable or out of date. Cross sections for backwater analysis of the detailed study streams were located at close intervals above and below bridges in order to compute the significant backwater effects of these structures in the developed areas. In long reaches between structures, appropriate valley cross sections were also surveyed.

For the 1986 FIS for the Town of Essex, the cross section data for the Falls River were obtained from field measurements and topographic maps compiled from aerial photographs (CE Maguire Inc., 1977). All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Dams along the Falls River that were breached in June 1982 were assumed to be rebuilt as shown in drawings accompanying the application for permits to rebuild. From a hydraulic standpoint, the reconstructed dams will be similar to those which were breached.

For the 1979 FIS for the Town of Haddam, the valley portions of the cross section data for the Salmon River, Ponset Brook, Candlewood Hill Brook, Mill Creek, Bible Rock Brook and Beaver Meadow Brook were obtained from topographic mapping prepared photogrammetrically (Geod Aerial Mapping, Inc. 1977, and Relocation of CT Highway 9 CT DOT, July 1955); the below-water portions were obtained by field measurement. All bridges and culverts were surveyed to obtain elevation data and structural geometry in order to compute significant backwater effects of these structures.

For the 1992 FIS for the Town of Killingworth, cross-sectional data for the Pond Meadow Brook, Lane District Brook and Hammonasset River were field surveyed and located at intervals to evaluate normal channel losses and the effects of all man-made structures such as dams, bridges, and culverts located in the floodplain.

For the 1979 FIS for the Town of Middlefield, cross sections used for the backwater analyses of the Coginchaug River and Ellen Doyle Brook were field surveyed and located at intervals to evaluate normal channel losses and the effects of all man-made structures, such as dams, culverts, and bridges located in the floodplain.

For the 2001 FIS for the City of Middletown, cross sectional section data for the Coginchaug River, Sumner Brook, Longhill Brook, Longhill Brook Diversion Channel, Roundhill Brook, East and West Round Hill Brooks, Swamp Brook, East and West Swamp Brooks, Miner Brook, East and West Miner Brooks, and Sawmill Brook were obtained by field measurements. Cross section data for the backwater analysis along the Mattabesset River were compiled using verified field topographic maps at scale of 1:1,200 with a contour interval of 2 feet (Aerial Cartographic Technology, Inc., 1983, in Cromwell, and Aerial Data Reduction Associates, Inc., 1980, in Middletown). All bridges, dams and culverts were field surveyed to obtain elevation data and structural geometry.

For the 1978 FIS for the Town of Portland, the valley portions of the cross section data for the Hales Brook and Reservoir Brook were obtained photogrammetrically; the below-water portions were obtained by field measurement. Bridge plans were utilized to obtain elevation data and structural geometry. All bridges and culverts for which plans were unavailable or out of date were surveyed. Cross sections for backwater analysis of the detailed study streams were located at close intervals upstream and downstream of bridges in order to compute the significant backwater effects of these structures in the developed areas. In long reaches between structures, appropriate valley cross sections were also surveyed wherever warranted by topography.

For the 1986 FIS for the Town of Westbrook, cross section data for the Falls River, Patchogue River, and Menunketesuck River were obtained by field measurements and from topographic maps compiled from aerial photographs (CE Maguire Inc., 1977). When available, bridges plans were utilized to obtain elevation data and structural geometry. All bridges and culverts for which plans were unavailable or out of date were field surveyed.

Water-surface elevations of floods of the selected recurrence intervals were computed using the computer programs summarized in Table 9:

TABLE 9 - EFFECTIVE STUDIES HYDRAULIC MODELS

Hydraulic Model and Date	Community	Flooding Source
Unites States Army Corp of Engineer's (USACE) HE C-RAS step-backwater Version 3.1.3	Cromwell East Haddam East Hampton Haddam Middletown Portland	Connecticut River
USACE's HEC-2 step-backwater, 1973	Deep River	Deep River
	East Hampton	Salmon River
		Pocotopaug Creek
	Killingworth	Pond Meadow Brook
		Lane District Brook
		Hammonasset River
	Old Saybrook	Fishing Brook
	Westbrook	Falls River
		Patchogue River
		Menunketesuck River

TABLE 9 - EFFECTIVE STUDIES HYDRAULIC MODELS (continued)

Hydraulic Model and Date	Community	Flooding Source
USACE's HEC-2 step-ba ckwater, 1975	Portland	Hales Brook
		Reservoir Brook
		Carr Brook
		Carr Brook Tributary A
USACE's HEC-2 step-ba ckwater, 1976	East Haddam	Salmon River
		Moodus River
		Succor Brook
		Eightmile River
	Essex	Falls River
	Haddam	Salmon River
		Ponset Brook
		Candlewood Hill Brook
		Mill Creek
		Bible Rock Brook
		Beaver Meadow Brook
USACE's HEC-2 step-ba ckwater, 1991	Clinton	Menunketesuck River
		Hammonasset River
		Indian River
		Boulder Lake Brook
		Old Nod Brook
		W. Branch Boulder Lake Brook
		Spencer Hill Brook
	Cromwell	Mattabesset River
		Cromwell Creek
		Chestnut Brook
		Shunpike Creek
		Willow Brook
		Coles Road Brook
	Middletown	Mattabesset River
		Coginchaug River
		Sumner Brook
		Longhill Brook
		Longhill Brook Diversion Channel
		Roundhill Brook
		West Roundhill Brook
		East Roundhill Brook
		Swamp Brook
		West Swamp Brook
		East Swamp Brook
		Miner Brook
		West Miner Brook
		East Miner Brook
		Sawmill Brook

TABLE 9 - EFFECTIVE STUDIES HYDRAULIC MODELS (continued)

Hydraulic Model and Date	Community	Flooding Source
USGS WSP-2 step-backwater (US Dept of Interior, 1976):	Chester	Chester Creek
		Pattaconk Brook
		Great Brook
		S. Branch Great Brook
		Deep River
USGS E 431 step-backwater, 1976	Durham	Allyn Brook
		Ball Brook
		Coginchaug River
		Hersig Brook
		Parmalee Brook
	Middlefield	Coginchaug River
		Ellen Doyle Brook

Starting water surface elevations for the backwater computations of Salmon River, Ponset Brook, Mill Creek, Moodus River, Succor Brook, Chester Creek, Pocotopaug Creek, Willow Brook, and Indian River were calculated using the slope/area method. For the Salmon River, non-concurrent peaks between the tributary and the main stem were assumed. The backwater elevations of the Connecticut River were extended upstream until the tributary backwater of the Salmon River produced a greater elevation. Long Island Sound storm tide elevations represented the main stem backwater influencing the Connecticut River. Storm tide elevations were obtained from work completed by the USACE's New England Division (Long Island Sound Interim Memo No. COE 2, Tidal Hydrology, June 1973).

Starting elevations for Bible Rock Brook and Candlewood Hill Brook were taken from Ponset Brook, assuming concurrent peaks.

Beaver Meadow Brook starting elevations were taken from Mill Creek, assuming concurrent peaks.

For Pattaconk and Great Brook, starting water-surface elevations were adopted from computed water-surface elevations on Chester Creek.

For South Branch Great Brook, starting water-surface elevations were adopted from computed water-surface elevations on Great Brook.

Starting water surface elevations for the Mattabesset River were calculated using the slope/area method. The approximate high tide elevation was used as the minimum starting water-surface elevation. The high tide elevation was obtained from the 1995 Tide Tables (US Department of Commerce, National Ocean Service). The water-surface elevations computed for the Connecticut River were not used because the peak discharges on the rivers are not expected to coincide due to the large watershed size difference.

For Chestnut Brook, Shunpike Creek, and Coles Road Brook, starting water-surface elevations were taken directly from the Mattabesset River profiles.

The starting water-surface elevation for the Deep River was developed using mean high water on the Connecticut River.

Starting elevations for the Coginchaug River were obtained from the stage-discharge relationship at the gaging station at State Highway 157.

Starting water-surface elevations for Allyn Brook, Parmalee Brook and Ellen Doyle Brook were taken from the initially determined Coginchaug River profile at the points of confluence.

Starting water-surface elevations for Ball Brook and Hersig Brook were taken from Allyn Brook profile at the points of confluence.

The starting water-surface elevations for the backwater computations for the Eightmile River were approximated after studying the water-surface profile for the Eightmile River in the 1978 Flood Insurance Study for the Town of Lyme, Connecticut. The profile in Lyme falls short of the East Haddam line, necessitating the approximation.

Starting water-surface elevations for Pond Meadow Brook were determined by the computation of flow over Kroopa Pond Dam.

Starting water-surface elevations for Lane District Brook were taken from the Pond Meadow Brook profile at the point of confluence.

For the 1981 FIS for the Town of Killingworth, starting water-surface elevations for the Hammonasset River were taken from the 10-year tidal elevation of Long Island Sound (FIS for the Town of Madison, CT). For the 1992 revision, starting water-surface elevations for the Hammonasset River upstream of State Route 80 were obtained by computing the critical depth at their downstream limits. Also in that revision, starting water-surface elevations for the Hammonasset River upstream of the Hammonasset Reservoir Dam were determined by computing the 100-year flow over the dam (Measurement of Peak Discharge at Dams by Indirect Methods, US Department of the Interior, 1967).

For the FIS for the Town of Clinton, the starting water-surface elevations for the Hammonasset River were obtained using the mean high water levels in Long Island Sound.

Starting water-surface elevations for the Patchogue and Menunketesuck Rivers were obtained using the mean high-water levels on Long Island Sound.

For the FIS's for the Towns of Cromwell and Portland, starting water-surface elevations for the Connecticut River were based on adjustments to meet established records at the Bodkin Rock gaging station. The starting water-surface elevations for Hales Brook, Reservoir Brook, Carr Brook, Cromwell Creek and Carr Brook Tributary A, were taken directly from the Connecticut River profiles.

Flood levels over the crest of the Falls River Pond Dam spillway were used as starting water-surf ace elevations for the Falls River.

The starting elevation for the 100-year flood on Fishing Brook was determined using the 10-year Long Island Sound coastal surge elevation. The 10-year flood was determined using the mean spring high tide, and floods of the other recurrence intervals were adjusted accordingly.

Countywide Analyses

Cross-section data for the backwater analyses for the Connecticut River were compiled using a terrain model developed from a Digital Elevation Model of the Connecticut River floodplain collected using Light Detection and Ranging (LIDAR) Technology in July 2004. The LIDAR data was provided by the Federal Emergency Management Agency (FEMA). In addition to the LIDAR, bathymetric surveys of the river were performed by Roald Haestad, Inc. in the fall of 2004. All the bridges, culverts, and dams were modeled from existing drawings.

Water surface elevations of the selected recurrence intervals were computed using the USACE HEC-RAS step-backwater computer programs (see Table 9).

Starting water surface elevations for the Connecticut River were calculated using the slope area method. The Connecticut River energy slope was estimated using the 100-year water surface profile published in the Town of Haddam effective FIS dated July 1979.

3.3 Coastal Hydrologic Analyses

Precountywide Analyses

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

Stillwater elevation for wave height analysis in Clinton, Westbrook, Old Saybrook and the Borough of Fenwick were developed by Dewberry & Davis by adjusting the elevations contained in the U.S. Army Corps of Engineers, Long Island Sound Interim Memo No. COE 2, June 1973. The adjustment was made using the tidal gage analysis and the profiles for the 1938 and 1954 storms as contained in Richard L. Umbarger, Century Engineering, Inc., Personal Communication to Craig S. Wingo, Federal Emergency Agency, Concerning the Analysis of Tide Gage Data for New London, Connecticut, April 23, 1980. The revised stillwater elevation were published by Dewberry & Davis in a publication entitled, "Tidal Flood Profiles for the Connecticut Shoreline of Long Island Sound, February 1982."

The stillwater elevations have been determined for the 10-, 50-, 100-, 500-year floods for the flooding sources studied by detailed methods and are summarized in Table 10, "Summary of Stillwater Elevations."

TABLE 10 - SUMMARY OF COASTAL STILLWATER ELEVATIONS

	Elevations (NAVD 88)			
Flooding Source and Location	**10-Year**	**50-Year**	**100-Year**	**500-Year**
LONG ISLAND SOUND				
Entire Clinton Shoreline	6.7	8.5	9.4	11.4
Entire Westbrook Shoreline	6.6	8.4	9.4	11.4
Old Saybrook Shoreline from Western Corporate Limits to Cornfield Point	6.6	8.4	9.4	11.4
Old Saybrook Shoreline from Cornfield Point to Borough of Fenwick corporate limits	6.5	8.3	9.3	11.4
Old Saybrook shoreline abutting the Connecticut River	6.5	8.3	9.3	11.4
Entire Borough of Fenwick Shoreline	6.5	8.3	9.3	11.4

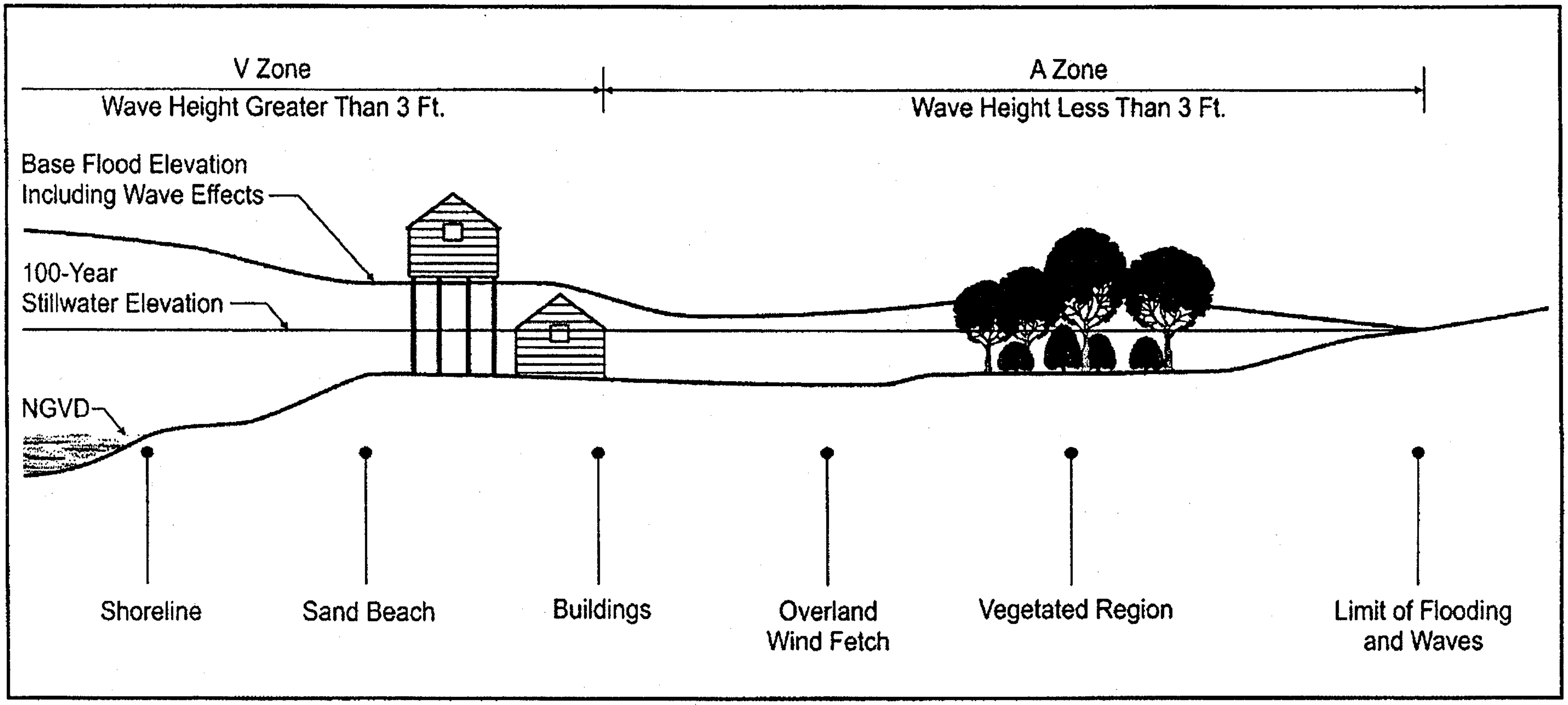
3.4 Coastal Hydraulic Analyses

Precountywide Analyses

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report entitled Methodology for Calculating Wave Action Effects Associated with Storm Surges prepared by the National Academy of Sciences (NAS, 1977). This method is based on three major concepts. First, depth-limited waves in shallow water reach maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions such as sand dunes, dikes and seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in the NAS report. The third major concept is that 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.

Wave heights were computed along transects (cross section lines) that were located along the coastal areas in accordance with the Users Manual for Wave Height Analysis (FEMA, 1981). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, the transects 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 1 represents a sample transect which illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the A/V zone boundary. Actual wave conditions may not include all the situations illustrated in Figure 1.



TRANSECT SCHEMATIC

FIGURE 1

Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Wave heights were calculated to the nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments. The calculations were carried inland along the transect until the wave crest elevation was permanently less than 0.5 foot above the stillwater elevation or the coastal flooding met another flood source (i.e. riverine) with an equal water-surface elevation. The results of the calculations are accurate until local topography, vegetation, or cultural development of the area undergoes any major changes.

After analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including the topographic work maps, aerial photographs, and engineering judgment. Controlling features affecting the elevations are identified and considered in relation to their positions at a particular transect and their variation between transects.

These concepts and equations were used to compute wave heights and wave crest elevations associated with the 100-year storm surge. Accurate topographic, land-use, and land cover data are required for the wave height analysis. Because wave height calculations are based on such parameters as the size and density of vegetation, natural barriers such as sand dunes, buildings, and other man-made structures, detailed information on the physical and cultural features of the study area had to be obtained.

Maps of the shoreline of the Town of Westbrook at a scale of 1:4,800 with a contour interval of 5 feet were used for the topographic data (USACE Topographic Maps). The land-use and land cover data were obtained from aerial photographs (USACE, 1982).

For the shoreline of the Town of Clinton, aerial photographs and glass aerial plotting plates of the Town of Clinton (Aero Graphics Corporation, 1980); topographic maps of the shoreline within the town at a scale of 1:2,400 with a contour interval of 4 feet (Dewberry & Davis, 1982); USGS topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (US Department of the Interior, 1970); and a publication entitled, Tidal Flood Profiles of the Connecticut Shoreline of Long Island Sound (Dewberry & Davis, 1982) were used for topographic data.

Hydraulic analyses of the shoreline characteristics of the tidal flooding sources studied in detail were carried out to provide estimates of wave heights and corresponding wave crest elevations of floods of the selected recurrence intervals along each of the shorelines.

Areas of the 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 (Guidelines for Identifying Coastal High Hazard Zones, 1975). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures. This criterion has been adopted by FEMA for the determination of V-zones.

Computed wave heights and elevations associated with the 100-year storm surge are summarized in Table 11, "Transect Descriptions", for various reaches in the study area.

For the Town of Westbrook shoreline, the maximum wave crest elevation from Long Island Sound is 15 feet. Waves greater than 3 feet affect the shoreline of the town but do not propagate inland to a significant extent due to the rise in ground elevation, with the exception of the marsh area at the eastern end of the town and the Grove Beach area. Waves greater than 3 feet from Long Island Sound are reduced by rising ground elevations and development along Westbrook Harbor as far east as Chapman Beach. East of Chapman Beach, waves greater than 3 feet propagate through the adjacent Cold Spring Brook marsh area. At the western end of the town, waves penetrate the low-lying Grove Beach area. Waves less than 3 feet propagate into the town in several areas, including some low-lying areas of the Patchogue and Menunketesuck Rivers and at Stannard, Middle, Quotenset, and West Beaches. These waves are diminished by development, vegetation, and the rise in ground elevation.

The maximum wave crest elevation affecting Long Island Sound shoreline of Old Saybrook is 15 feet. Along most of this shoreline, waves greater than 3 feet do not propagate more than 150 feet inland due to rising ground elevations. In the Great Hammock Beach area, waves greater than 3 feet can propagate inland 400 feet where they are reduced by rising ground elevations. Waves less than 3 feet affect the low-lying shoreline areas of Hager Creek, Mud Creek, the Oyster River, the Back River, and Plum Bank Creek.

The maximum wave crest elevation affecting the Connecticut River shoreline of Old Saybrook is 14 feet. Waves greater than 3 feet propagate over the State Route 154 Bridge and affect the northern half of South Cove as far as 900 feet inland. On the Connecticut River shoreline between South Cove and North Cove, waves greater than 3 feet propagate inland 300 feet where they are reduced to less than 3 feet by ground elevations. Waves greater than 3 feet affect the northern portion of North Cove and the Connecticut River shoreline as far inland as 3,500 feet and as far north as the Conrail Bridge. Waves less than 3 feet affect the low-lying areas of South Cove and North Cove. They also affect the Connecticut River inland of areas affected by waves greater than 3 feet and in the low-lying areas of the river north of the Conrail Bridge.

Areas along the Old Saybrook coast, the Connecticut River, and the estuarine zones of Oyster River and smaller streams have been investigated for possible tidal flooding. A tide-level frequency relationship was developed for the Connecticut coast between Old Saybrook and Guilford using available tide data gathered at various stations.

Stillwater elevations for Long Island Sound were developed by Dewberry & Davis by adjusting elevations contained in the publication entitled, "Tidal Flood Profiles for the New England Coastline", (USACE, January 1980). The adjustment was made using a New London Connecticut, tidal gage analysis and the profiles for the 1938 and 1954 storms (Richard L. Umbarger, Personal Communication to Craig S. Wingo of FEMA, Concerning the Analysis of Tide Gage Data for New London, CT, April 23, 1980). Stillwater elevations for the Menunketesuck River upstream of the Conrail Bridge were determined by a routing analysis using information from Long Island Sound Interim Memo No. COE 2, Tidal Hydrology, (USACE, June 1973).

Table 11 provides a listing of the transect locations and the stillwater elevations, as well as the maximum wave crest elevations. Figure 2, "Transect Location Map," illustrates the location of the transects for the county.

Table 12, "Transect Data," the flood hazard zone and base flood elevations for each transect flooding sources is provided, along with the 100-year stillwater elevation, including effects of wave setup where applicable, for the respective flooding source.

TABLE 11 - TRANSECT DESCRIPTIONS

Transect	Location	Elevation (Feet NAVD 88) Stillwater 100-year	Elevation (Feet NAVD 88) Max. Wave Crest 100-year[1]
1	At the shoreline of Long Island Sound, in the Town of Clinton, the Western corporate limits to Hammock Point	9.4	15
2	At the shoreline of Long Island Sound, in the Town of Clinton, Hammock Point to Kelsey Point	9.4	15
3	At the shoreline of Long Island Sound, in the Town of Clinton, Kelsey Point to U.S. Route 1 Causeway, extended	9.4	15
4	At the shoreline of Long Island Sound, in the Town of Clinton, U.S. Route 1 Causeway, extended, to the Eastern corporate limits	9.4	15
5	At the shoreline of Long Island Sound, in the Town of Westbrook, the Western corporate limits to Grove Beach Road, extended	9.4	15
6	At the shoreline of Long Island Sound, in the Town of Westbrook, Grove Beach Road, extended, to Menunketesuck Road, extended	9.4	15
7	At the shoreline of Long Island Sound, in the Town of Westbrook, Menunketesuck Road, extended, to Grove Beach Point	9.4	15
8	At the shoreline of Long Island Sound, in the Town of Westbrook, Grove Beach Point to Striper Avenue, extended	9.4	15
9	At the shoreline of Long Island Sound, in the Town of Westbrook, Striper Avenue, extended, to Tarpon Avenue, extended	9.4	15
10	At the shoreline of Long Island Sound, in the Town of Westbrook, Tarpon Avenue, extended, to Seaside Avenue	9.4	15
11	At the shoreline of Long Island Sound, in the Town of Westbrook, Seaside Avenue to Kingsfisher Lane, extended	9.4	15
12	At the shoreline of Long Island Sound, in the Town of Westbrook, Kingsfisher Lane, extended, to Gerard Avenue, extended	9.4	15
13	At the shoreline of Long Island Sound, in the Town of Westbrook, Gerard Avenue, extended, to Economy Drive, extended	9.4	15
14	At the shoreline of Long Island Sound, in the Town of Westbrook, Economy Drive, extended, to Maple Avenue, extended	9.4	15

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

TABLE 11 - TRANSECT DESCRIPTIONS (continued)

Transect	Location	Elevation (Feet NAVD 88) Stillwater 100-year	Max. Wave Crest 100-year[1]
15	At the shoreline of Long Island Sound, in the Town of Westbrook, Maple Avenue, extended, to Salt Works Road, extended	9.4	15
16	At the shoreline of Long Island Sound, in the Town of Westbrook, Salt Works Road, extended, to Kelsey Point Road, extended	9.4	15
17	At the shoreline of Long Island Sound, in the Town of Westbrook, Kelsey Point Road, extended, to Chapman Beach Road, extended	9.4	15
18	At the shoreline of Long Island Sound, in the Town of Westbrook, Chapman Beach Road, extended, to the Eastern corporate limits	9.4	15
19	At the shoreline of Long Island Sound, in the Town of Old Saybrook, the Western corporate limits to Chapman Point	9.4	15
20	At the shoreline of Long Island Sound, in the Town of Old Saybrook, Chapman Point to the mouth of the Oyster River	9.4	15
21	At the shoreline of Long Island Sound, in the Town of Old Saybrook, the mouth of Oyster River to Cornfield Point	9.4	15
22	At the shoreline of Long Island Sound, in the Town of Old Saybrook, Cornfield Point to Atlantic Drive, extended	9.3	15
23	At the shoreline of Long Island Sound, in the Town of Old Saybrook, Atlantic Drive, extended, to Park Avenue, extended	9.3	15
24	At the shoreline of Long Island Sound, in the Borough of Fenwick, Park Avenue, extended, to Grove Avenue, extended	9.3	15
25	At the shoreline of Long Island Sound, in the Borough of Fenwick, Grove Avenue, extended, to Fenwick Avenue, extended	9.3	15
26	At the shoreline of Long Island Sound, in the Borough of Fenwick, Fenwick Avenue, extended, to Lynde Point	9.3	15
27	At the shoreline of Long Island Sound, in the Borough of Fenwick, Lynde Point to Neponsett Avenue, extended	9.3	15
28	In the Town of Old Saybrook, South Cove Western and Northern shoreline	9.3	12
29	At the Connecticut River shoreline, in the Town of Old Saybrook, Saybrook Point to mouth of Ragged Rock Creek	9.3	14
30	At the Connecticut River shoreline, in the Town of Old Saybrook, the mouth of Ragged Rock Creek to the Raymond E. Baldwin Bridge	9.3	12
31	At the Connecticut River shoreline, in the Town of Old Saybrook, the Raymond E. Baldwin Bridge to northern corporate limits	9.3	11

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

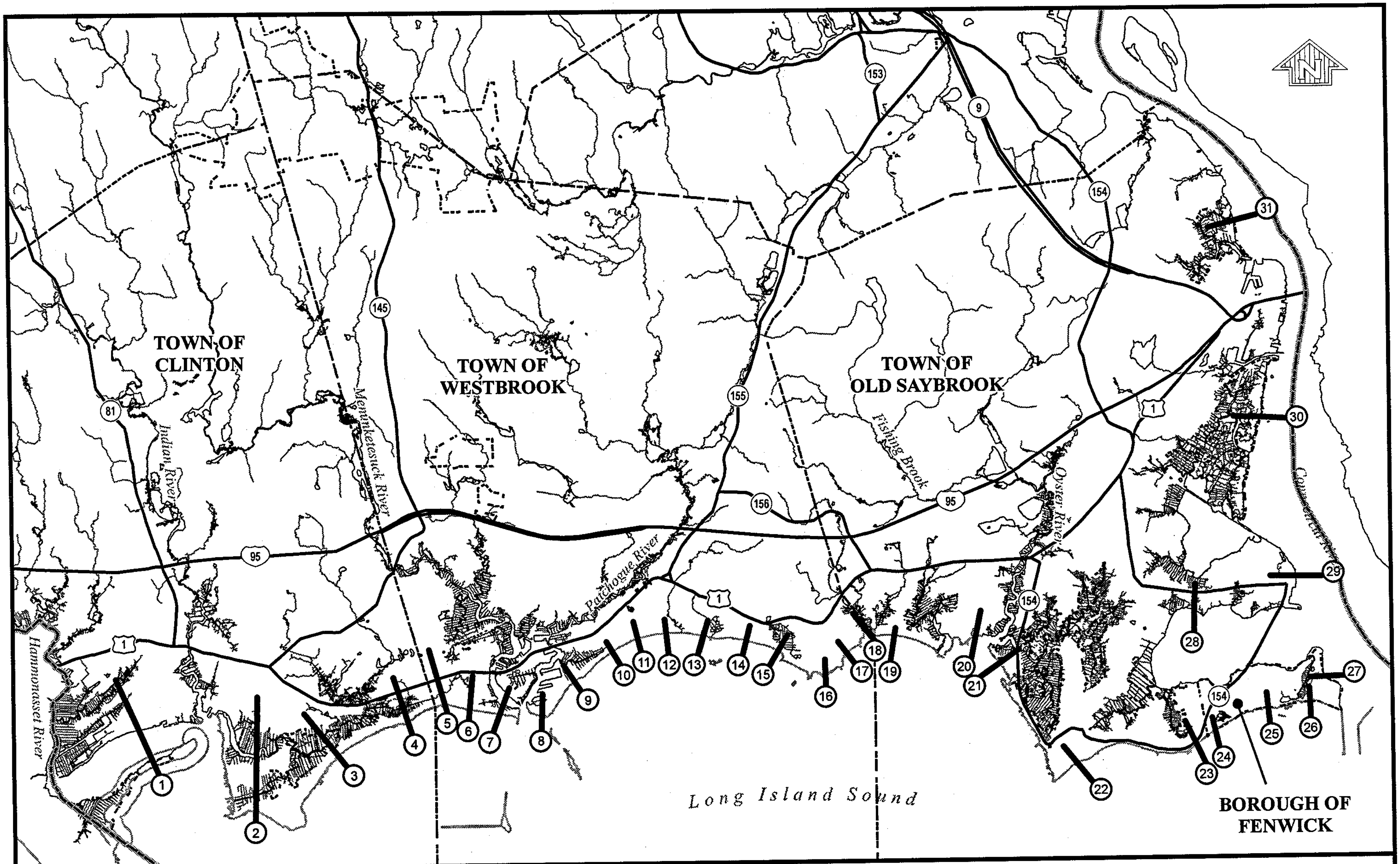


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
(AND INCORPORATED AREAS)

APPROXIMATE SCALE

6,000 3,000 0 6,000 12,000 18,000 Feet

TRANSECT LOCATION MAP

TABLE 12 - TRANSECT DATA

Flooding Source and Transect Number	Stillwater Elevation				Zone	Base Flood Elevation (Feet NAVD 88)[1]
	10-year	50-year	100-year	500-year		
LONG ISLAND SOUND						
Entire shoreline within Clinton						
Transects 1-2	6.7	8.5	9.4	11.4	VE	12-15
					AE	9-11
					AE	9
Transect 3	6.7	8.5	9.4	11.4	VE	12-15
					AE	9-11
					AE	9
Transect 4	6.7	8.5	9.4	11.4	VE	12-15
					AE	9-11
Entire shoreline within Westbrook						
Transects 5-11	6.6	8.4	9.4	11.4	VE	12-14
					AE	9-11
					AE	9
					AE	9
Transects 12-14	6.6	8.4	9.4	11.4	VE	12-14
					AE	9-11
Transects 15-18	6.6	8.4	9.4	11.4	VE	12-15
					AE	9-11
					AE	9
Entire Shoreline and Estuaries within Old Saybrook (except Fenwick)						
Transects 19-20	6.6	8.4	9.4	11.4	VE	12-15
					AE	9-11
Transect 21	6.6	8.4	9.4	11.4	VE	12-15
					AE	9-11
Transect 22-23	6.5	8.3	9.3	11.4	VE	11-15
Entire Shoreline of Fenwick						
Transect 24-27	6.5	8.3	9.3	11.4	VE	11-15
					VE	9-11
					AE	9-11
CONNECTICUT RIVER						
Transects 28-30	6.5	8.3	9.3	11.4	VE	11-15
					AE	9-11
Transect 31	6.5	8.3	9.3	11.4	AE	11-15
					AE	9-11

[1] Because of map scale limitations, base flood elevations shown on the FIRM represent average elevations for the zones depicted.

3.5 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the completion of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are now 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 (BFEs) 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% annual chance (100-year) 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 Middlesex 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 from NGVD 29 to NAVD 88 is -1.0 foot and from NAVD 88 to NGVD 29 is +1.0 foot. The conversion from NGVD 29 to NAVD 88 was performed using the USACE's CORPSON Version 6.0.1 computer program to calculate vertical adjustment factors for the southwest corners of USGS Quadrangles within and around the county boundary.

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.

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 report provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation Table. Users should reference the data presented in the FIS report 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 (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance (500-year) flood is employed to indicate additional areas of flood risk in the county. For each stream studied by detailed methods, the 100-year and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps as listed in Table 13, Topographical Map Index.

Boundaries for stream reaches studied in detail in previous community FIS reports but not addressed in this countywide FIS remain the same as in the previous FIS.

For the flooding sources studied by approximate methods, the boundaries of the 100-year floodplains were delineated using topographic maps taken from the previously printed FIS reports, Flood Hazard Boundary Maps and/or FIRMs for the communities within Middlesex County.

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

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the FIRM (Exhibit 2).

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 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

TABLE 13 - TOPOGRAPHIC MAP INDEX

Community	Flooding Source	Map Scale	Contour Intervals (ft)	Map Preparer & Date
Chester, Town of	Chester Creek Pattaconk Brook Great Brook South Branch Great Brook Deep River	1:2,400	5	Town of Chester, CT, Topographic Maps of Chester Creek December 1977
	CT River	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Deep River, CT 1961, photorevised 1971 and Haddam, CT 1961
Clinton, Town of	Menunketesuck River Hammonasset River Indian River Boulder Lake Brook Old Nod Brook West Branch Boulder Brook Spencer Hill Brook Tidal Areas	1:2,400 and	5	CE Maguire, Inc., Topographic Maps Hammonasset River, Menunketesuck River, and Indian River, December 1977
		1:24,000 enlarged to 1:10,800	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Clinton, CT 1961, photorevised 1970; Essex, CT 1958, photorevised 1970
		1:2,400	4	Dewberry & Davis of Fairfax, VA Topographic Maps for the Town of Clinton, CT Prepared November 1982 (Unpublished)
Cromwell, Town of	Chestnut Brook Willow Brook Coles Road Brook Shunpike Creek	1:2,400	5	CT DOT, Topographic Maps, Cromwell, CT 1959
	Mattabesset River	1:1,200	2	Aerial Cartographic Technology, Inc., Topographic Maps, Cromwell, CT, April 13, 1983 and Aerial Data Reduction Associates, Inc., Topographic Map of the City of Middletown, April 4, 1980
	All Others	1:24,000	20	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Hartford South, CT 1964; Middle Haddam, CT 1961; Middletown, CT 1992

TABLE 13 - TOPOGRAPHIC MAP INDEX

Community	Flooding Source	Map Scale	Contour Intervals (ft)	Map Preparer & Date
Deep River, Town of	Deep River	1:2,400	5	CE Maguire, Inc., New Britain, CT, Topographic Maps of Deep River, December 1977
		1:4,800	20	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Deep River, CT 1961, photorevised 1971; Essex, CT, 1958, photorevised 1970
Durham, Town of	Allyn Brook Ball Brook Coginchaug River Hersig Brook	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Haddam, CT 1971
East Haddam, Town of	Salmon River Portions of Eightmile River	1:2,400 or 1:4,800	5	Geod Aerial Mapping, Inc. East Haddam, CT 1977
	Moodus River Portions of Succor Brook	1:2,400	5	CT DOT, Relocation of Conn 82, Haddam-East Haddam, December 1958
	All Others	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Colchester, CT 1953, photorevised 1970; Deep River & Hamburg, CT 1961, photorevised 1971; Moodus, CT 1967, photorevised 1973
East Hampton, Town of	Salmon River Portions of Pocotopaug Creek	1:4,800	5	Geod Aerial Mapping, Inc. East Hampton, CT (No date referenced)
	All Others	1:12,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Middle Haddam, CT 1961, photorevised 1971; Glastonbury, CT 1964, photorevised 1972; Moodus, CT 1967, photorevised 1973; Marlboro, CT 1967, photorevised 1972
Essex, Town of	Falls River	1:4,800	5	Kucera & Associates of Mentor, OH Essex, CT 1982
	All Others	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Deep River, CT 1939; Essex, CT 1939, photorevised 1958; Old Lyme, CT 1938, photorevised 1958

TABLE 13 - TOPOGRAPHIC MAP INDEX

Community	Flooding Source	Map Scale	Contour Intervals (ft)	Map Preparer & Date
Haddam, Town of	Salmon River Mill Creek	1"=200 ft	5	State of CT DOT, Relocation of Connecticut Highway 9, Haddam to Old Saybrook, July 1955
	Portions of Ponset Brook Bible Rock Brook Candlewood Hill Brook Beaver Meadow Brook	1"=400 ft	5	Geod Aerial Mapping, Inc., 1977
	All Others	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps Deep River, CT 1961, photorevised 1971; Durham, CT, 1953; Haddam, CT 1961, photorevised 1971; Middle Haddam, CT 1961, photorevised 1971; Middletown, CT 1952; Moodus, CT 1967, photorevised 1973
Killingworth, Town of	Pond Meadow Brook Lane District Brook Hammonasset River	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Haddam, CT, 1971; Durham, Guilford and Clinton, CT 1984
Middlefield, Town of	Coginchaug River Ellen Doyle Brook	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Middletown and Durham, CT 1972
Middletown, Town of	Longhill Brook and Longhill Brook Diversion	1:24,000	10	Aerial Cartographic Technology, Inc., Topographic Map of the Town of Cromwell, April 13, 1983
	Mattabesset River and Portions of CT River	1:1,200	2	Aerial Data Reduction Associates, Inc., Topographic Map of the City of Middletown, April 17, 1980
	Portion of CT River	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Middle Haddam, CT 1961, photorevised 1971; Deep River, CT 1961, photorevised 1971; Durham, CT 1953; Middletown, CT 1952, revised 1972; Moodus, CT 1967, photorevised 1973
	All Other Streams Studied in Detail	1:2,400	2	Aerial Data Reduction Associates, Inc., Topographic Maps, April 17, 1980

TABLE 13 - TOPOGRAPHIC MAP INDEX

Community	Flooding Source	Map Scale	Contour Intervals (ft)	Map Preparer & Date
Old Saybrook, Town of	Fishing Brook	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Essex, CT 1958; photorevised 1970; Old Lyme, CT 1958, photorevised 1970
Portland, Town of	Hales Brook Reservoir Brook Carr Brook Tributary A	1:2,400	5	CT Dept. of Transportation, 1959 and Geod Aerial Mapping, Inc., April 1975
Westbrook, Town of	Patchogue River Menunketesuck River	1:2,400	5	CE Maguire, Inc., Topographic Maps Patchogue & Menunketesuck Rivers, December 1977
	Falls River	1:24,000	10	US Dept. of Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Essex, CT 1958, photorevised 1970
	Tidal Areas	1:4,800	5	US Army Corps of Engineers, New England Division, Topographic Maps, Town of Westbrook, CT

The floodways presented in this FIS report 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 14). The computed floodways are shown on the revised FIRM (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Floodways were not delineated at lakes due to their impoundment effect on the 100-year flood flow. The computer program of the USGS does not provide floodway analysis at bridge or dam cross sections, thus, these cross sections are not listed in Table 14.

Portions of the floodway for the Hammonasset River and Mattabesset River extend beyond the county limits.

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 14 for certain downstream section of the Carr Brook, Carr Brook Tributary A, Chester Creek, Chestnut Brook, Coginchaug River, Coles Road Brook, Cromwell Creek, Deep River, East Swamp Brook, Great Brook, Hales Brook, Hammonasset River, Indian River, Mattabesset River, Menunketesuck River, Mill Creek, Miner Brook, Moodus River, Patchogue River, Pattaconk Brook, Ponset Brook, Reservoir Brook, Salmon River, Shunpike Creek, Succor Brook, Sumner Brook, Swamp Brook, West Swamp Brook, and Willow Brook are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

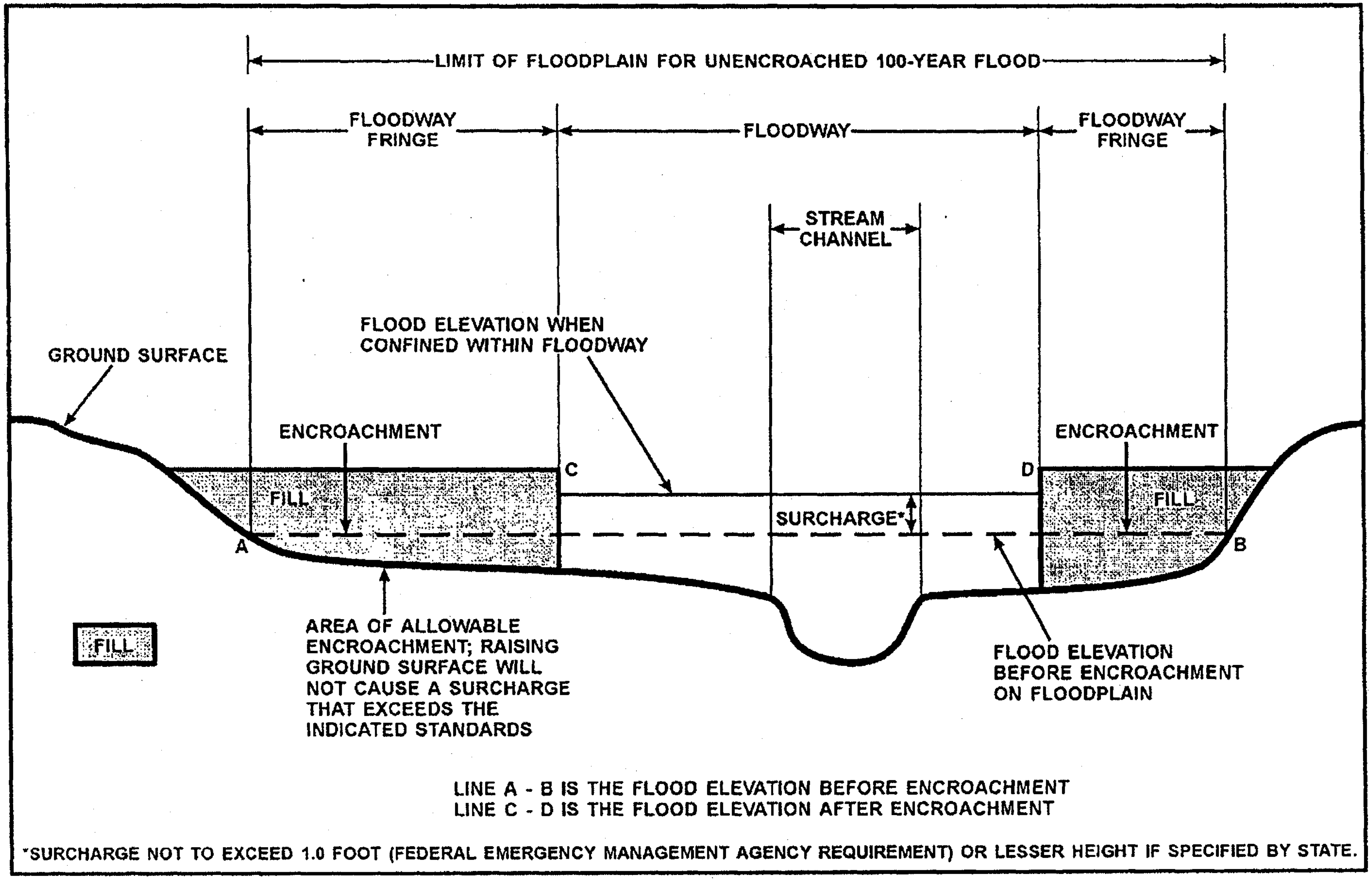
No floodways were computed for Boulder Lake Brook, Old Nod Brook, Spencer Hill Brook, and West Branch Boulder Lake Brook. A floodway was not computed for Ellen Doyle Brook because of supercritical flow conditions encountered in this very steep stream. No floodways were computed for Connecticut River downstream of East Haddam because it is an area of permanent tidal inundation.

Portions of the floodway are shared for Allyn Brook, Ball Brook, the Coginchaug River, and Hersig Brook. Also, the downstream portion of Parmalee Brook lies within the Coginchaug River floodway. When the water-surface elevation is increased by the 100-year flood, the flooding sources in this flat, marshy land area combine to form one wide flooding source.

The floodway recommended in this study was computed for the reach of the Coginchaug River from the Middletown town line to the Durham town line, except for a short segment in the Wadsworth Falls area, where the stream undergoes supercritical flow.

For the Towns of Haddam, East Hampton, and East Haddam, no encroachment was attempted for cross sections at bridges or cross sections having hazardous pre-floodway condition velocities. Encroachment limits based on equal conveyance reduction which would produce a maximum 1.0 foot flood water rise at each of the remaining sections were checked to insure that the velocities were reasonable. If they were not, the encroachment limits were adjusted until the velocities were reduced, occasionally resulting in a water-surface increase of less than 1.0 foot. Because of the effects of downstream encroachment on water-surface elevations upstream, there may be numerous cross sections where minimal encroachment can be permitted without upstream elevation increases of more than 1.0 foot. This "domino" effect, therefore, imposes an additional constraint on floodplain encroachment. In East Haddam, the floodway at the confluence of the Connecticut River and Salmon River is shown at the banks.

The area between the floodway and 1-percent-annual-chance (100 year) floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation (WSEL) of 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3, Floodway Schematic.



FLOODWAY SCHEMATIC

FIGURE 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Allyn Brook								
A	3,520 [1]	85	232	5.8	156.2	156.2	157.2	1.0
B	4,200 [1]	40	170	8.0	160.5	160.5	160.8	0.3
C	4,330 [1]	67	264	5.1	162.6	162.6	162.6	0.0
D	4,770 [1]	50	168	8.0	164.4	164.4	164.5	0.1
E	4,970 [1]	55	481	2.8	171.0	171.0	171.0	0.0
F	5,070 [1]	100	802	1.7	171.1	171.1	171.2	0.1
G	5,470 [1]	90	217	6.2	174.4	174.4	175.4	1.0
H	6,590 [1]	67	312	3.2	177.6	177.6	178.4	0.8
I	6,750 [1]	92	718	1.4	183.6	183.6	183.6	0.0
J	7,030 [1]	90	660	1.5	183.6	183.6	183.6	0.0
Ball Brook								
A	960 [2]	46	109	4.4	183.9	183.9	184.1	0.2
B	1,240 [2]	40	267	1.8	188.7	188.7	188.7	0.0
C	3,300 [2]	*	141	3.4	197.0	197.0	197.0	0.0
D	4,900 [2]	*	3.6	1.6	203.7	203.7	203.7	0.0

[1] Feet above confluence with Coginchaug River
[2] Feet above confluence with Allyn Brook
* Floodway coincident with channel banks

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

ALLYN BROOK AND BALL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Beaver Meadow Brook								
A	602 [1]	20	65	9.1	133.2	133.2	133.2	0.0
B	2,239 [1]	20	75	8.0	150.7	150.7	151.2	0.5
C	2,640 [1]	30	115	4.5	156.0	156.0	156.2	0.2
D	2,999 [1]	40	220	2.4	163.5	163.5	163.5	0.0
E	3,400 [1]	100	805	0.7	168.3	168.3	168.3	0.0
F	3,844 [1]	50	275	1.9	168.4	168.4	168.4	0.0
Bible Rock Brook								
A	1,225 [2]	40	185	5.9	56.1	56.1	57.1	1.0
B	2,376 [2]	40	205	5.3	61.0	61.0	61.7	0.7
C	3,759 [2]	60	135	8.1	76.7	76.7	76.7	0.0
D	5,333 [2]	40	200	5.5	104.1	104.1	104.1	0.0
E	6,294 [2]	80	325	3.2	117.5	117.5	117.5	0.0

[1] Feet above confluence with Mill Creek

[2] Feet above confluence with Ponset Brook

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

BEAVER MEADOW BROOK AND BIBLE ROCK BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Candlewood Hill Brook								
A	296	40	160	8.3	57.7	57.7	58.7	1.0
B	570	60	385	3.5	65.3	65.3	65.3	0.0
C	3,337	50	150	9.0	118.2	118.2	118.3	0.1
D	3,759	40	180	7.4	124.8	124.8	125.5	0.7
E	4,023	50	240	5.6	126.3	126.3	126.6	0.3
F	4,235	40	130	10.1	130.9	130.9	130.9	0.0
G	5,343	20	115	11.4	146.6	146.6	147.4	0.8
I	6,473	30	225	5.9	168.0	168.0	168.0	0.0
J	6,769	40	245	5.4	168.8	168.8	168.9	0.1
K	7,804	30	120	11.0	175.3	175.3	175.3	0.0
L	11,099	200	915	1.5	198.4	198.4	199.2	0.8
M	11,595	30	110	11.9	201.9	201.9	201.9	0.0
N	12,577	50	700	1.9	209.0	209.0	209.0	0.0
O	13,168	70	485	2.7	210.1	210.1	210.1	0.0
P	13,823	30	175	7.5	210.2	210.2	210.7	0.5
Q	15,312	60	145	4.1	221.2	221.2	221.2	0.0
R	15,660	100	1,335	1.0	226.2	226.2	226.2	0.0

[1] Feet above confluence with Ponset Brook

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

CANDLEWOOD HILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Candlewood Hill Brook (cont.)								
S	16,178 [1]	110	1,311	1.0	226.9	226.9	226.9	0.0
T	18,385 [1]	200	1,040	1.3	228.4	228.4	228.4	0.0
U	19,483 [1]	110	370	3.3	228.8	228.8	228.9	0.1
V	20,455 [1]	140	435	2.8	231.0	231.0	231.8	0.8
W	22,503 [1]	90	230	3.9	237.6	237.6	237.6	0.0
X	23,084 [1]	90	185	4.8	240.2	240.2	240.2	0.0
Carr Brook								
A	90 [2]	40	460	3.8	24.8	18.7 [3]	18.7	0.0
B	2,777 [2]	100	1,090	1.4	24.8	18.8 [3]	19.8	1.0
C	4,287 [2]	35	180	8.4	24.8	18.8 [3]	19.8	1.0
D	4,419 [2]	240	1,200	1.3	24.8	23.5 [3]	23.5	0.0
E	5,417 [2]	200	240	5.7	24.8	23.6 [3]	23.9	0.3
G	6,172 [2]	30	175	6.9	33.2	33.2	33.2	0.0
I	7,608 [2]	25	215	5.7	77.1	77.1	77.1	0.0
K	7,814 [2]	20	165	7.3	83.1	83.1	83.7	0.6
M	8,010 [2]	90	820	1.5	103.1	103.1	103.1	0.0

[1] Feet above confluence with Ponset Brook
[2] Feet above mouth at Connecticut River
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

CANDLEWOOD HILL BROOK AND CARR BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Carr Brook (continued)								
N	8,913 [1]	35	120	10.2	146.8	146.8	146.8	0.0
P	9,699 [1]	45	475	2.3	166.8	166.8	166.8	0.0
R	11,056 [1]	30	215	4.9	168.4	168.4	168.4	0.0
S	12,144 [1]	25	110	8.5	168.6	168.6	168.8	0.2
U	13,126 [1]	100	425	2.2	182.2	182.2	182.2	0.0
V	14,641 [1]	90	165	5.6	190.4	190.4	190.5	0.1
X	15,581 [1]	45	105	7.5	213.3	213.3	213.3	0.0
Y	16,284 [1]	25	85	9.2	228.0	228.0	228.2	0.2
AB	16,922 [1]	95	150	5.3	244.8	244.8	244.8	0.0
Carr Brook Tributary A								
A	1,859 [2]	60	270	1.3	24.8	8.2 [3]	8.6	0.4
B	3,237 [2]	10	50	6.8	24.8	10.9 [3]	11.8	0.9
C	3,453 [2]	40	395	0.9	24.8	19.4 [3]	20.0	0.6
D	5,555 [2]	30	110	3.2	24.8	19.4 [3]	20.0	0.6
E	6,864 [2]	30	55	6.4	29.0	29.0	29.0	0.0

[1] Feet above mouth at Connecticut River
[2] Feet above confluence with Carr Brook
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

CARR BROOK AND CARR BROOK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Chester Creek								
A	671 [1]	100	696	2.5	9.8	1.1 [3]	1.1	0.0
B	1,626 [1]	90	571	3.1	9.8	1.2 [3]	1.2	0.0
C	1,737 [1]	90	887	2.0	9.8	4.9 [3]	4.9	0.0
D	2,645 [1]	130	1,214	1.4	9.8	5.0 [3]	5.0	0.0
E	4,229 [1]	125	628	2.8	9.8	5.1 [3]	5.2	0.1
F	4,821 [1]	120	538	3.3	9.8	5.3 [3]	5.8	0.5
G	5,433 [1]	344	1,424	1.6	9.8	6.0 [3]	7.0	1.0
Chestnut Brook								
A	1,092 [2]	15	40	8.59	23.3	8.5 [3]	8.6	0.1
B	1,409 [2]	30	55	6.20	23.3	14.4 [3]	14.6	0.2
C	2,528 [2]	20	45	6.89	50.4	50.4	50.5	0.1
D	3,146 [2]	45	65	4.70	68.5	68.5	68.5	0.0
E	3,273 [2]	90	205	1.53	70.1	70.1	70.1	0.0
F	4,059 [2]	60	55	5.16	75.2	75.2	75.2	0.0
G	4,234 [2]	235	2,215	0.13	92.0	92.0	92.0	0.0
H	5,928 [2]	25	40	6.81	96.9	96.9	97.1	0.2
I	6,134 [2]	20	140	1.84	105.7	105.7	105.7	0.0
J	6,166 [2]	20	130	2.02	105.7	105.7	105.7	0.0

[1] Feet above Connecticut Valley Railroad

[2] Feet above mouth at Mattabesset River

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

CHESTER CREEK AND CHESTNUT BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coginchaug River								
A	2,000	910	9,391	0.3	23.3	15.5[2]	16.5	1.0
B	2,630	80	814	3.7	23.3	15.5[2]	16.5	1.0
C	3,560	750	7,735	0.4	23.3	15.6[2]	16.6	1.0
D	4,280	500	5,162	0.6	23.3	15.6[2]	16.6	1.0
E	5,170	530	5,422	0.6	23.3	15.7[2]	16.7	1.0
F	6,045	790	8,008	0.40	23.3	15.7[2]	16.7	1.0
G	6,665	616	6,027	0.50	23.3	15.7[2]	16.7	1.0
H	7,485	241	2,209	1.40	23.3	15.7[2]	16.7	1.0
I	8,165	304	2,784	1.10	23.3	15.8[2]	16.8	1.0
J	8,935	342	2,307	1.30	23.3	16.7[2]	17.5	0.8
K	9,905	100	854	3.50	23.3	17.3[2]	18.0	0.7
L	10,740	868	4,954	0.60	23.3	17.7[2]	18.3	0.6
M	11,550	87	611	4.90	23.3	17.7[2]	18.2	0.5
N	11,900	60	493	6.10	23.3	18.1[2]	18.6	0.5
O	12,250	46	268	11.20	23.3	18.5[2]	19.0	0.5
P	13,015	171	1,088	2.8	25.7	25.7	26.2	0.5
Q	13,565	89	381	7.9	30.2	30.2	30.4	0.2

[1] Feet above confluence with Mattabesset River

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

COGINCHAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coginchaug River (cont.)								
R	13,975	358	1,838	1.6	32.3	32.3	33.0	0.7
S	14,585	155	996	3.0	32.6	32.6	33.2	0.6
T	15,330	59	244	12.3	35.3	35.3	35.3	0.0
U	15,552	80	678	4.4	39.0	39.0	39.2	0.2
V	16,784	543	2,984	1.0	43.9	43.9	44.4	0.5
W	17,229	477	2,245	1.3	44.1	44.1	44.6	0.5
X	18,094	361	1,682	1.8	44.6	44.6	45.1	0.5
Y	18,689	144	637	4.7	45.3	45.3	45.7	0.4
Z	19,159	146	553	5.4	46.9	46.9	47.5	0.6
AA	19,474	236	1,262	2.4	49.3	49.3	50.2	0.9
AB	19,820	203	842	3.6	56.2	56.2	56.7	0.5
AC	20,015	110	513	5.8	56.7	56.7	57.2	0.5
AD	20,400	357	1,822	1.6	57.8	57.8	58.1	0.3
AE	20,955	338	1,411	2.1	58.1	58.1	58.5	0.4
AF	21,315	325	1,295	2.3	58.6	58.6	59.1	0.5
AG	21,750	370	1,694	1.8	59.1	59.1	59.7	0.6
AH	22,445	123	404	7.4	60.1	60.1	60.4	0.3

[1] Feet above confluence with Mattabesset River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

COGINCHAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coginchaug River (cont.)								
AI	22,925	184	872	3.4	63.0	63.0	63.9	0.9
AJ	23,382	124	598	5.0	64.0	64.0	64.8	0.8
AK	23,882	116	527	5.7	65.7	65.7	66.4	0.7
AL	24,354	469	1,818	1.7	69.1	69.1	69.7	0.6
AM	25,315	171	573	6.1	71.8	71.8	72.2	0.4
AN	26,235	129	528	6.6	79.3	79.3	80.0	0.7
AO	26,480	234	1,738	2.0	83.0	83.0	84.0	1.0
AP	27,145	62	477	7.3	83.1	83.1	84.1	1.0
AQ	28,845	152	415	8.4	93.3	93.3	93.3	0.0
AR	30,130	120	523	6.7	105.1	105.1	105.2	0.1
AS	30,735	125	1,223	2.9	143.5	143.5	144.5	1.0
AT	31,845	186	1,310	2.7	144.5	144.5	145.5	1.0
AU	33,125	174	1,266	2.8	145.5	145.5	146.4	0.9
AV	34,275	197	1,417	2.5	146.4	146.4	147.4	1.0
AW	34,620	397	2,490	1.4	149.4	149.4	149.4	0.0
AX	35,880	188	2,081	1.7	150.5	150.5	150.5	0.0
AY	37,400	445	3,466	1.0	150.7	150.7	150.8	0.1

[1] Feet above confluence with Mattabesset River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

COGINCHAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coginchaug River (cont.)								
AZ	38,240	342	3,116	1.0	150.8	150.8	150.9	0.1
BA	38,560	447	3,204	0.9	150.8	150.8	151.0	0.2
BB	39,930	841	7,005	0.4	150.8	150.8	151.0	0.2
BC	41,350	1,641	11,753	0.3	150.8	150.8	151.0	0.2
BD	42,770	958	6,783	0.4	150.8	150.8	151.0	0.2
BE	44,160	804	5,402	0.6	150.8	150.8	151.0	0.2
BF	45,070	881	5,299	0.6	150.8	150.8	151.0	0.2
BG	47,350	654	3,592	0.8	150.9	150.9	151.2	0.3
BH	49,860	1,830	9,130	0.3	150.9	150.9	151.0	0.1
BI	51,550	1,117	5,607	0.5	150.9	150.9	151.0	0.1
BJ	53,280	840[2]	3,941	0.8	151.0	151.0	151.2	0.2
BK	54,240	1,280[2]	3,841	0.8	151.1	151.1	151.3	0.2
BL	54,440	1,554[2]	10,197	0.3	155.0	155.0	155.0	0.0
BM	56,320	1,591[3]	11,650	0.2	155.0	155.0	155.0	0.0
BN	58,380	2,587[3]	14,918	0.1	155.0	155.0	155.0	0.0
BO	59,670	1,300	5,578	0.2	155.0	155.0	155.0	0.0
BP	60,630	1,150	2,597	0.4	155.0	155.0	155.0	0.0

[1] Feet above confluence with Mattabesset River
[2] Combined Allyn Brook/Coginchaug River floodway
[3] Combined Coginchaug River/Parmalee Brook floodway

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

COGINCHAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coginchaug River (cont.)								
BQ	60,760	1,047	4,093	0.3	155.7	155.7	155.7	0.0
BR	62,720	500	588	1.9	156.1	156.1	156.3	0.2
BS	64,000	165	321	3.1	161.8	161.8	162.6	0.8
BT	64,150	695	2,012	0.5	164.8	164.8	164.8	0.0
BU	64,650	234	942	1.1	164.9	164.9	164.9	0.0
BV	65,720	250	1,408	0.7	167.5	167.5	167.5	0.0
BW	66,160	88	346	2.9	167.6	167.6	167.6	0.0
BX	66,250	217	860	1.2	168.4	168.4	168.4	0.0
BY	67,950	20	91	10.9	172.7	172.7	173.4	0.7
BZ	68,200	276	981	1.0	176.2	176.2	176.3	0.1
CA	69,800	162	246	4.1	180.9	180.9	180.9	0.0
CB	70,760	54	150	6.7	187.9	187.9	187.9	0.0
CC	72,570	21	125	8.0	198.9	198.9	199.5	0.6

[1] Feet above confluence with Mattabesset River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

COGINCHAUG RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Coles Road Brook								
A	190 [1]	120	255	3.2	23.3	9.8 [3]	10.5	0.7
B	348 [1]	50	530	1.5	23.3	17.6 [3]	17.7	0.1
C	391 [1]	80	300	2.7	23.3	17.6 [3]	17.7	0.1
D	496 [1]	30	350	2.3	25.2	25.2	25.4	0.2
E	1,954 [1]	60	230	3.3	25.2	25.2	26.1	0.9
F	2,001 [1]	50	110	6.7	25.9	25.9	25.9	0.0
G	3,564 [1]	45	100	7.4	56.7	56.7	56.7	0.0
Connecticut River								
A	73,035 [2]	1,910	41,138	5.3	10.2	10.2	11.1	0.9
B	75,591 [2]	1,420	35,148	6.2	10.6	10.6	11.5	0.9
C	78,734 [2]	2,775	49,758	4.4	11.6	11.6	12.4	0.8
D	82,801 [2]	3,500	62,806	3.5	12.0	12.0	12.9	0.9
E	86,306 [2]	1,060	34,406	6.3	12.2	12.2	13.1	0.9
F	86,919 [2]	799	30,281	7.2	12.3	12.3	13.2	0.9
G	92,004 [2]	1,676	46,015	4.7	13.8	13.8	14.6	0.8

[1] Feet above mouth at Mattabesset River
[2] Feet above Saybrook Breakwater Light
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

COLES ROAD BROOK AND CONNECTICUT RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Connecticut River (continued)								
H	97,328	2,530	45,869	4.7	14.3	14.3	15.2	0.9
I	103,423	2,000	44,384	4.8	15.0	15.0	15.9	0.9
J	107,443	2,179	49,966	4.2	15.7	15.7	16.6	0.9
K	112,483	1,780	47,824	4.4	16.3	16.3	17.1	0.8
L	117,540	1,545	34,888	6.1	16.8	16.8	17.6	0.8
M	121,484	1,226	37,600	5.6	17.4	17.4	18.3	0.9
N	123,168	1,746	47,779	4.4	17.8	17.8	18.7	0.9
O	127,919	1,344	41,280	5.1	18.4	18.4	19.2	0.8
P	132,021	1,176	38,393	5.5	18.8	18.8	19.6	0.8
Q	134,640	1,108	36,634	5.8	19.2	19.2	20.0	0.8
R	138,387	1,510	43,600	4.8	19.8	19.8	20.6	0.8
S	142,819	1,299	41,985	5.0	20.3	20.3	21.1	0.8
T	145,982	880	32,588	6.5	20.4	20.4	21.2	0.8
U	150,069	712	30,852	6.8	21.0	21.0	21.8	0.8
V	152,824	1,352	42,184	5.0	21.9	21.9	22.6	0.7
W	156,497	1,324	44,671	4.7	22.1	22.1	23.0	0.9

[1] Feet above Saybrook Breakwater Light

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

CONNECTICUT RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Connecticut River (continued)								
X	160,540 [1]	1,687	49,183	4.3	22.7	22.7	23.6	0.9
Y	163,397 [1]	992	38,534	5.5	22.8	22.8	23.7	0.9
Z	164,385 [1]	1,163	41,792	5.1	23.0	23.0	24.0	1.0
AA	165,043 [1]	1,288	43,001	4.9	23.1	23.1	24.1	1.0
AB	168,942 [1]	1,382	46,862	4.4	23.7	23.7	24.6	0.9
AC	172,964 [1]	1,357	44,465	4.6	24.1	24.1	24.9	0.8
AD	177,926 [1]	2,230	60,373	3.4	24.5	24.5	25.4	0.9
AE	182,250 [1]	3,080	75,079	2.7	24.9	24.9	25.8	0.9
AF	186,978 [1]	3,700	90,740	2.3	25.1	25.1	26.1	1.0
AG	192,497 [1]	2,030	49,006	4.2	25.4	25.4	26.3	0.9
Cromwell Creek								
A	174 [2]	20	189	2.2	23.7	10.9 [3]	11.8	0.9
B	454 [2]	18	160	2.5	23.7	11.0 [3]	11.8	0.8
C	708 [2]	179	480	0.8	23.7	18.4 [3]	19.3	0.9
D	929 [2]	85	1,026	0.4	23.7	18.9 [3]	19.6	0.7

[1] Feet above Saybrook Breakwater Light

[2] Feet above confluence with Connecticut River

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

CONNECTICUT RIVER AND CROMWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Cromwell Creek (continued)								
E	1,547 [1]	70	905	0.5	23.7	18.9 [3]	19.6	0.7
F	1,806 [1]	100	1,343	0.3	23.7	18.9 [3]	19.7	0.8
G	3,242 [1]	100	993	0.4	23.7	18.9 [3]	19.8	0.9
H	3,717 [1]	80	748	0.5	23.7	19.3 [3]	20.3	1.0
I	5,037 [1]	14	72	5.1	23.8	23.8	24.2	0.4
J	5,644 [1]	40	212	1.7	31.8	31.8	32.6	0.8
K	6,711 [1]	55	294	1.3	52.2	52.2	52.6	0.4
L	7,593 [1]	18	121	3.1	61.4	61.3	62.3	1.0
Deep River								
A	80 [2]	90	552	2.4	9.8	0.8 [3]	0.8	0.0
B	808 [2]	75	421	3.1	9.8	0.9 [3]	0.9	0.0
C	1,764 [2]	20	130	10.0	9.8	2.1 [3]	2.1	0.0
D	2,424 [2]	40	316	4.1	9.8	3.4 [3]	4.0	0.6
E	3,047 [2]	30	225	5.8	9.8	3.9 [3]	4.4	0.5
F	3,263 [2]	40	145	9.1	9.8	4.9 [3]	5.2	0.3
G	3,305 [2]	30	290	4.5	18.3	18.3	18.3	0.0

[1] Feet above confluence with Connecticut River

[2] Feet above Connecticut Valley Railroad

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

CROMWELL CREEK AND DEEP RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Deep River (continued)								
H	3,685	30	230	5.6	18.6	18.6	18.6	0.0
I	4,145	40	255	5.1	18.7	18.7	19.2	0.5
J	4,372	60	345	3.7	19.9	19.9	20.2	0.3
K	4,726	65	445	2.9	22.0	22.0	22.0	0.0
L	4,916	20	185	7.1	22.1	22.1	22.1	0.0
M	5,127	30	290	4.5	22.3	22.3	22.7	0.4
N	5,243	40	325	4.0	22.3	22.3	22.9	0.6
O	5,375	30	255	4.7	23.3	23.3	23.9	0.6
P	5,697	35	280	4.4	24.1	24.1	24.5	0.4
Q	5,776	30	225	5.4	24.7	24.7	25.1	0.4
R	5,871	30	220	5.5	25.4	25.4	25.8	0.4
S	6,114	80	365	3.3	28.4	28.4	28.4	0.0
T	6,215	15	105	11.5	37.9	37.9	37.9	0.0
U	6,426	85	1,065	1.1	40.4	40.4	41.0	0.6
V	6,774	25	315	3.9	40.5	40.5	41.0	0.5
W	7,070	85	925	1.3	40.5	40.5	41.3	0.8
X	7,587	30	330	3.7	40.6	40.6	41.3	0.7

[1] Feet above Connecticut Valley Railroad

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

DEEP RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Deep River (continued)								
Y	7,769	45	515	2.4	41.1	41.1	41.8	0.7
Z	8,200	110	935	1.3	41.2	41.2	42.0	0.8
AA	8,701	130	1,085	1.1	41.2	41.2	42.1	0.9
AB	9,166	70	450	2.7	41.5	41.5	42.3	0.8
AC	9,404	20	220	5.6	42.3	42.3	42.8	0.5
AD	9,926	180	940	1.3	42.4	42.4	43.4	1.0
AE	10,988	235	1,760	0.7	44.4	44.4	44.4	0.0
AF	11,209	180	1,425	0.9	45.7	45.7	45.7	0.0
AG	11,774	305	2,155	0.6	45.8	45.8	45.8	0.0
AH	12,524	35	185	6.6	46.7	46.7	46.7	0.0
AI	13,110	80	220	4.9	50.0	50.0	50.3	0.3
AJ	13,475	30	105	10.5	55.9	55.9	56.2	0.3
AK	14,034	35	105	10.4	63.5	63.5	63.5	0.0
AL	14,414	20	105	10.2	71.3	71.3	71.4	0.1
AM	14,689	50	120	8.9	77.3	77.3	77.6	0.3
AN	14,884	30	170	6.4	84.0	84.0	84.5	0.5
AO	15,085	40	125	8.8	86.7	86.7	87.3	0.6
AP	15,307	55	125	8.7	112.9	112.9	112.9	0.0

[1] Feet above Connecticut Valley Railroad

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

DEEP RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Miner Brook								
N	8,275 [1]	30	137	3.0	184.2	184.2	184.4	0.2
O	8,495 [1]	86	315	1.3	186.9	186.9	186.9	0.0
P	8,800 [1]	17	49	8.4	190.6	190.6	190.6	0.0
Q	10,115 [1]	31	82	5.0	199.9	199.9	199.9	0.0
R	10,675 [1]	213	357	0.9	204.4	204.4	204.5	0.1
East Roundhill Brook								
G	4,545 [2]	233	967	0.4	126.1	126.1	126.3	0.2
H	5,165 [2]	92	124	3.4	126.1	126.1	126.3	0.2
I	5,865 [2]	187	221	1.9	128.3	128.3	128.9	0.6
J	7,065 [2]	10	30	9.9	141.5	141.5	141.5	0.0
K	7,335 [2]	13	36	8.3	146.2	146.2	146.6	0.4
L	7,475 [2]	72	292	1.0	150.4	150.4	151.0	0.6
M	8,015 [2]	10	30	9.9	158.9	158.9	159.5	0.6
N	9,165 [2]	15	34	8.7	190.3	190.3	190.3	0.0
O	10,465 [2]	30	36	6.3	217.7	217.7	217.7	0.0

[1] Feet above confluence with Mattabesset River

[2] Feet above confluence with Longhill Brook

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

EAST MINER BROOK AND EAST ROUNDHILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Roundhill Brook (continued)								
P	10,905 [1]	20	32	7.2	227.8	227.8	228.1	0.3
Q	11,400 [1]	30	54	4.3	238.6	238.6	238.8	0.2
R	11,780 [1]	7	13	6.9	244.0	244.0	245.0	1.0
East Swamp Brook								
A	1,120 [2]	181	403	0.7	23.3	17.0 [3]	17.0	0.0
B	1,540 [2]	291	987	0.3	23.3	19.3 [3]	19.3	0.0
C	2,520 [2]	158	424	0.4	23.3	19.9 [3]	19.9	0.0
D	3,810 [2]	199	291	0.6	23.3	23.0 [3]	23.0	0.0
E	5,700 [2]	15	20	4.6	39.8	39.8	39.8	0.0
F	6,460 [2]	20	40	1.3	43.8	43.8	44.5	0.7
G	7,170 [2]	20	11	4.4	47.1	47.1	47.1	0.0

[1] Feet above confluence with Longhill Brook

[2] Feet above confluence with Swamp Brook

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

EAST ROUNDHILL BROOK AND EAST SWAMP BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Eightmile River								
A	565[1]	290	1,611	1.8	57.3	57.3	58.3	1.0
B	1,020[1]	90	655	4.5	57.6	57.6	58.5	0.9
C	2,040[1]	130	720	4.1	61.8	61.8	62.6	0.8
D	2,850[1]	70	500	5.8	63.9	63.9	64.7	0.8
E	3,110[1]	370	1,970	1.5	64.8	64.8	65.8	1.0
F	3,690[1]	75	1,050	2.7	65.0	65.0	65.8	0.8
G	4,596[1]	170	1,070	2.7	68.5	68.5	69.2	0.7
H	5,425[1]	270	1,363	2.0	71.9	71.9	72.6	0.7
I	6,100[1]	90	370	7.2	73.4	73.4	73.8	0.4
J	7,280[1]	70	467	5.4	79.3	79.3	80.1	0.8
Falls River								
A	500[2]	333	2,427	1.1	13.8	13.8	14.8	1.0
B	760[2]	203	1,294	2.0	13.9	13.9	14.9	1.0
C	1,160[2]	132	1,361	1.9	14.0	14.0	15.0	1.0
D	1,295[2]	120	1,288	2.0	14.6	14.6	15.4	0.8
E	1,880[2]	150	1,374	1.9	16.4	16.4	17.4	1.0
F	2,700[2]	202	1,854	1.4	20.1	20.1	20.9	0.8

[1] Feet above Middlesex/New London county limits

[2] Feet above Falls River Pond Dam

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

EIGHTMILE RIVER AND FALLS RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Falls River (continued)								
G	3,342	200	1,227	2.1	20.3	20.3	21.1	0.8
H	3,511	214	1,993	1.3	20.6	20.6	21.4	0.8
I	3,750	125	1,428	1.8	21.2	21.2	22.0	0.8
J	4,750	212	1,972	1.3	21.3	21.3	22.1	0.8
K	5,300	200	1,902	1.4	21.7	21.7	22.6	0.9
L	6,100	190	1,653	1.4	21.7	21.7	22.6	0.9
M	6,320	150	877	2.6	22.0	22.0	22.9	0.9
N	6,480	192	1,792	1.3	22.3	22.3	23.2	0.9
O	6,830	78	886	2.5	22.7	22.7	23.7	1.0
P	7,130	80	906	2.5	22.8	22.8	23.7	0.9
Q	7,240	200	1,875	1.2	24.0	24.0	24.7	0.7
R	8,140	200	1,882	1.2	24.1	24.1	24.8	0.7
S	9,010	200	1,314	1.7	24.3	24.3	25.1	0.8
T	10,214	140	1,305	1.5	25.9	25.9	26.9	1.0
U	11,050	50	467	4.1	28.5	28.5	29.2	0.7
V	11,870	100	1,238	1.6	39.6	39.6	40.4	0.8
W	12,500	150	1,494	1.3	39.7	39.7	40.5	0.8
X	12,850	260	2,711	0.7	39.7	39.7	40.6	0.9

[1] Feet above Falls River Pond Dam

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

FALLS RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Falls River (continued)								
Y	13,710	160	1,644	1.2	39.8	39.8	40.7	0.9
Z	14,500	180	1,636	1.2	39.9	39.9	40.8	0.9
AA	15,620	200	2,077	0.9	40.0	40.0	41.0	1.0
AB	16,250	250	1,609	1.2	40.0	40.0	41.0	1.0
AC	17,160	40	275	7.0	45.7	45.7	46.6	0.9
AD	18,020	80	397	4.8	53.7	53.7	54.7	1.0
AE	19,296	110	875	2.2	59.4	59.4	60.3	0.9
AF	19,420	110	964	2.0	59.6	59.6	60.5	0.9
AG	21,700	36	308	6.2	73.9	73.9	74.9	1.0
AH	22,250	120	499	3.9	76.4	76.4	77.2	0.8
AI	23,810	420	1,145	1.3	78.2	78.2	79.1	0.9
AJ	24,700	430	1,143	1.3	79.3	79.3	80.1	0.8
AK	25,492	200	423	3.4	81.3	81.3	82.1	0.8
AL	26,740	50	332	4.4	90.9	90.9	91.8	0.9
AM	28,390	50	238	6.1	98.3	98.3	99.3	1.0
AN	29,280	150	550	2.6	103.1	103.1	104.1	1.0
AO	30,460	100	412	3.5	107.7	107.7	108.4	0.7

[1] Feet above Falls River Pond Dam

TABLE 14	FEDERAL EMERGENCY MANAGEMENT AGENCY **MIDDLESEX COUNTY, CT AND INCORPORATED AREAS**	**FLOODWAY DATA** **FALLS RIVER**

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Falls River (continued)								
AP	31,520 [1]	200	516	2.8	112.5	112.5	113.4	0.9
AQ	33,910 [1]	130	1,098	1.3	125.1	125.1	126.0	0.9
AR	34,489 [1]	130	580	2.5	125.2	125.2	126.1	0.9
AS	37,750 [1]	200	590	1.8	131.4	131.4	132.1	0.7
AT	39,450 [1]	100	939	1.2	152.9	152.9	153.8	0.9
AU	40,100 [1]	80	395	2.7	153.5	153.5	154.4	0.9
Fishing Brook								
A	400 [2]	190	837	0.9	10.3	10.3	10.3	0.0
B	725 [2]	160	1,172	0.7	14.9	14.9	14.9	0.0
C	1,425 [2]	410	3,267	0.2	14.9	14.9	14.9	0.0
D	2,825 [2]	255	1,322	0.6	14.9	14.9	15.9	1.0
E	3,400 [2]	118	656	1.2	15.3	15.3	16.3	1.0
F	3,815 [2]	131	826	0.9	16.2	16.2	17.2	1.0
G	4,180 [2]	478	1,926	0.9	17.0	17.0	17.9	0.9
H	5,980 [2]	172	746	1.7	18.0	18.0	18.8	0.8
I	6,730 [2]	179	358	3.5	21.9	21.9	21.9	0.0
J	6,830 [2]	119	178	6.9	25.7	25.7	25.7	0.0

[1] Feet above Falls River Pond Dam

[2] Feet above Dam Below Connecticut Turnpike, Route I-95

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

FALLS RIVER AND FISHING BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Great Brook								
A	354	250	305	3.0	9.8	8.4[2]	8.4	0.0
B	671	40	146	6.2	9.8	9.4[2]	9.4	0.0
C	1,082	145	492	1.8	20.2	20.2	20.2	0.0
D	1,394	26	87	10.3	21.1	21.1	21.1	0.0
E	1,732	43	108	8.3	31.5	31.5	31.5	0.0
F	1,922	32	95	9.5	35.4	35.4	35.4	0.0
G	2,086	21	82	11.0	40.4	40.4	40.4	0.0
H	2,545	20	80	11.3	53.2	53.2	53.2	0.0
I	2,994	32	125	7.2	60.0	60.0	60.9	0.9
J	3,210	20	80	11.2	64.5	64.5	64.5	0.0
K	3,585	30	135	6.7	81.3	81.3	81.5	0.2
L	3,823	30	119	7.6	82.4	82.4	82.6	0.2
M	3,955	126	499	1.8	86.8	86.8	86.8	0.0
N	4,324	70	164	5.5	89.3	89.3	89.3	0.0
O	4,625	45	134	6.7	92.2	92.2	92.7	0.5
P	5,000	23	46	8.1	95.5	95.5	95.5	0.0
Q	5,159	30	72	5.2	98.0	98.0	98.0	0.0
R	5,259	87	169	2.2	99.4	99.4	99.4	0.0

[1] Feet above confluence with Chester Creek

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

GREAT BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Great Brook (continued)								
S	5,834	25	99	3.8	100.1	100.1	100.1	0.0
T	6,241	25	104	3.6	100.7	100.7	101.1	0.4
U	6,347	136	282	1.3	102.7	102.7	102.8	0.1
V	6,563	27	83	4.5	103.2	103.2	103.4	0.2
W	6,795	20	117	7.7	105.7	105.7	106.7	1.0
X	7,144	20	137	6.6	107.7	107.7	108.6	0.9
Y	7,466	100	559	1.6	110.7	110.7	111.7	1.0
Z	7,582	30	139	6.5	110.6	110.6	111.5	0.9
AA	7,973	22	92	9.8	113.5	113.5	114.3	0.8
AB	8,427	29	95	9.5	121.1	121.1	121.5	0.4
AC	8,696	25	99	9.1	125.2	125.2	126.0	0.8
AD	9,013	20	88	10.9	129.8	129.8	130.5	0.7
AE	9,504	20	111	8.1	136.2	136.2	136.7	0.5
AF	9,570	56	113	8.0	142.2	142.2	142.2	0.0

[1] Feet above confluence with Chester Creek

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

GREAT BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hales Brook								
B	169 [1]	90	510	2.1	25.0	14.5 [3]	14.5	0.0
D	6,611 [1]	60	125	7.2	35.5	35.5	35.5	0.0
F	8,179 [1]	95	270	2.0	120.5	120.5	120.5	0.0
H	8,844 [1]	30	465	1.1	137.9	137.9	137.9	0.0
J	10,317 [1]	30	195	2.7	175.7	175.7	175.7	0.0
L	11,236 [1]	25	135	3.9	177.7	177.7	177.9	0.2
M	12,651 [1]	25	60	9.0	190.3	190.3	190.3	0.0
O	14,267 [1]	20	110	3.5	229.5	229.5	229.5	0.0
P	14,921 [1]	15	40	9.5	251.3	251.3	251.3	0.0
Hammonasset River - Lower Reach								
A	69 [2]	120	1,390	3.1	9.4	1.7 [4]	1.7	0.0
B	792 [2]	135	1,385	3.1	9.4	1.8 [4]	1.8	0.0
C	1,874 [2]	110	910	4.7	9.4	2.0 [4]	2.0	0.0
D	3,094 [2]	65	605	7.1	9.4	2.4 [4]	2.4	0.0
E	4,794 [2]	130	1,090	3.9	9.4	3.7 [4]	3.7	0.0
F	8,068 [2]	270	1,715	2.5	9.4	5.1 [4]	5.2	0.1

[1] Feet above mouth at Connecticut River
[2] Feet above U.S. Route 1
[3] Elevation computed without consideration of backwater effects from the Connecticut River
[4] Elevation computed without consideration of backwater effects from the Long Island Sound

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

HALES BROOK AND HAMMONASSET RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hammonasset River - Lower Reach (continued)								
G	9,129	140	935	4.6	9.4	6.1 [2]	6.1	0.0
H	9,314	85	515	8.4	9.4	6.6 [2]	6.7	0.1
I	9,536	110	805	5.1	9.4	7.8 [2]	7.9	0.1
J	9,868	110	965	4.3	9.4	9.2 [2]	9.3	0.1
K	10,090	100	975	4.2	11.6	11.6	11.6	0.0
L	11,204	100	920	4.5	12.1	12.1	12.6	0.5
M	12,223	500	3,415	1.2	12.5	12.5	13.5	1.0
N	13,195	500	2,960	1.4	12.7	12.7	13.6	0.9
O	14,779	185	1,595	2.6	13.1	13.1	13.9	0.8
P	16,484	120	1,135	3.6	14.0	14.0	14.8	0.8
Q	17,984	300	2,340	1.8	15.3	15.3	16.3	1.0
R	18,739	650	5,290	0.8	15.6	15.6	16.6	1.0
S	19,452	300	2,690	1.5	15.8	15.8	16.8	1.0

[1] Feet above U.S. Route 1

[2] Elevation computed without consideration of backwater effects from the Long Island Sound

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

HAMMONASSET RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Hammonasset River - Upper Reach								
A	222 [1]	105 [3]	818	3.5	51.1	51.1	52.1	1.0
B	1,155 [1]	65 [3]	439	6.6	55.4	55.4	56.4	1.0
C	2,555 [1]	77 [3]	438	6.6	64.5	64.5	65.0	0.5
D	4,530 [1]	50 [3]	286	10.0	104.4	104.4	105.4	1.0
E	5,530 [1]	86 [3]	360	8.0	116.7	116.7	117.7	1.0
F	8,000 [1]	37 [3]	245	11.6	160.7	160.7	161.7	1.0
G	12,590 [1]	48 [3]	318	9.0	212.0	212.0	213.0	1.0
H-AD [4]								
Hersig Brook								
A	1,280 [2]	15	48	10.8	192.0	192.0	192.9	0.9
B	1,540 [2]	*	1,182	0.4	200.1	200.1	200.1	0.0
C	2,560 [2]	*	202	2.6	209.0	209.0	209.0	0.0

[1] Feet above Chestnut Hill Road
[2] Feet above confluence with Allyn Brook
[3] This width extends beyond the county limits
[4] Floodway not computed
* Floodway coincident with channel banks

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

HAMMONASSET RIVER AND HERSIG BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Indian River								
A	174	30	330	3.6	9.4	8.7[2]	8.7	0.0
B	412	100	1,195	1.0	9.5	9.5	9.5	0.0
C	866	70	820	1.4	9.5	9.5	9.5	0.0
D	2,297	80	900	1.3	9.6	9.6	9.6	0.0
E	3,495	32	335	3.6	9.6	9.6	9.8	0.2
F	3,854	40	345	3.5	9.7	9.7	10.0	0.3
G	4,044	50	525	2.3	9.8	9.8	10.5	0.7
H	4,229	60	630	1.9	9.8	9.8	10.5	0.7
I	4,910	355	2,270	0.5	12.4	12.4	12.4	0.0
J	5,148	230	1,670	0.7	13.5	13.5	13.5	0.0
K	5,238	200	1,445	0.8	13.5	13.5	13.5	0.0
L	5,533	20	125	9.6	13.7	13.7	13.9	0.2
M	5,750	40	205	5.9	15.5	15.5	16.1	0.6
N	5,977	110	510	2.1	17.2	17.2	18.0	0.8
O	6,093	60	420	2.5	17.7	17.7	18.3	0.6
P	6,320	50	290	3.6	18.0	18.0	18.6	0.6
Q	6,642	30	115	9.3	21.2	21.2	21.4	0.2
R	7,297	115	485	2.2	26.0	26.0	26.0	0.0
S	7,899	200	775	1.4	26.2	26.2	26.2	0.0

[1] Feet above U.S. Route 1

[2] Elevation computed without consideration of backwater effects from the Long Island Sound

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

INDIAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Indian River (continued)								
T	8,242	90	355	3.0	26.3	26.3	26.6	0.3
U	8,828	270	995	1.1	26.5	26.5	27.3	0.8
V	9,504	210	590	1.8	27.2	27.2	28.1	0.9
W	10,333	160	640	1.7	29.8	29.8	30.5	0.7
X	10,935	120	350	3.0	32.5	32.5	33.2	0.7
Y	11,136	120	465	2.3	32.8	32.8	33.5	0.7
Z	11,400	55	235	4.5	33.1	33.1	33.7	0.6
AA	11,526	70	350	3.0	35.9	35.9	35.9	0.0
AB	11,885	30	190	5.5	36.3	36.3	36.5	0.2
AC	12,202	70	365	2.9	36.9	36.9	37.7	0.8
AD	12,434	80	335	3.2	37.5	37.5	38.3	0.8
AE	12,619	140	705	1.5	37.9	37.9	38.6	0.7
AF	13,332	125	390	2.7	38.7	38.7	39.4	0.7
AG	13,543	85	430	2.5	39.0	39.0	39.8	0.8
AH	13,828	105	200	5.3	39.5	39.5	39.8	0.3
AI	13,950	65	295	3.2	42.1	42.1	42.1	0.0
AJ	14,483	60	340	2.8	42.8	42.8	43.2	0.4
AK	15,291	200	970	1.0	43.5	43.5	44.1	0.6

[1] Feet above U.S. Route 1

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

INDIAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Lane District Brook								
A	0 [1]	686	2,830	0.1	360.6	360.6	360.7	0.1
B	1,890 [1]	59	55	5.4	363.1	363.1	363.1	0.0
C	2,040 [1]	79	436	0.7	367.4	367.4	367.4	0.0
D	4,670 [1]	222	430	0.7	367.5	367.5	367.6	0.1
E	4,750 [1]	237	439	0.7	367.5	367.5	367.7	0.2
F	5,420 [1]	23	61	4.9	367.8	367.8	368.2	0.4
G	5,550 [1]	119	322	0.9	370.7	370.7	370.7	0.0
H	7,400 [1]	12	33	9.2	376.1	376.1	376.6	0.5
Longhill Brook								
A	175 [2]	945	20,000	0.1	36.0	36.0	36.8	0.8
B	418 [2]	403	8,251	0.3	36.0	36.0	36.8	0.8
C	1,216 [2]	60	204	10.2	50.8	50.8	51.1	0.3
D	1,673 [2]	30	253	8.3	52.1	52.1	52.5	0.4
E	4,488 [2]	330	3,339	0.5	81.0	81.0	81.8	0.8
F	5,194 [2]	173	994	1.5	81.5	81.5	82.3	0.8
G	6,403 [2]	19	117	11.4	84.0	84.0	84.8	0.8
H	6,673 [2]	45	316	3.4	94.6	94.6	95.5	0.9

[1] Feet above confluence with Pond Meadow Brook

[2] Feet above confluence with Sumner Brook

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

LANE DISTRICT BROOK AND LONGHILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Longhill Brook (continued)								
I	6,991 [1]	105	238	4.5	102.2	102.2	103.0	0.8
J	7,531 [1]	32	156	6.9	119.4	119.4	119.4	0.0
K	9,403 [1]	29	149	7.2	151.8	151.8	152.5	0.7
L	9,994 [1]	40	164	6.3	156.3	156.3	156.7	0.4
M	10,726 [1]	27	119	8.7	164.3	164.3	164.9	0.6
N	11,309 [1]	241	1,018	1.0	165.8	165.8	166.8	1.0
O	12,362 [1]	29	149	6.2	171.1	171.1	171.6	0.5
P	13,314 [1]	53	255	3.4	177.7	177.7	178.4	0.7
Q	13,529 [1]	34	178	4.9	180.0	180.0	180.5	0.5
R	14,008 [1]	430	1,269	0.5	182.7	182.7	182.9	0.2
S	14,776 [1]	60	122	5.3	188.5	188.5	189.1	0.6
Longhill Brook Diversion Channel								
A	88 [2]	42	152	2.3	81.0	81.0	81.7	0.7
B	457 [2]	31	49	7.2	83.9	83.9	84.2	0.3
C	939 [2]	59	63	5.6	92.3	92.3	92.5	0.2

[1] Feet above confluence with Sumner Brook

[2] Feet above confluence with Longhill Brook

TABLE 14	FEDERAL EMERGENCY MANAGEMENT AGENCY **MIDDLESEX COUNTY, CT AND INCORPORATED AREAS**	**FLOODWAY DATA** **LONGHILL BROOK AND LONGHILL BROOK DIVERSION CHANNEL**

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY[2]	WITH FLOODWAY	INCREASE
Mattabesset River								
A	800	192	5,342	1.9	23.3	5.8	6.6	0.8
B	3,320	1000	6,577	1.6	23.3	6.1	6.9	0.8
C	6,550	1602	8,890	0.8	23.3	7.1	7.6	0.5
D	11,330	1050	6,580	1.1	23.3	7.7	8.3	0.6
E	15,500	1017	5,425	1.4	23.3	9.2	9.7	0.5
F	17,200	81	1,144	6.1	23.3	10.0	10.5	0.5
G	18,100	600	4,716	1.5	23.3	11.7	12.4	0.7
H	19,900	390	3,193	2.2	23.3	12.3	13.1	0.8
I	21,500	250	2,321	3.0	23.3	13.2	14.0	0.8
J	22,160	135	1,742	4.0	23.3	13.8	14.5	0.7
K	23,010	150	1,797	3.9	23.3	14.9	15.5	0.6
L	23,500	112	1,450	4.8	23.3	15.8	16.3	0.5
M	24,000	250	3,155	2.2	23.3	16.5	17.1	0.6
N	25,250	250	2,607	2.5	23.3	17.2	17.9	0.7
O	25,900	133	1,998	3.2	23.3	17.8	18.5	0.7
P	26,850	140	1,707	3.7	23.3	19.5	20.1	0.6
Q	27,740	113	1,597	4.0	23.3	20.6	21.3	0.7

[1] Feet above mouth at Connecticut River

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

MATTABESSET RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mattabesset River (continued)								
R	28,500	520	5,362	1.2	23.3	21.0 [3]	21.8	0.8
S	29,500	236	2,369	2.4	23.3	21.1 [3]	22.1	1.0
T	30,080	420	3,636	1.6	23.3	21.6 [3]	22.5	0.9
U	31,680	220 [2]	1,112	5.2	23.3	22.5 [3]	22.5	0.0
V	31,840	560 [2]	2,910	2.0	24.9	24.9	25.4	0.5
W	35,380	553 [2]	4,057	1.4	25.8	25.8	26.2	0.4
X	35,590	250 [2]	1,504	3.9	26.7	26.7	27.0	0.3
Y	36,485	223 [2]	1,853	3.1	27.3	27.3	27.5	0.2
Z	36,800	655 [2]	2,961	2.0	27.4	27.4	27.8	0.4
AA	38,490	482 [2]	2,676	2.2	28.2	28.2	28.4	0.2

[1] Feet above mouth at Connecticut River

[2] Width extends beyond county boundary

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

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

TABLE 14

FLOODWAY DATA

MATTABESSET RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Menunketesuck River								
A	48	233	1,981	1.1	9.4	1.5 [2]	1.5	0.0
B	787	140	1,245	1.7	9.4	1.5 [2]	1.5	0.0
C	2,212	360	2,475	0.9	9.4	1.6 [2]	1.6	0.0
D	3,105	100	922	2.3	9.4	1.6 [2]	1.6	0.0
E	3,231	73	437	4.9	5.7	2.2 [2]	2.2	0.0
F	4,863	150	1,004	2.1	5.7	3.3 [2]	3.3	0.0
G	6,801	60	574	3.6	5.7	4.1 [2]	4.4	0.3
H	8,210	70	720	2.9	5.7	4.7 [2]	5.5	0.8
I	11,014	175	1,570	1.3	5.7	5.1 [2]	5.1	0.0
J	11,209	90	1,255	1.5	10.8	10.8	10.8	0.0
K	12,075	110	1,500	1.3	10.9	10.9	10.9	0.0
L	12,815	150	2,045	0.9	10.9	10.9	10.9	0.0
M	13,184	40	530	3.7	11.1	11.1	11.1	0.0
N	13,543	95	1,215	1.6	11.2	11.2	11.2	0.0
O	14,161	110	1,310	1.5	11.2	11.2	11.3	0.1
P	14,995	160	1,860	1.0	12.6	12.6	12.6	0.0
Q	17,355	245	2,225	0.9	12.7	12.7	12.7	0.0
R	19,024	35	300	6.5	13.6	13.6	13.9	0.3
S	19,631	90	415	4.7	15.1	15.1	15.7	0.6

[1] Feet above U.S. Route 1

[2] Elevation computed without consideration of backwater from the Long Island Sound

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

MENUNKETESUCK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Menunketesuck River (continued)								
T	19,789	80	615	3.2	17.7	17.7	17.8	0.1
U	20,370	100	615	3.2	18.3	18.3	18.7	0.4
V	20,735	100	690	2.6	18.8	18.8	19.6	0.8
W	21,611	40	280	6.6	20.2	20.2	21.1	0.9
X	21,843	50	295	6.0	21.3	21.3	22.1	0.8
Y	21,928	120	675	2.6	22.8	22.8	23.5	0.7
Z	22,360	120	765	2.3	22.9	22.9	23.7	0.8
AA	23,031	150	770	2.3	23.2	23.2	24.1	0.9
AB	23,897	115	710	2.5	24.1	24.1	25.1	1.0
AC	24,035	70	445	3.9	24.5	24.5	25.3	0.8
AD	24,510	75	425	4.2	25.4	25.4	26.2	0.8
AE	25,133	80	440	4.0	28.1	28.1	28.8	0.7
AF	25,719	60	455	3.9	30.1	30.1	30.7	0.6
AG	26,162	45	325	5.5	30.8	30.8	31.7	0.9
AH	26,316	85	630	2.8	32.0	32.0	32.7	0.7
AI	26,696	180	1,430	1.2	32.4	32.4	33.1	0.7
AJ	27,826	510	1,955	0.9	32.5	32.5	33.5	1.0

[1] Feet above U.S. Route 1

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

MENUNKETESUCK RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Menunketesuck River (continued)								
AK	28,517 [1]	160	775	2.3	33.2	33.2	34.1	0.9
AL	28,750 [1]	100	545	3.2	33.8	33.8	34.6	0.8
AM	28,940 [1]	50	430	4.1	36.6	36.6	36.7	0.1
AN	29,610 [1]	60	280	6.3	37.2	37.2	38.0	0.8
AO	30,508 [1]	260	1,035	1.7	49.6	49.6	49.6	0.0
AP	31,078 [1]	70	415	4.3	52.3	52.3	53.1	0.8
AQ	31,511 [1]	45	320	5.5	54.1	54.1	54.9	0.8
AR	31,696 [1]	90	520	2.9	55.2	55.2	55.8	0.6
AS	32,256 [1]	20	160	9.6	56.7	56.7	57.7	1.0
Mill Creek								
A	708 [2]	60	470	2.9	14.7	7.4 [3]	7.8	0.4
B	1,489 [2]	40	135	10.2	14.7	7.9 [3]	7.9	0.0
C	2,175 [2]	30	115	11.8	18.9	18.9	18.9	0.0
D	3,527 [2]	30	175	7.9	48.2	48.2	49.2	1.0
E	5,650 [2]	30	125	11.1	93.3	93.3	93.3	0.0
F	7,086 [1]	30	120	8.6	111.4	111.4	112.0	0.6

[1] Feet above U.S. Route 1

[2] Feet above confluence with Connecticut River

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

MENUNKETESUCK RIVER AND MILL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mill Creek (continued)								
G	7,590 [1]	80	390	2.6	117.0	117.0	117.5	0.5
H	9,620 [1]	200	340	2.8	121.7	121.7	122.3	0.6
I	10,571 [1]	150	340	2.8	125.7	125.7	125.9	0.2
Miner Brook								
A	150 [2]	188	376	2.1	23.3	7.8 [3]	8.8	1.0
B	470 [2]	588	5,977	0.1	24.6	24.6	25.1	0.5
C	1,055 [2]	480	2,913	0.2	24.6	24.6	25.1	0.5
D	1,465 [2]	30	81	8.0	26.2	26.2	26.2	0.0
E	1,775 [2]	75	156	4.2	36.3	36.3	36.3	0.0
F	2,430 [2]	16	75	8.7	69.0	69.0	69.6	0.6
G	4,160 [2]	16	64	10.2	119.8	119.8	119.8	0.0
H	4,685 [2]	58	195	3.2	131.6	131.6	131.9	0.3
I	5,415 [2]	97	122	5.1	143.7	143.7	143.7	0.0
J	6,435 [2]	18	70	8.0	161.3	161.3	161.5	0.2
K	6,655 [2]	30	89	6.4	167.0	167.0	167.0	0.0
L	7,330 [2]	35	109	5.0	177.3	177.3	177.3	0.0
M	7,595 [2]	130	376	1.4	180.5	180.5	180.7	0.2

[1] Feet above confluence with Connecticut River
[2] Feet above confluence with Mattabesset River
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK AND MINER BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Moodus River								
A	1,732	130	377	7.2	13.8	2.7[2]	2.8	0.1
B	3,986	50	307	7.5	13.8	10.9[2]	11.6	0.7
C	4,250	30	263	8.7	17.2	17.2	17.2	0.0
D	4,467	50	563	4.1	17.6	17.6	18.4	0.8
E	6,046	30	266	8.6	32.0	32.0	32.0	0.0
F	8,400	60	228	10.1	75.9	75.9	75.9	0.0
G	8,744	50	211	10.9	93.9	93.9	94.0	0.1
H	9,134	30	382	6.0	115.0	115.0	115.0	0.0
I	9,757	70	230	10.0	116.5	116.5	116.5	0.0
J	9,852	180	1,150	2.0	125.1	125.1	125.1	0.0
K	10,233	80	260	8.8	126.0	126.0	126.1	0.1
L	10,993	140	289	5.9	140.1	140.1	140.1	0.0
M	11,294	40	196	8.7	142.3	142.3	142.3	0.0
N	11,590	40	256	6.6	152.7	152.7	152.7	0.0
O	11,864	50	300	5.7	158.3	158.3	158.3	0.0
P	12,260	30	356	4.8	173.5	173.5	173.5	0.0
Q	12,551	50	175	9.7	173.5	173.5	173.5	0.0
R	12,809	120	250	6.8	187.9	187.9	187.9	0.0
S	13,739	50	305	5.6	193.1	193.1	193.3	0.2

[1] Feet above confluence with Salmon River

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14	FEDERAL EMERGENCY MANAGEMENT AGENCY **MIDDLESEX COUNTY, CT AND INCORPORATED AREAS**	**FLOODWAY DATA** **MOODUS RIVER**

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Moodus River (continued)								
T	14,235 [1]	50	176	9.7	197.1	197.1	197.2	0.1
U	15,048 [1]	170	334	5.1	207.0	207.0	207.0	0.0
V	16,975 [1]	180	317	4.1	229.5	229.5	229.5	0.0
W	18,818 [1]	160	290	4.5	241.6	241.6	241.7	0.1
X	18,945 [1]	60	296	4.4	245.9	245.9	245.9	0.0
Y	21,664 [1]	30	81	9.8	336.5	336.5	336.5	0.0
Parmalee Brook								
A	4,300 [2]	281	696	1.1	155.0	155.0	155.1	0.1
B	5,300 [2]	50	168	4.4	155.9	155.9	156.4	0.5
C	5,470 [2]	134	174	4.3	156.8	156.8	156.8	0.0
D	7,535 [2]	27	131	5.7	165.8	165.8	166.7	0.9
E	7,710 [2]	250	1,094	0.7	169.8	169.8	169.8	0.0
F	9,700 [2]	24	75	9.9	215.1	215.1	215.2	0.1
G	9,800 [2]	36	201	3.7	221.6	221.6	221.6	0.0
H	10,880 [2]	99	350	2.1	222.4	222.4	222.9	0.5
I	13,610 [2]	100	159	4.6	235.2	235.2	235.2	0.0
J	14,820 [2]	80	157	4.7	247.5	247.5	247.9	0.4
K	15,950 [2]	100	253	2.9	253.9	253.9	254.3	0.4

[1] Feet above confluence with Salmon River

[2] Feet above confluence with Coginchaug River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

MOODUS RIVER AND PARMALEE BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Patchogue River								
A	90	80	595	1.8	9.4	1.5[2]	1.5	0.0
B	180	67	435	2.5	9.4	1.5[2]	1.5	0.0
C	1,125	80	549	2.0	9.4	1.6[2]	1.6	0.0
D	3,131	60	340	3.2	9.4	1.8[2]	1.8	0.0
E	5,185	70	432	2.5	9.4	2.4[2]	2.4	0.0
F	5,702	100	669	1.6	9.4	2.5[2]	2.5	0.0
G	5,840	60	442	2.5	9.4	3.7[2]	3.7	0.0
H	6,716	50	386	2.8	9.4	3.8[2]	3.8	0.0
I	7,793	60	532	2.1	9.4	3.9[2]	4.0	0.1
J	8,121	110	1,021	1.1	9.4	4.0[2]	4.1	0.1
K	8,268	40	379	2.9	9.4	4.5[2]	4.5	0.0
L	8,781	50	388	2.8	9.4	4.5[2]	4.5	0.0
M	8,997	50	355	3.1	9.4	4.6[2]	4.7	0.1
N	9,557	60	384	2.9	9.4	4.8[2]	4.8	0.0
O	10,116	60	417	2.6	9.4	4.9[2]	5.0	0.1

[1] Feet above U.S. Route 1

[2] Elevation computed without consideration of backwater effects from the Long Island Sound

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

PATCHOGUE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pattaconk Brook								
H	5,877	344	1,335	1.0	9.8	6.7[2]	7.4	0.7
I	6,721	90	614	2.2	14.6	14.6	14.6	0.0
J	7,044	70	643	2.2	19.9	19.9	20.9	1.0
K	7,308	40	273	5.1	19.9	19.9	20.9	1.0
L	7,508	30	126	10.9	21.5	21.5	21.6	0.1
M	7,703	24	179	7.7	23.5	23.5	24.3	0.8
N	7,920	24	157	8.8	25.1	25.1	25.2	0.1
O	8,944	70	290	4.8	42.5	42.5	43.5	1.0
P	9,140	53	163	8.5	47.4	47.4	47.4	0.0
Q	9,683	132	270	5.1	61.9	61.9	62.1	0.2
R	10,037	60	375	3.7	63.9	63.9	63.9	0.0
S	10,623	30	168	8.2	67.6	67.6	67.6	0.0
T	10,845	44	244	5.7	68.6	68.6	69.5	0.9
U	11,019	30	164	8.4	69.4	69.4	69.8	0.4
V	11,320	80	479	2.9	77.3	77.3	78.3	1.0
W	11,616	30	173	7.2	77.5	77.5	78.3	0.8
X	11,991	76	346	3.6	79.6	79.6	80.0	0.4
Y	12,107	280	1,067	1.2	82.6	82.6	82.6	0.0
Z	12,709	65	229	5.5	82.8	82.8	82.8	0.0

[1] Feet above Connecticut Valley Railroad

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

PATTACONK BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pattaconk Brook (continued)								
AA	13,031	127	421	3.0	88.5	88.5	89.4	0.9
AB	13,250	70	168	7.5	91.0	91.0	91.1	0.1
AC	13,385	73	221	5.7	93.2	93.2	93.2	0.0
AD	13,633	38	156	8.0	95.4	95.4	95.6	0.2
AE	13,754	63	504	2.5	105.5	105.5	106.5	1.0
AF	14,097	18	98	12.7	122.7	122.7	122.8	0.1
AG	14,361	35	303	4.1	132.4	132.4	132.4	0.0
AH	16,051	158	1,357	1.1	141.3	141.3	141.3	0.0
AI	17,683	55	236	6.5	148.8	148.8	149.5	0.7
AJ	17,841	85	226	6.8	152.5	152.5	152.5	0.0
AK	18,105	20	102	15.2	154.9	154.9	155.0	0.1
AL	18,343	54	289	5.3	159.3	159.3	160.0	0.7
AM	18,686	50	197	7.8	167.5	167.5	168.3	0.8
AN	18,902	60	362	4.3	170.0	170.0	170.2	0.2
AO	19,172	150	991	1.6	175.1	175.1	176.1	1.0
AP	19,304	35	149	10.3	177.3	177.3	177.5	0.2
AQ	19,456	96	239	6.4	180.7	180.7	181.0	0.3
AR	19,794	14	101	15.2	185.3	185.3	186.2	0.9

[1] Feet above Connecticut Valley Railroad

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

PATTACONK BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pattaconk Brook (continued)								
AS	20,449 [1]	30	185	8.3	206.7	206.7	207.4	0.7
AT	20,692 [1]	156	1,226	1.3	238.5	238.5	239.4	0.9
AU	21,077 [1]	159	1,404	1.1	238.6	238.6	239.4	0.8
AV	21,326 [1]	161	1,161	1.0	238.6	238.6	239.4	0.8
AW	22,493 [1]	324	2,092	0.5	241.0	241.0	241.0	0.0
AX	23,448 [1]	378	2,027	0.6	241.0	241.0	242.0	1.0
AY	24,959 [1]	452	1,952	0.6	241.1	241.1	242.0	0.9
Pocotopaug Creek								
A	42 [2]	14	73	11.8	287.7	287.7	287.7	0.0
B	1,690 [2]	267	1,028	0.8	292.1	292.1	293.1	1.0
C	3,501 [2]	136	230	3.6	295.5	295.5	296.0	0.5
D	4,530 [2]	161	491	1.0	299.3	299.3	300.1	0.8
E	5,428 [2]	14	42	9.3	304.5	304.5	304.7	0.2
F	7,170 [2]	22	58	6.7	339.4	339.4	339.8	0.4
G	7,904 [2]	15	43	9.1	353.2	353.2	353.2	0.0

[1] Feet above Connecticut Valley Railroad

[2] Feet above Old Chestnut Hill Road Bridge

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

PATTACONK BROOK AND POCOTOPAUG CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Pond Meadow Brook								
A	0[1]	196	123	8.1	321.7	321.7	322.5	0.8
B	100[1]	250	1,975	0.5	323.5	323.5	323.7	0.2
C	1,880[1]	254	290	3.4	359.3	359.3	359.3	0.0
D	3,450[1]	286	1,338	0.5	360.6	360.6	360.7	0.1
E	5,100[1]	145	103	6.8	374.2	374.2	374.2	0.0
F	6,420[1]	35	85	8.3	395.2	395.2	395.2	0.0
G	6,550[1]	131	442	1.6	401.4	401.4	401.4	0.0
Ponset Brook								
A	201[2]	70	285	11.8	17.1	2.2[3]	2.2	0.0
B	2,017[2]	130	807	4.1	17.1	9.4[3]	10.1	0.7
C	2,893[2]	70	280	11.9	41.2	41.2	41.2	0.0
D	3,390[2]	50	345	4.5	50.9	50.9	51.6	0.7
E	4,076[2]	40	140	8.2	59.4	59.4	59.4	0.0
F	5,132[2]	50	235	4.6	62.2	62.2	63.2	1.0
G	5,660[2]	40	250	4.7	63.4	63.4	64.3	0.9
I	9,958[2]	40	125	9.5	100.0	100.0	100.0	0.0

[1] Feet above downstream face of State Route 148

[2] Feet above confluence with Connecticut River

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

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

POND MEADOW BROOK AND PONSET BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Ponset Brook (continued)								
J	10,729	30	130	9.1	141.0	141.0	141.0	0.0
K	11,605	40	280	3.9	147.9	147.9	147.9	0.0
L	12,397	30	100	11.0	156.4	156.4	156.5	0.1
M	13,475	30	45	11.0	191.8	191.8	191.8	0.0
N	13,908	20	90	11.7	214.1	214.1	214.1	0.0
O	14,488	40	125	8.5	242.4	242.4	242.4	0.0
P	15,048	20	130	8.0	257.6	257.6	258.2	0.6
Q	15,481	20	85	11.6	267.9	267.9	267.9	0.0
R	15,703	30	205	4.9	271.0	271.0	271.1	0.1
S	16,727	60	145	6.8	279.2	279.2	279.3	0.1
T	17,540	30	95	10.0	311.0	311.0	311.0	0.0
U	17,889	70	160	5.9	322.1	322.1	322.2	0.1
V	18,860	100	135	6.8	334.7	334.7	334.8	0.1

[1] Feet above confluence with Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

PONSET BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Reservoir Brook								
B	227	200	690	2.6	25.0	15.6[2]	15.6	0.0
D	3,379	45	415	4.4	29.5	29.5	29.5	0.0
F	4,050	55	175	10.3	40.5	40.5	40.5	0.0
G	4,863	60	175	10.3	73.2	73.2	73.2	0.0
I	5,064	60	255	7.1	78.7	78.7	78.7	0.0
J	5,908	45	170	10.6	98.4	98.4	98.4	0.0
K	7,777	45	160	11.1	149.5	149.5	149.5	0.0
M	9,446	50	525	3.2	188.7	188.7	188.7	0.0
N	11,035	55	160	8.6	192.4	192.4	192.4	0.0
P	12,551	40	380	3.6	221.0	221.0	221.0	0.0
S	13,052	35	225	6.0	228.4	228.4	228.4	0.0
U	13,950	40	220	6.1	269.2	269.2	269.2	0.0
X	15,053	45	165	8.1	290.4	290.4	290.9	0.5

[1] Feet above mouth at Connecticut River

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

RESERVOIR BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Roundhill Brook								
A	120 [1]	10	64	13.5	87.3	87.3	88.3	1.0
B	620 [1]	24	105	8.2	93.5	93.5	94.1	0.6
C	1,580 [1]	160	870	1.0	120.8	120.8	120.8	0.0
D	2,090 [1]	200	1,088	0.7	120.8	120.8	120.8	0.0
E	2,490 [1]	183	1,394	0.6	123.0	123.0	123.0	0.0
F	3,890 [1]	222	520	1.5	123.0	123.0	123.0	0.0
Salmon River								
A	7,012 [2]	950	3,559	4.6	13.8	0.7 [3]	0.7	0.0
B	10,703 [2]	240	2,167	6.7	13.8	2.2 [3]	2.2	0.0
C	16,854 [2]	180	1,857	7.2	13.8	4.6 [3]	4.6	0.0
D	19,330 [2]	220	1,431	9.3	13.8	6.3 [3]	6.4	0.1
E	21,152 [2]	140	1,516	8.8	28.1	28.1	28.1	0.0
F	23,412 [2]	200	4,050	3.3	29.9	29.9	29.9	0.0
G	25,993 [2]	110	1,621	7.8	29.9	29.9	29.9	0.0

[1] Feet above confluence with Longhill Brook
[2] Feet above confluence with Connecticut River
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

ROUNDHILL BROOK AND SALMON RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Sawmill Brook								
A	1,910	127	431	7.8	26.4	26.4	27.0	0.6
B	2,870	50	277	12.2	32.3	32.3	32.6	0.3
C	4,520	121	475	6.8	43.5	43.5	44.1	0.6
D	6,100	203	617	5.2	58.4	58.4	58.4	0.0
E	7,500	46	580	2.2	68.9	68.9	69.5	0.6
F	8,654	158	311	4.2	70.0	70.0	70.1	0.1
G	10,679	26	132	8.9	81.7	81.7	82.2	0.5
H	11,381	138	808	1.4	91.4	91.4	92.4	1.0
I	12,916	41	171	5.0	95.7	95.7	96.4	0.7
J	13,926	79	144	5.8	107.4	107.4	107.8	0.4
K	15,706	64	129	6.5	123.3	123.3	123.7	0.4
L	16,241	49	118	6.9	137.5	137.5	137.8	0.3

[1] Feet above confluence with Mattabesset River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

SAWMILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shunpike Creek								
A	264[1]	40	90	3.4	23.3	3.6[3]	4.3	0.7
B	417[1]	400	1,075	0.3	23.3	10.2[3]	11.0	0.8
C	1,320[1]	150	100	3.2	23.3	13.5[3]	13.5	0.0
D	1,785[1]	200	820	0.4	24.4	24.4	24.4	0.0
E	2,249[1]	80	240	1.3	28.7	28.7	28.8	0.1
F	2,608[1]	35	70	4.0	30.3	30.3	30.3	0.0
G	2,841[1]	20	45	6.3	34.2	34.2	34.3	0.1
H	3,226[1]	20	80	3.4	42.3	42.3	42.6	0.3
I	5,143[1]	30	155	1.8	70.2	70.2	70.2	0.0
South Branch Great Brook								
A	16[2]	20	105	5.0	96.0	96.0	96.0	0.0
B	116[2]	57	177	3.0	100.2	100.2	100.2	0.0

[1] Feet above mouth at Mattabesset River
[2] Feet above Great Brook
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

SHUNPIKE CREEK AND SOUTH BRANCH GREAT BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Succor Brook								
A	290	30	99	6.6	12.1	5.3 [2]	6.0	0.7
B	1,088	30	87	7.5	12.8	12.8	12.9	0.1
Sumner Brook								
A	200	38	432	17.1	22.7	12.8 [2]	13.4	0.6
B	1,014	24	462	16.0	22.7	17.1 [2]	18.1	1.0
C	1,769	386	4,764	1.6	25.4	25.4	25.4	0.0
D	2,509	38	1,054	5.8	28.7	28.7	28.7	0.0
E	3,539	528	11,590	0.6	36.0	36.0	36.0	0.0
F	4,579	387	7,046	0.6	36.0	36.0	36.0	0.0
G	5,539	302	4,934	0.7	43.1	43.1	43.1	0.0
H	6,589	44	721	6.0	43.1	43.1	43.6	0.5
I	7,229	97	479	9.0	59.9	59.9	60.2	0.3
J	8,051	90	364	11.5	75.5	75.5	75.5	0.0
K	9,181	48	349	12.0	77.9	77.9	77.9	0.0
L	10,106	115	1,102	3.6	78.2	78.2	78.6	0.4
M	11,082	416	3,286	1.2	81.8	81.8	82.7	0.9
N	12,412	363	2,066	1.4	82.2	82.2	83.1	0.9

[1] Feet above confluence with Connecticut River

[2] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT
AND INCORPORATED AREAS

FLOODWAY DATA

SUCCOR BROOK AND SUMNER BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Sumner Brook (continued)								
O	12,547 [1]	390	3,444	0.8	82.4	82.4	83.3	0.9
P	14,177 [1]	533	2,509	1.0	82.7	82.7	83.5	0.8
Q	15,257 [1]	147	465	5.5	83.3	83.3	83.5	0.2
R	15,764 [1]	215	1,084	2.4	88.4	88.4	89.3	0.9
S	19,899 [1]	446	1,303	1.7	99.3	99.3	99.9	0.6
T	20,329 [1]	195	406	5.4	101.0	101.0	101.3	0.3
U	21,279 [1]	183	561	3.9	109.3	109.3	109.3	0.0
V	22,509 [1]	39	214	10.3	117.6	117.6	117.6	0.0
W	23,749 [1]	223	342	5.1	126.6	126.6	126.8	0.2
X	24,566 [1]	105	329	5.4	138.0	138.0	138.0	0.0
Y	26,661 [1]	98	244	5.1	162.6	162.6	162.7	0.1
Z	27,796 [1]	20	120	10.3	180.1	180.1	181.1	1.0
Swamp Brook								
A	600 [2]	145	807	1.0	23.3	9.0 [3]	10.0	1.0
B	1,315 [2]	14	87	9.4	23.3	9.0 [3]	9.4	0.4
C	2,185 [2]	205	913	0.9	23.3	11.1 [3]	11.4	0.3

[1] Feet above confluence with Connecticut River
[2] Feet above confluence with Mattabesset River
[3] Elevation computed without consideration of backwater effects from the Connecticut River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

SUMNER BROOK AND SWAMP BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
West Minor Brook								
A	525 [1]	54	55	4.4	186.3	186.3	186.3	0.0
B	985 [1]	41	57	4.2	193.3	193.3	193.3	0.0
C	1,320 [1]	131	300	0.7	195.9	195.9	196.3	0.4
D	2,390 [1]	43	49	4.1	202.0	202.0	202.0	0.0
West Roundhill Brook								
A	840 [2]	32	61	6.7	129.6	129.6	130.4	0.8
B	1,940 [2]	17	44	7.9	142.5	142.5	143.3	0.8
C	2,840 [2]	20	42	8.3	160.9	160.9	161.1	0.2
D	3,210 [2]	10	34	10.4	169.9	169.9	170.4	0.5
E	3,680 [2]	19	37	6.0	183.4	183.4	184.3	0.9
F	4,080 [2]	16	29	7.7	197.4	197.4	197.5	0.1

[1] Feet above confluence with Miner Brook
[2] Feet above confluence with Roundhill Brook

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

WEST MINER BROOK AND WEST ROUNDHILL BROOK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
West Swamp Brook								
D	4,503 [1]	160	558	1.5	23.3	14.1 [3]	14.8	0.7
E	5,403 [1]	28	73	8.2	23.3	15.3 [3]	15.9	0.6
F	5,963 [1]	396	2,688	0.2	24.4	24.4	24.4	0.0
G	6,863 [1]	90	131	4.6	24.4	24.4	24.4	0.0
H	7,593 [1]	120	272	2.2	27.2	27.2	28.2	1.0
I	8,393 [1]	90	136	3.5	32.9	32.9	32.9	0.0
J	9,313 [1]	61	389	1.2	42.9	42.9	43.2	0.3
K	10,343 [1]	118	135	3.5	49.4	49.4	49.4	0.0
L	10,913 [1]	210	681	0.6	62.6	62.6	62.7	0.1
Willow Brook								
A	169 [2]	30	465	1.3	23.3	22.5 [4]	22.5	0.0
B	718 [2]	15	195	2.7	23.3	22.6 [4]	23.0	0.4
C	792 [2]	130	1,060	0.5	23.3	22.7 [4]	23.3	0.6
D	1,162 [2]	65	295	1.6	23.3	22.7 [4]	23.3	0.6
E	1,536 [2]	30	140	3.4	26.2	26.2	27.0	0.8

[1] Feet above confluence with Mattabesset River
[2] Feet above mouth at Mattabesset River
[3] Elevation computed without consideration of backwater effects from the Connecticut River
[4] Elevation computed without consideration of backwater effects from the Mattabesset River

TABLE 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

MIDDLESEX COUNTY, CT AND INCORPORATED AREAS

FLOODWAY DATA

WEST SWAMP BROOK AND WILLOW BROOK

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. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance (100-year) floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such area, no BFEs or base flood depths are shown.

Zone AE

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

Zone AO

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

Zone AR

Area of special flood hazard formerly protected from the 100-year 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 100-year or greater flood event.

Zone A99

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

Zone V

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

Zone VE

Zone VE is the flood insurance risk zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance (500-year) floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance (100-year) floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

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

The countywide FIRM presents flooding information for the entire geographic area of Middlesex County. Previously, FIRMs were prepared for each incorporated community of the County identified as flood-prone. 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 are presented in Table 15, " Community Map History."

TABLE 15 - COMMUNITY MAP HISTORY

Community Name	Initial Identification	Flood Hazard Boundary Map Revisions Date	FIRM Effective Date	FIRM Revisions Date
Chester, Town of	September 7, 1973	November 5, 1976	July 16, 1980	February 2, 1990 August 28, 2008

TABLE 15 - COMMUNITY MAP HISTORY - continued

Community Name	Initial Identification	Flood Hazard Boundary Map Revisions Date	FIRM Effective Date	FIRM Revisions Date
Clinton, Town of	February 1, 1974	March 4, 1977	September 30, 1980	October 1, 1983 June 1, 1984 June 16, 1992 September 6, 1995 January 17, 1997 August 28, 2008
Cromwell, Town of	March 22, 1974	December 10, 1976	June 15, 1978	September 26, 1980 June 2, 1992 September 17, 1997 August 28, 2008
Deep River, Town of	December 28, 1973	December 3, 1976	January 16, 1981	August 28, 2008
Durham, Town of	November 29, 1974	None	April 1, 1982	August 28, 2008
E. Haddam, Town of	August 23, 1974	July 30, 1976	November 1, 1979	August 28, 2008
E. Hampton, Town of	May 10, 1974	July 19, 1977	October 16, 1979	August 28, 2008
Essex, Town of	October 26, 1973	August 20, 1976	July 16, 1980	March 4, 1986 August 28, 2008
Fenwick, Borough of	July 26, 1974[1]	None	July 3, 1978	January 18, 1984 August 28, 2008
Haddam, Town of	May 31, 1974	July 16, 1976	January 16, 1980	August 28, 2008
Killingworth, Town of	April 4, 1975	None	March 15, 1982	September 30, 1992 August 28, 2008
Middlefield, Town of	May 31, 1974	August 20, 1976	March 28, 1980	August 28, 2008
Middletown, City of	August 16, 1974	None	December 16, 1980	July 16, 1990 March 7, 2001 August 28, 2008
Old Saybrook, Town of	July 26, 1974	None	July 3, 1978	October 1, 1983 July 5, 1984 June 16, 1992 August 28, 2008
Portland, Town of	March 15, 1974	None	July 3, 1978	August 28, 2008
Westbrook, Town of	November 23, 1973	October 15, 1976	December 1, 1982	October 1, 1983 February 19,1986 June 16, 1992 August 28, 2008

[1] The Borough of Fenwick entered the Regular Program under the Town of Old Saybrook

7.0 OTHER STUDIES

An FIS and FIRM are being prepared for Hartford County, Connecticut.

Because it is based on more up-to-date analysis, this FIS supersedes the previously printed FISs for the Town of Chester (FEMA), Town of Clinton (FEMA), Town of Cromwell (FEMA), Town of Deep River (FEMA), Town of Durham (FEMA), Town of East Haddam (FIA), Town of East Hampton (FIA), Town of Essex (FEMA), Town of Haddam (FIA), Town of Killingworth (FEMA), Town of Middlefield (FEMA), City of Middletown (FEMA), Town of Old Saybrook (FIA), Town of Portland (FIA) and Town of Westbrook (FEMA), and the Wave Height Analysis-FIS supplements for the Town of Old Saybrook (FEMA) and the Borough of

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

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region I, 99 High Street, 6th Floor, Boston, Massachusetts 02110.

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