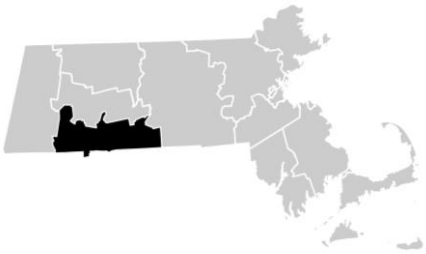
FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 5



HAMPDEN COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
AGAWAM, TOWN OF	250133	MONSON, TOWN OF	250145
BLANDFORD, TOWN OF	250134	MONTGOMERY, TOWN OF	250146
BRIMFIELD, TOWN OF	250135	PALMER, TOWN OF	250147
CHESTER, TOWN OF	250136	RUSSELL, TOWN OF	250148
CHICOPEE, CITY OF	250137	SOUTHWICK, TOWN OF	250149
EAST LONGMEADOW, TOWN OF	250138	SPRINGFIELD, CITY OF	250150
GRANVILLE, TOWN OF	250139	TOLLAND, TOWN OF	250151
HAMPDEN, TOWN OF	250140	WALES, TOWN OF	250152
HOLLAND, TOWN OF	250141	WEST SPRINGFIELD, TOWN OF	250155
HOLYOKE, CITY OF	250142	WESTFIELD, CITY OF	250153
LONGMEADOW, TOWN OF	250143	WILBRAHAM, TOWN OF	250154
LUDLOW, TOWN OF	250144		

REVISED:

June 7, 2023

FLOOD INSURANCE STUDY NUMBER
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Version Number 2.6.3.6

FEMA

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FLOOD INSURANCE STUDY REPORT
HAMPDEN COUNTY, MASSACHUSETTS

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were

built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as "Post-FIRM" buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community's regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Hampden County, Massachusetts**.**

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) sub-basins affecting each, are shown in Table 1. The FIRM panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

Table 1: Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Agawam, Town of	250133	01080201, 01080205, 01080206	25013C0377E 25013C0379E 25013C0381E 25013C0382E 25013C0383E 25013C0384E 25013C0387E 25013C0391E 25013C0392E[1] 25013C0401E 25013C0403E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Agawam, Town of (continued)	250133	01080201, 01080205, 01080206	25013C0404E 25013C0411E 25013C0413E	
Blandford, Town of	250134	01080206, 01080207	25013C0020E 25013C0038E 25013C0110E 25013C0118E 25013C0119E 25013C0120E 25013C0130E 25013C0131E 25013C0132E[1] 25013C0135E 25013C0140E 25013C0142E 25013C0144E 25013C0145E 25013C0153E 25013C0335E	
Brimfield, Town of	250135	01080204, 01100001	25013C0267E 25013C0269E 25013C0286E 25013C0287E 25013C0288F 25013C0289F 25013C0291E[1] 25013C0292F 25013C0293F 25013C0294F 25013C0457E 25013C0459E 25013C0476F 25013C0477F 25013C0478F 25013C0479F 25013C0481F 25013C0482F 25013C0483F 25013C0484F	
Chester, Town of	250136	1080206	25013C0009E 25013C0020E 25013C0027E 25013C0028E 25013C0029E 25013C0033E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Chester, Town of	250136	1080206	25013C0034E[1] 25013C0036E 25013C0037E[1] 25013C0038E 25013C0039E 25013C0041E 25013C0042E 25013C0043E 25013C0044E 25013C0130E 25013C0131E 25013C0132E[1]	
Chicopee, City of	250137	01080201, 01080204	25013C0192E 25013C0194E 25013C0203E 25013C0204E 25013C0208E[1] 25013C0209E 25013C0211E 25013C0212E 25013C0213E 25013C0214E 25013C0216E 25013C0217E 25013C0218E 25013C0401E	
East Longmeadow, Town of	250138	1080205	25013C0408E 25013C0409E 25013C0416E 25013C0417E 25013C0430E 25013C0440E	
Granville, Town of	250139	01080206, 01080207	25013C0140E 25013C0144E 25013C0145E 25013C0326E 25013C0328E 25013C0330E 25013C0335E 25013C0336E 25013C0337E 25013C0345E 25013C0352E 25013C0354E 25013C0355E 25013C0361E 25013C0362E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Hampden, Town of	250140	01080204, 01080205	25013C0430E 25013C0435E 25013C0440E 25013C0445E 25013C0453E 25013C0461E	
Holland, Town of	250141	1100001	25013C0479F 25013C0483F 25013C0484F 25013C0487F 25013C0490F[1] 25013C0491F 25013C0492F 25013C0495F	
Holyoke, City of	250142	01080201, 01080206	25013C0069E[1] 25013C0086E 25013C0088E 25013C0180E 25013C0181E 25013C0182E 25013C0183E 25013C0184E 25013C0191E 25013C0192E 25013C0201E 25013C0203E 25013C0204E 25013C0211E	
Longmeadow, Town of	250143	1080205	25013C0403E 25013C0404E 25013C0408E 25013C0411E 25013C0412E 25013C0413E 25013C0414E 25013C0416E	
Ludlow, Town of	250144	01080201, 01080204	25013C0207E 25013C0209E 25013C0217E 25013C0226E 25013C0227E[1] 25013C0228E 25013C0229E 25013C0231E 25013C0232E 25013C0233E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Ludlow, Town of	250144	01080201, 01080204	25013C0234E 25013C0236E 25013C0237E 25013C0240E 25013C0241E 25013C0242E 25013C0245E	
Monson, Town of	250145	01080204, 01080205, 01100002	25013C0245E 25013C0261E 25013C0262E 25013C0263E 25013C0264E 25013C0268E 25013C0269E 25013C0435E 25013C0451E 25013C0452E 25013C0453E 25013C0454E 25013C0456E 25013C0457E 25013C0458E 25013C0459E 25013C0461E 25013C0462E 25013C0466E[1] 25013C0467E	
Montgomery, Town of	250146	01080201, 01080206	25013C0151E 25013C0153E 25013C0155E 25013C0156E[1] 25013C0160E 25013C0162E 25013C0164E 25013C0170F	
Palmer, Town of	250147	1080204	25013C0234E 25013C0242E 25013C0245E 25013C0252E 25013C0253E 25013C0254E 25013C0256E 25013C0257E 25013C0258E 25013C0259E 25013C0261E 25013C0262E 25013C0263E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Palmer, Town of	250147	1080204	25013C0264E 25013C0266E 25013C0267E 25013C0268E 25013C0269E 25013C0276E 25013C0278E[1]	
Russell, Town of	250148	1080206	25013C0135E 25013C0142E 25013C0144E 25013C0151E 25013C0153E 25013C0155E 25013C0161E 25013C0162E 25013C0163E 25013C0164E 25013C0170F 25013C0335E 25013C0355E	
Southwick, Town of	250149	01080205, 01080206, 01080207	25013C0352E 25013C0354E 25013C0358E 25013C0359E 25013C0360F 25013C0362E 25013C0364E 25013C0366E 25013C0367E 25013C0368E 25013C0369E 25013C0378E 25013C0379E 25013C0386E 25013C0387E 25013C0502E 25013C0506E	
Springfield, City of	250150	01080201, 01080204, 01080205	25013C0213E 25013C0214E 25013C0216E 25013C0217E 25013C0218E 25013C0219E 25013C0236E 25013C0240E 25013C0401E 25013C0402E 25013C0404E	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Springfield, City of	250150	01080201, 01080204, 01080205	25013C0406E 25013C0407E 25013C0408E 25013C0409E 25013C0430E	
Tolland, Town of	250151	01080206, 01080207	25013C0114E 25013C0118E 25013C0119E 25013C0140E 25013C0302E 25013C0304E[1] 25013C0306E 25013C0307E 25013C0308E 25013C0309E 25013C0316E 25013C0317E 25013C0326E 25013C0328E 25013C0336E	
Wales, Town of	250152	01080204, 01100001, 01100002	25013C0459E 25013C0467E 25013C0478F 25013C0479F 25013C0486F 25013C0487F 25013C0490F[1]	
West Springfield, Town of	250155	01080201, 01080206	25013C0190F 25013C0191E 25013C0192E 25013C0193E 25013C0194E 25013C0213E 25013C0377E 25013C0381E 25013C0382E 25013C0383E 25013C0384E 25013C0401E 25013C0402E 25013C0403E 25013C0404E	
Westfield, City of	250153	01080201, 01080206	25013C0160E 25013C0163E 25013C0164E 25013C0170F 25013C0180E 25013C0190F	

[1] Panel Not Printed

Table 1: Listing of NFIP Jurisdictions (continued)

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Westfield, City of	250153	01080201, 01080206	25013C0191E 25013C0193E 25013C0352E 25013C0355E 25013C0358E 25013C0359E 25013C0360F 25013C0376F 25013C0377E 25013C0378E 25013C0379E	
Wilbraham, Town of	250154	01080204, 01080205	25013C0236E 25013C0237E 25013C0240E 25013C0241E 25013C0242E 25013C0245E 25013C0430E 25013C0435E	

[1] Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1-percent-annual-chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1-percent-annual-chance and 0.2-percent-annual-chance floodplains; and 1-percent-annual-chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance

purposes. Community map repository addresses are provided in Table 30, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

  The initial Countywide FIS Report for Hampden County became effective on July 16, 2013. Refer to Table 27 for information about subsequent revisions to the FIRMs.

- The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/national-flood-insurance-program-community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

- Previous FIS Reports and FIRMs may have included levees that were accredited as reducing the risk associated with the 1-percent-annual-chance flood based on the information available and the mapping standards of the NFIP at that time. For FEMA to continue to accredit the identified levees, the levees must meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled "Mapping of Areas Protected by Levee Systems."

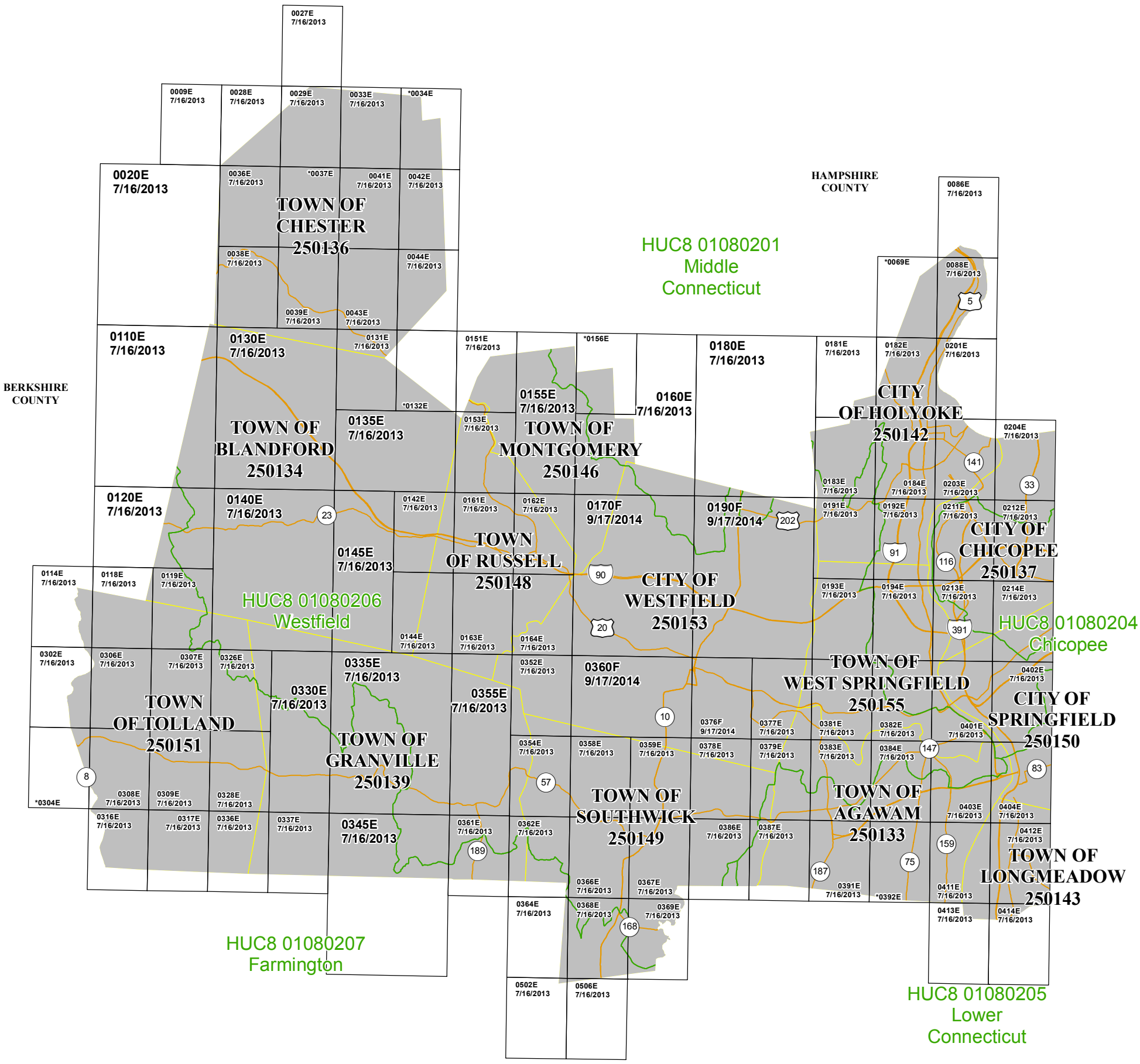
  Since the status of levees is subject to change at any time, the user should contact the appropriate agency for the latest information regarding levees presented in Table 8 of this FIS Report. For levees owned or operated by the U.S. Army Corps of Engineers (USACE), information may be obtained from the USACE National Levee Database (nld.usace.army.mil). For all other levees, the user is encouraged to contact the appropriate local community.

  Please also note that FEMA has identified one or more levees in this jurisdiction that have not been demonstrated by the community or levee owner to meet the requirements of 44 CFR 65.10, of the NFIP regulations as it relates to the levee's capacity to provide 1-percent-annual-chance flood protection. These levees are on FIRM panel(s) 25013C0203E on the Connecticut River. Please refer to Section 4.4 of this FIS Report for more information.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/online-tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Hampden County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, watershed boundaries, and USGS HUC-8 codes.

Figure 1: FIRM Index



ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before June 7, 2023.

N

1 inch = 3 miles

Miles
0 1 2 4 6

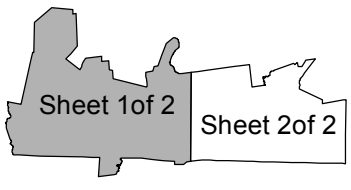
Map Projection:
State Plane Massachusetts Mainland FIPS 2001 Feet; North Amrican 1983; Western Hemisphere; Vertical Datum: NAVD 88

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX (Sheet 1 of 2)

HAMPDEN COUNTY, MASSACHUSETTS All Jurisdictions

PANELS PRINTED:

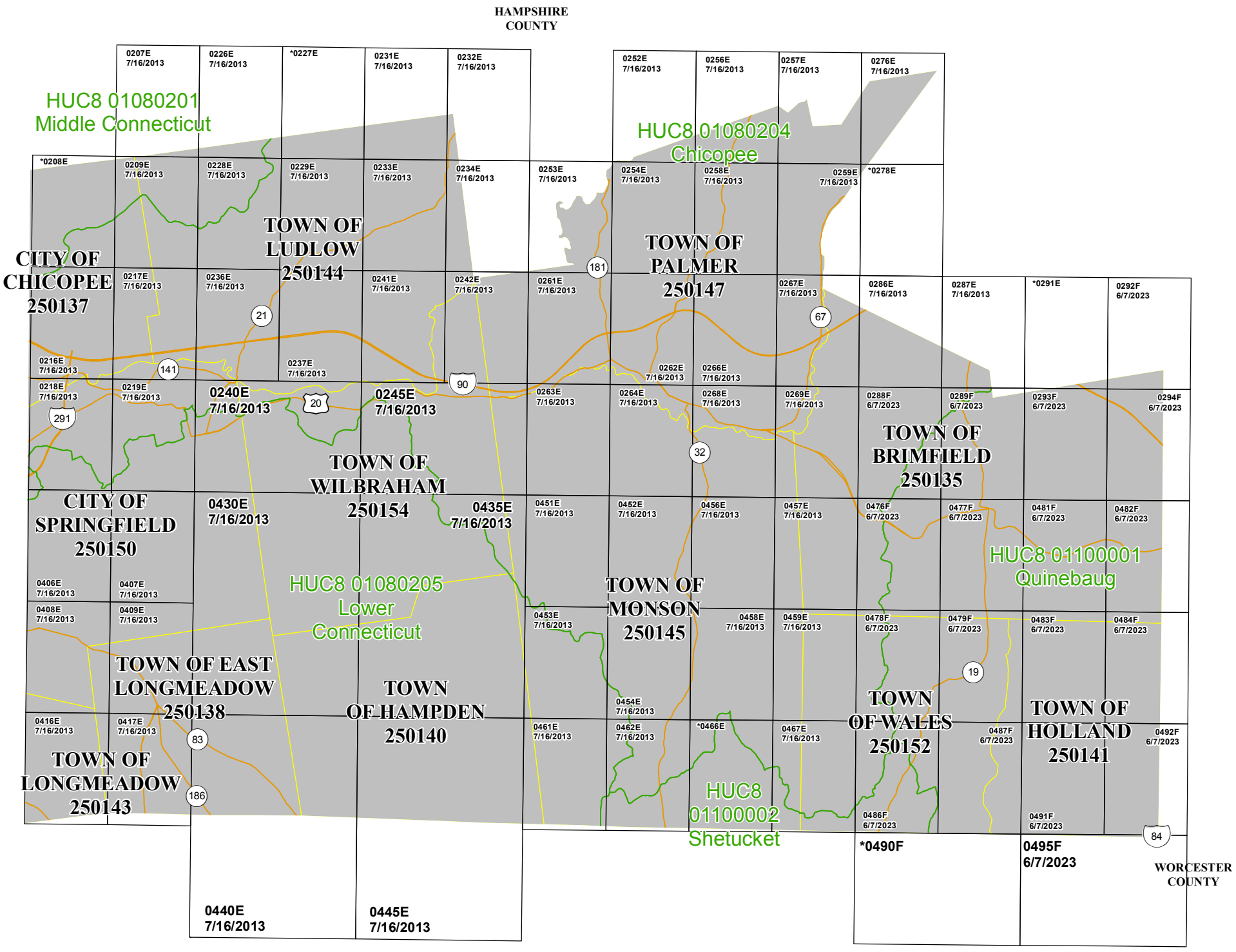
0009 , 0020 , 0027 , 0028 , 0029 , 0033 , 0036 , 0038 , 0039 , 0041 , 0042 , 0043 , 0044 , 0086 , 0088 , 0110 , 0114 , 0118 , 0119 , 0120 , 0130 , 0131 , 0135 , 0140 , 0142 , 0144 , 0145 , 0151 , 0153 , 0155 , 0160 , 0161 , 0162 , 0163 , 0164 , 0170 , 0180 , 0181 , 0182 , 0183 , 0184 , 0190 , 0191 , 0192 , 0193 , 0194 , 0201 , 0203 , 0204 , 0211 , 0212 , 0213 , 0214 , 0302 , 0306 , 0307 , 0308 , 0309 , 0316 , 0317 , 0326 , 0328 , 0330 , 0335 , 0336 , 0337 , 0345 , 0352 , 0354 , 0355 , 0358 , 0359 , 0360 , 0361 , 0362 , 0364 , 0366 , 0367 , 0368 , 0369 , 0376 , 0377 , 0378 , 0379 , 0381 , 0382 , 0383 , 0384 , 0386 , 0387 , 0391 , 0401 , 0402, 0403 , 0404 , 0411 , 0412 , 0413 , 0414 , 0502 , 0506

FEMA

MAP NUMBER
25013CIND1C

MAP REVISED
JUNE 7, 2023

Figure 1: FIRM Index



ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before June 7, 2023.

Map Projection:
State Plane Massachusetts Mainland FIPS 2001 Feet; North Amrican 1983; Western Hemisphere; Vertical Datum: NAVD 88

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX (Sheet 2 of 2)

HAMPDEN COUNTY, MASSACHUSETTS

PANELS PRINTED:

0207 , 0209 , 0216 , 0217 , 0218 , 0219 , 0226 , 0228 , 0229 , 0231 , 0232 , 0233 , 0234 , 0236 , 0237 , 0240 , 0241 , 0242 , 0245 , 0252 , 0253 , 0254 , 0256 , 0257 , 0258 , 0259 , 0261 , 0262 , 0263 , 0264 , 0266 , 0267 , 0268 , 0269 , 0276 , 0286 , 0287 , 0288 , 0289 , 0292 , 0293 , 0294 , 0406 , 0407 , 0408 , 0409 , 0416 , 0417 , 0430 , 0435 , 0440 , 0445 , 0451 , 0452, 0453 , 0454 , 0456 , 0457 , 0458 , 0459 , 0461 , 0462 , 0467 , 0476 , 0477 , 0478 , 0479 , 0481 , 0482 , 0483 , 0484 , 0486 , 0487 , 0491 , 0492 , 0495

FEMA

MAP NUMBER
25013CIND2C

MAP REVISED
JUNE 7, 2023

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Mapping and Insurance eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 27 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

Figure 2. FIRM Notes to Users

PROJECTION INFORMATION: The projection used in the preparation of the map was StatePlane Massachusetts Mainland FIPS 2001 Feet. The horizontal datum was the North American Datum of 1983 NAD83. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov.

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 30 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was derived from digital orthophotography provided by the NAIP. The imagery was flown in 2018 and was produced at 0.6 meter resolution. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Hampden County, MA, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 27 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

Figure 2. FIRM Notes to Users

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Hampden County, MA**,** effective June 7, 2023**.**

ACCREDITED LEVEE: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit www.fema.gov/national-flood-insurance-program.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Hampden County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.
	Regulatory Floodway determined in Zone AE.

Figure 3: Map Legend for FIRM

OTHER AREAS OF FLOOD HAZARD

Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.

Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.

Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.

Area with Flood Risk due to Levee: Areas where a non-accredited levee, dike, or other flood control structure is shown as providing protection to less than the 1% annual chance flood.

OTHER AREAS

Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

Unshaded Zone X: Areas of minimal flood hazard.

FLOOD HAZARD AND OTHER BOUNDARY LINES

Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)

Limit of Study

Jurisdiction Boundary

Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet

GENERAL STRUCTURES

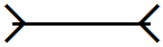
Aqueduct
Channel
Culvert
Storm Sewer

Channel, Culvert, Aqueduct, or Storm Sewer

Dam
Jetty
Weir

Dam, Jetty, Weir

Levee, Dike, or Floodwall



Bridge

Bridge

Figure 3: Map Legend for FIRM

REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
513	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad

Figure 3: Map Legend for FIRM

_____	Horizontal Reference Grid Line
⎯⎯	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
^{42}**76**^{000m}**E**	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 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 hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Hampden County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1-percent-annual-chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 22), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1-percent and 0.2-percent-annual-chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1-percent-annual-chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Hampden County, respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 12. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1-percent-annual-chance floodplain corresponds to the SFHAs. The 0.2-percent-annual-chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

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. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Within this jurisdiction, there are one or more levees that have not been demonstrated by the communities or levee owners to meet the requirements of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) as it relates to the levee's capacity to provide 1-percent-annual-chance flood protection. As such, the floodplain boundaries in this area are subject to change. Please refer to Section 4.4 of this FIS Report for more information on how this may affect the floodplain boundaries shown on this FIRM.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Austin Brook	Chester, Town of	Walker Brook	Approximately 1,000 feet upstream of W Main Street/ U.S. Highway 20	01080206	0.3		N	AE	Aug-81
Bradley Brook	Russell, Town of	Westfield River	Approximately 1,600 feet upstream of U.S. Highway 20/Huntington Road	01080206	0.8		Y	AE	Dec-90
Broad Brook	Ludlow, Town of	Chicopee River	Approximately 0.5 miles upstream of Piney Lane	01080204	1.4		N	AE	Jun-88
Broad Brook (Lower)	Holyoke, City of	Downstream City of Holyoke corporate limits	Farm Bridge	01080201	1.5		Y	AE	Mar-78
Broad Brook (Upper)	Holyoke, City of	Approximately 4.1 miles upstream of City of Holyoke corporate limits	Approximately 4.5 miles upstream of City of Holyoke corporate limits	01080201	0.4		N	AE	Mar-78
Browns Brook	Holland, Town of	Confluence with May Brook	Approximately 8,746 feet above confluence with May Brook	01100001	0.2		N	A	Jul-19
Chicopee Brook	Monson, Town of; Palmer, Town of	Quaboag River	Approximately 1.5 miles upstream of Main St/ State Highway 32	01080204	5.6		N	AE	Jul-96
Chicopee River	Chicopee, City of; Ludlow, Town of; Palmer, Town of; Springfield, City of; West Springfield, Town of; Wilbraham, Town of	Connecticut River	Ware River and Quaboag River	01080201, 01080204	18.2		N	AE	Mar-78

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Connecticut River	Agawam, Town of; Chicopee, City of; Holyoke, City of; Longmeadow, Town of; Springfield, City of; West Springfield, Town of	Agawam / Enfield corporate limits	Hampden County Boundary	01080205, 01080201	21.7		Y	AE	Nov-06
Foskett Mill Stream	Brimfield, Town of	Quaboag River	Approx 0.16 miles upstream U.S. Highway 20/ Palmer Road	01080204	0.7		N	AE	Feb-82
Great Brook	Southwick, Town of; Westfield, City of	Westfield River	Approximately 100 feet upstream of Berkshire Avenue (Lake Outlet)	01080206	9.8		N	AE	Jan-84
Higher Brook	Ludlow, Town of	Approximately 0.60 miles downstream of West Street	Approximately 160 feet upstream of US Hwy 21/Center Street	01080204	6.6		N	AE	Jun-88
Little River	Westfield, City of	Westfield River	City of Westfield corporate limits	01080206	8.2		N	AE	Nov-77
Longmeadow Brook	Longmeadow, Town of	Connecticut River	Approximately 600 feet above Shaker Road/ State Highway 192	01080205	2.5		N	AE	Jun-91
May Brook	Holland, Town of	Outlet of Hamilton Reservoir and Upstream from Maybrook Road	Approximately 9,997 feet above outlet of Hamilton Reservoir and upstream from Maybrook Road	01100001	0.8		N	A	Jul-19
May Brook	Holland, Town of	May Brook Road	2,500 feet upstream	01100001	0.5		Y	AE	Jul-81
Middle Branch of the Westfield River	Chester, Town of	Kinne Brook Road	Hampden County Boundary	01080206	4.6		N	AE	Aug-81

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Mill Brook	Brimfield, Town of	Confluence with Quinebaug River	Approximately 39,260 feet above confluence with Quinebaug River	01100001	7.4		N	A	Jul-19
Mill Brook-Unnamed Tributary 1	Brimfield, Town of	Confluence with Mill Brook	Approximately 4,636 feet above confluence with Mill Brook	01100001	0.9		N	A	Jul-19
Mountain Brook	Brimfield, Town of	Confluence with Mill Brook	Approximately 4,927 feet above confluence with Mill Brook	01100001	0.9		N	A	Jul-19
Munn Brook	Southwick, Town of; Westfield, City of	Little River	Approximately 2,300 feet upstream of covered bridge	01080206	4.3		N	AE	Nov-77
Ninemile Pond	Wilbraham, Town of	Entire length within Town of Wilbraham	Entire length within Town of Wilbraham	01080205		0.1	N	AE	Jun-88
North Branch Mill River	Springfield, City of; Wilbraham, Town of	South Face of Wilbraham Road bridge in Springfield	Approximately 0.25 miles upstream of N Main Street	01080205	11.9		N	AE	Jun-88
North Brook	Springfield, City of	North Branch Mill River	Approximately 2,000 feet upstream Parker Street	01080205	1.6		N	AE	Jun-91
Otis Wait Brook	Chester, Town of	West Branch of the Westfield River	Approximately 2,845 feet above confluence with West Branch of the Westfield River	01080206	0.5		N	AE	Aug-81
Potash Brook	Russell, Town of	Confluence with Westfield River	Russell corporate limits	01080206	3.6		N	AE	Dec-90

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Powdermill Brook	Westfield, City of	Railroad	Approximately 4,450 feet upstream of Lower Sandy Hill Road	01080206	2.5		N	AE	Nov-77
Quaboag River	Brimfield, Town of; Monson, Town of; Palmer, Town of	Chicopee River	Approximately 2 miles upstream Massachusetts Turnpike/ Interstate 90	01080204	13.1		N	AE	Feb-82
Quinebaug River	Brimfield, Town of; Holland, Town of	Approximately 300 feet downstream of Long Pond	Approximately 130 feet upstream of Sturbridge Road	01100001	6.1		N	A	Oct-19
Quinebaug River	Holland, Town of	Approximately 130 feet upstream of Sturbridge Road	Approximately 1,200 feet downstream of Holland Road	01100001	2.8		Y	AE	Oct-19
Quinebaug River-Unnamed Tributary 10	Holland, Town of	Confluence with Quinebaug River	Approximately 5,290 feet above confluence with Quinebaug River	01100001	1.0		N	A	Jul-19
Quinebaug River-Unnamed Tributary 7	Brimfield, Town of	Confluence with Quinebaug River	Approximately 29,968 feet above confluence with Quinebaug River	01100001	0.2		N	A	Jul-19
Quinebaug River-Unnamed Tributary 8	Brimfield, Town of	Confluence with Quinebaug River	Approximately 7,149 feet above confluence with Quinebaug River	01100001	1.4		N	A	Jul-19
Quinebaug River-Unnamed Tributary 9	Brimfield, Town of	Confluence with Quinebaug River	Approximately 1,865 feet above confluence with Quinebaug River	01100001	0.4		N	A	Jul-19
Sawmill Brook	Wilbraham, Town of	South Branch Mill River	Approximately 0.5 miles upstream of Soule Road	01080205	1.0		N	AE	Jun-88

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Scantic River	Hampden, Town of	State Boundary/ Tirbutary A	Approximately 0.4 miles upstream of Chapin Road	01080205	5.2		N	AE	May-78
Sessions Brook	Brimfield, Town of	Confluence with Sherman Brook	Approximately 4,041 feet above confluence with Sherman Brook	01100001	0.8		N	A	Jul-19
Sherman Brook	Brimfield, Town of	Cemetery Road in Brimfield	Approximately 1.74 miles upstream of Cemetery Road	01100001	1.7		Y	AE	Oct-79
Sherman Brook	Brimfield, Town of	Approximately 1.74 miles upstream Cemetery Road in Brimfield	Approximately 3.74 miles above confluence with Sherman Brook	01100001	2.0		N	A	Jul-19
Shurtleff Brook	Southwick, Town of	Munn Brook	Approximately 3,000 feet upstream of N Loomis Street	01080206	1.0		N	AE	Jan-84
South Branch Mill River	East Longmeadow, Town of; Hampden, Town of; Springfield, City of; Wilbraham, Town of	Northern most headwall of Plumtree Road bridge	Approximately 50 feet upstream of Sessions Drive	01080205	8.4		N	AE	Jun-91
Stevens Brook	Holland, Town of	Approximately 8,120 feet upstream of Hamilton Reservoir	Approximately 15,488 feet above confluence with Quinebaug River	01100001	2.9		N	A	Jul-19
Stevens Brook	Holland, Town of	Hamilton Reservoir	Approximately 8,120 feet above confluence with Hamilton Reservoir	01100001	1.5		Y	AE	Jul-81

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Still Brook	Agawam, Town of	Agawam corporate limits	Approximately 4,500 feet upstream of State Highway 187/ Pine Street	01080205	1.4		N	AE	Mar-77
Swift River	Palmer, Town of	Ware River	County Boundary	01080204	4.3		N	AE	Oct-79
Tannery Brook	Holyoke, City of	Connecticut River	Approximately 0.20 miles upstream of Kane Road	01080201	0.6		N	AE	Feb-79
Thayer Brook	Monson, Town of	Pulpit Rock Pond (Twelvemile Brook)	Approximately 50 feet above Lake Shore Drive	01080204	0.1		N	AE	Jul-96
Tributary A (Wilbraham)	Wilbraham, Town of	Chicopee River	Aproximately 0.1 miles upstream of Oxford Drive	01080204	0.7		N	AE	Jun-88
Tributary A to Scantic River	Hampden, Town of	Scantic River	Approximately 0.83 miles upstream	01080205	0.8		N	AE	May-78
Tributary A to Watchaug Brook	East Longmeadow, Town of	Watchaug Brook	Approximately 1.87 miles upstream	01080205	1.8		N	AE	Mar-78
Tributary C	Wilbraham, Town of	North Branch Mill River	Approximately 1.5 miles upstream of Miles Morgan Court	01080205	1.6		N	AE	Jun-88
Tributary to Great Brook	Southwick, Town of	Great Brook	Approximately 500 feet above Granville Road/ State Highway 57	01080206	0.4		N	AE	Jan-84
Twelvemile Brook	Monson, Town of	Monson corporate limits	Approximately 1,500 feet upstream of weir	01080204	0.8		N	AE	Jul-96
Valley Brook	Granville, Town of	See FIRMs	See FIRMs	01080207	3.8		N	A	Mar-12

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Wales Brook	Brimfield, Town of; Wales, Town of	Confluence with Mill Brook	Approximately 15,829 feet above confluence with Mill Brook	01100001	3.0		N	A	Jul-19
Wales Brook	Wales, Town of	Approximately 0.15 miles downstream of Holland Road in Wales	Approximately 2.89 miles upstream of Holland Road in Wales	01100001	3.4		Y	AE	Jul-79
Walker Brook	Chester, Town of	West Branch of the Westfield River	Hampden County Boundary	01080206	1.7		N	AE	Aug-81
Ware River	Palmer, Town of	Chicopee River	County Boundary	01080204	6.9		N	AE	Oct-79
Watchaug Brook	East Longmeadow, Town of; Hampden, Town of	East Longmeadow corporate limits	Approximately 0.25 miles upstream of Allens Street	01080205	3.3		N	AE	Mar-78
West Branch Farmington River	Tolland, Town of	Tolland corporate limits	Hampden County Boundary	01080207	8.9		N	AE	Aug-90
West Branch of the Westfield River	Chester, Town of	Town of Chester corporate limits	Hampden County Boundary	01080206	8.7		N	AE	Aug-81
West Brook	Brimfield, Town of	Confluence with Mill Brook	Approximately 5,282 feet above confluence with Mill Brook	01100001	1.0		N	A	Jul-19
Westfield River	Agawam, Town of; Montgomery, Town of; Russell, Town of; West Springfield, Town of; Westfield, City of	Connecticut River	Hampden County Boundary	01080205	25.2		N	AE	Dec-90
Willimansett Brook	Chicopee, City of	Mouth	Downstream of Mountain Lake	01080201	0.4		N	AE	Mar-78

Table 2: Flooding Sources Included in this FIS Report (continued)

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Zone A Flooding Sources (miscellaneous	Blandford, Town of; Granville, Town of; Montgomery, Town of	See FIRMs	See FIRMs	01080206 01080207	57.5		N	A	Mar-12
Zone A Flooding Sources (Black Brook, Borden Brook Reservoir, Cooley Lake, Granville Reservoir, miscellaneous)	Blandford, Town of; Granville, Town of; Montgomery, Town of	See FIRMs	See FIRMs	01080206 01080207		5.8	N	A	Mar-12
Zone A Flooding Sources	Agawam, Town of; Brimfield, Town of; Chester, Town of; Chicopee, City of; East Londmeadow, Town of; Hampden, Town of; Holland, Town of; Longmeadow, Town of; Ludlow, Town of; Monson, Town of; Palmer, Town of; Russell, Town of; Southwick, Town of; Springfield, City of; Tolland, Town of; Wales, Town of; West Springfield, Town of; Westfield, City of; Wilbraham, Town of; Wilbraham, Town of	See FIRMs	See FIRMs	01080201 01080204 01080205 01080206 01080207 01100001 01100002	N/A	N/A	N	A	1977-1991

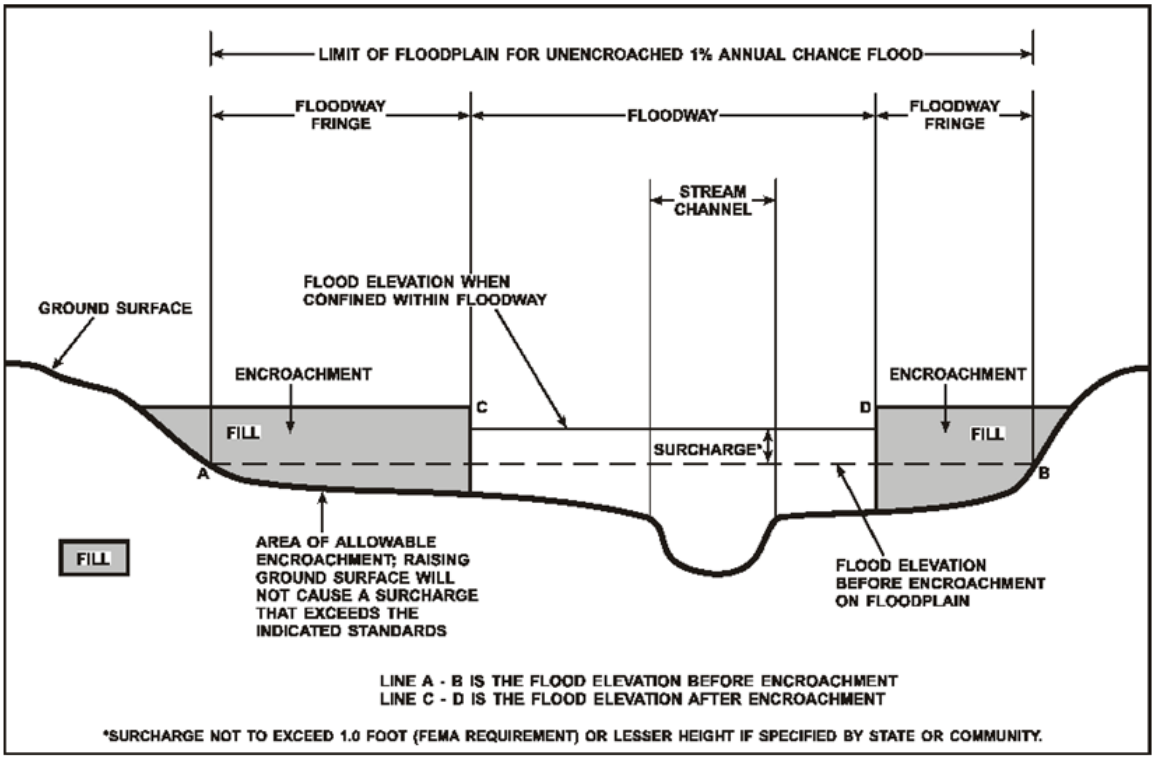
2.2 Floodways

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 balancing floodplain development against increasing flood hazard. With this approach, the area of the 1-percent-annual-chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1-percent-annual-chance flood. The floodway fringe is the area between the floodway and the 1-percent-annual-chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1-percent-annual-chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 23, “Floodway Data.”

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The BFE is the elevation of the 1-percent-annual-chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

BFEs are primarily intended for flood insurance rating purposes. Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. For example, the user may use the FIRM to determine the stream station of a location of interest and then use the profile to determine the 1-percent annual chance elevation at that location. Because only selected cross sections may be shown on the FIRM for riverine areas, the profile should be used to obtain the flood elevation between mapped cross sections. Additionally, for riverine areas, whole-foot elevations shown on the FIRM may not exactly reflect the elevations derived from the hydraulic analyses; therefore, elevations obtained from the profile may more accurately reflect the results of the hydraulic analysis.

2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

Figure 5: Wave Runup Transect Schematic

[Not applicable to this Flood Risk Project]

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

Figure 6: Coastal Transect Schematic

[Not applicable to this Flood Risk Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Hampden County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Agawam, Town of	A, AE, X
Blandford, Town of	A, X
Brimfield, Town of	A, AE, X
Chester, Town of	A, AE, X
Chicopee, City of	A, AE, X
East Longmeadow, Town of	A, AE, X
Granville, Town of	A, X
Hampden, Town of	A, AE, X
Holland, Town of	A, AE, X
Holyoke, City of	A, AE, X
Longmeadow, Town of	A, AE, X
Ludlow, Town of	A, AE, X
Monson, Town of	A, AE, X
Montgomery, Town of	A, AE, X
Palmer, Town of	A, AE, X
Russell, Town of	A, AE, X
Southwick, Town of	A, AE, X
Springfield, City of	A, AE, X
Tolland, Town of	A, AE, X
Wales, Town of	A, AE, X
West Springfield, Town of	A, AE, X
Westfield, City of	A, AE, X
Wilbraham, Town of	A, AE, X

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 4 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

Table 4: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Chicopee	01080204	Chicopee River	Drains into the Middle Connecticut watershed, affecting a large area in the north and eastern portion of Hampden County.	732
Farmington	01080207	West Branch Farmington River	Affects a small area in the southwest portion of Hampden County, including tributaries in parts of the towns of Southwick, Granville, Blandford and Tolland.	607
Lower Connecticut	01080205	Connecticut River	Upper portion of this watershed encompassing a south central area of Hampden County. The Mill River and other tributaries within the City of Springfield and Towns of Longmeadow, East Longmeadow, Agawam, Hampden and Wilbraham drain into the Connecticut River.	1,085
Middle Connecticut	01080201	Connecticut River	The lower portion of this watershed encompasses a narrow area within central Hampden County. This watershed drains into the Lower Connecticut HUC-8 watershed, through the Cities of Holyoke, Chicopee, and Springfield and the Town of West Springfield.	1,018
Quinebaug	01100001	Quinebaug River	Begins at the uppermost portion of the watershed encompassing the headwaters of the Quinebaug River in the eastern portion of Hampden County, and flows northheast into Worcester County, MA.	736

Table 4: Basins Characteristics (continued)

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Shetucket	01100002	Shetucket River	Uppermost portion of this watershed intersects a small area in southern Hampden County. Several streams drain into the state of Connecticut.	526
Westfield	01080206	Westfield River	Largest watershed within Hampden County, encompassing the majority of the western half of the county. Drains into the Connecticut River at its confluence with the Westfield River in the Town of Agawam.	519

4.2 Principal Flood Problems

Table 5 contains a description of the principal flood problems that have been noted for Hampden County by flooding source.

Table 5: Principal Flood Problems

Flooding Source	Description of Flood Problems
Connecticut River	Due to the large drainage area, the Connecticut River can have floods that inundate its floodplain for a day or longer. The steeper areas that occur along Longmeadow Brook create a situation of high velocities, which may result in flash flooding. Where Longmeadow Brook flattens, the floodplain becomes wider, and consequently, floods can inundate a large area. Low-lying areas within Hampden County are subject to periodic flooding.
Miscellaneous Flooding Sources within Hampden County	Flooding in Hampden County is primarily due to major storms which have occurred in nearly every month of the year. Northeasters are one of the most serious types of storms, generating very strong winds and heavy rain or snow. In winter, northeasters produce the heaviest snowfalls, and during fall and spring they are one of the most frequent causes of flooding. Some of the most severe floods have been those associated with hurricanes or tropical storms in the late summer or early fall. The most significant flood producing storms of this century were the hurricanes of September 1938, August 1955, and September 1960, and the non-hurricane storms of November 1927, March 1936, November 1953, March 1963, March 1968, and May 1984. A combined, total precipitation of over 18 inches associated with hurricanes Connie and Diane in 1955 created an unprecedented volume of runoff; a peak discharge of 34,300 cfs on the West Branch Farmington River was recorded at the New Boston gaging station (No. 018885500). The flood peak for the watershed has been estimated to have a recurrence interval which falls between 1- and 0.2-percent-annual-chance flood. The severity of the flood was compounded by the inexplicable release of 3-foot-high splashboards at Otis Reservoir (COMPASS 2014b).

Table 5: Principal Flood Problems (continued)

Flooding Source	Description of Flood Problems
Quinebaug River and tributaries	The most notable flooding event for the study reaches in the Quinebaug watershed was Hurricane Diane in August 1955. The New London County, Connecticut FIS report noted that a peak flow of 40,700 cfs was recorded at the mouth of the Quinebaug as a result of the storm. The watershed was also severely impacted by two extra-tropical storms in March 1936 and by two hurricanes in July and September of 1938. Five dams were put into operation by the U.S. Army Corps of Engineers (USACE) between 1958 and 1965 to mitigate flooding impacts, including the East Brimfield Dam in Sturbridge, Massachusetts, West Thompson Dam in Thompson, Connecticut, and Westville Dam in Southbridge, Massachusetts on the Quinebaug River; Hodges Village Dam in Oxford, Massachusetts on the French River; and the Buffumville Dam in Charlton, Massachusetts on the Little River (COMPASS 2013).

Table 6 contains information about historic flood elevations in the communities within Hampden County.

Table 6: Historic Flooding Elevations

[Not applicable to this Flood Risk Project]

4.3 Non-Levee Flood Protection Measures

Table 7 contains information about non-levee flood protection measures within Hampden County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

Table 7: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Bear Hole Reservoir	N/A	Dam	West Springfield, Town of	N/A
Broad Brook	Alden Pond Dam	Dam	Ludlow, Town of	N/A
Chicopee Brook	C. F. Church Company Dam Spillway	Dam	Monson, Town of	N/A
Chicopee Brook	Concrete Building Support	Wing Wall	Monson, Town of	N/A
Chicopee Brook	Creamer Brook Vicinity Dam	Dam	Monson, Town of	N/A
Chicopee Brook	Ellis Co Dam	Dam	Monson, Town of	N/A
Chicopee Brook	Ellis Co No. 1 Mill Building	Wing Wall	Monson, Town of	N/A
Chicopee Brook	Ellis Co No. 2 Mill Building	Wing Wall	Monson, Town of	N/A
Chicopee River	Collins Company Dam	Dam	Ludlow/Wilbraham	N/A

Table 7: Non-Levee Flood Protection Measures (continued)

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Chicopee River	N/A	Dam	Chicopee, City of	N/A
Chicopee River	N/A	Dam	Ludlow/Springfield	N/A
Chicopee River	N/A	Dam	Chicopee, City of	N/A
Chicopee River	Ludlow Dam	Dam	Ludlow/Wilbraham/Springfield	N/A
Chicopee River	Red Bridge Dam	Dam	Ludlow/Wilbraham	N/A
Connecticut River	Holyoke Dam	Dam	Holyoke, Town of	N/A
Connecticut River	Submerged Wooden Dam	Dam	Holyoke, Town of	N/A
Higher Brook	Holyoke St Dam	Dam	Ludlow, Town of	N/A
Little River	N/A	Dam	Russell, Town of	N/A
Little River	Lower Stevens Dam	Dam	Westfield, Tcity of	N/A
Little River	Upper Stevens Dam	Dam	Westfield, Tcity of	N/A
Longmeadow Brook	N/A	Dam	Longmeadow, Town of	N/A
Middle Branch of the Westfield River	N/A	Dam	Chester, Town of	N/A
North Branch Mill River	N/A	Dam	Springfield, City of	N/A
Potash Brook	N/A	Dam	Russell, Town of	N/A
Powdermill Brook	N/A	Dam	Westfield, City of	N/A
Pulpit Rock Pond	Spillway	Control Structure	Monson, Town of	N/A
Scantic River	Breached Stone Dam	Dam	Hampden, Town of	N/A
Scantic River	N/A	Dam	Hampden, Town of	N/A
Scantic River	Stone Dam	Dam	Hampden, Town of	N/A
South Branch Mill River	N/A	Dam	Springfield, City of	N/A
Swift River	Otis Company Dam	Dam	Palmer, Town of	N/A
Twelvemile Brook	N/A	Dam	Monson, Town of	N/A
Twelvemile Brook	N/A	Weir	Monson, Town of	N/A
Quinebaug River	N/A	Dam	Town of Holland	N/A
Unnamed Stream	N/A	Dam	Westfield, City of	N/A

Table 7: Non-Levee Flood Protection Measures (continued)

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Wales Brook	Lake George Outlet	Dam	Town of Wales	N/A
Wales Brook	Laurel Hill Rd Dam	Dam	Town of Wales	N/A
Ware River	N/A	Dam	Palmer, Town of	N/A
Ware River	N/A	Dam	Palmer, Town of	N/A
Westfield River	N/A	Dam	Russell/Montgomery	N/A
Westfield River	Dam No. 193	Dam	Russell, Town of	N/A
Westfield River	Dam No. 193	Dam	Russell, Town of	N/A
Westfield River	Dam No. 196	Dam	Russell, Town of	N/A
Westfield River	Strathmore Paper Company Dam	Dam	Agawam/West Springfield	N/A

4.4 Levees

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces the risk from the 1-percent-annual-chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate FIRM flood zone.

Levee systems that are determined to reduce the risk from the 1-percent-annual-chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with Section 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee's certification status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3 and in Table 8. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system no longer meets Section 65.10, FEMA will de-accredit the levee system and issue an effective FIRM showing the levee-impacted area as a SFHA.

FEMA coordinates its programs with USACE, who may inspect, maintain, and repair levee systems. The USACE has authority under Public Law 84-99 to supplement local efforts to repair flood control projects that are damaged by floods. Like FEMA, the USACE provides a program to allow public sponsors or operators to address levee system maintenance deficiencies. Failure to do so within the required timeframe results in the levee system being placed in an inactive status in the USACE Rehabilitation and Inspection Program. Levee systems in an inactive status are ineligible for rehabilitation assistance under Public Law 84-99.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levees that exist within Hampden County. Table 8, “Levees,” lists all accredited levees, PALs, and de-accredited levees shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports.

Please note that the information presented in Table 8 is subject to change at any time. For that reason, the latest information regarding any USACE structure presented in the table should be obtained by contacting USACE and accessing the USACE National Levee Database. For levees owned and/or operated by someone other than the USACE, contact the local community shown in Table 30.

Please note that FEMA has identified levees in this jurisdiction that have not been demonstrated by the community or levee owner to meet the requirements of 44 CFR 65.10 of the NFIP regulations as it relates to the levee’s capacity to provide 1-percent-annual-chance flood protection. Levees and their accreditation status are listed in Table 8 of this FIS Report.

Table 8: Levees

Community	Flooding Source	Levee Location	Levee Owner	USACE Levee	Levee ID	Covered Under PL84-99 Program?	FIRM Panel(s)
Chicopee, City of	Chicopee River	N/A	N/A	N/A	N/A	N/A	25013C0212E, 25013C0213E, 25013C0214E
Chicopee, City of; Holyoke, City of; Longmeadow, Town of; Springfield, City of; West Springfield, Town of	Connecticut River	N/A	N/A	N/A	N/A	N/A	25013C0192E, 25013C0194E, 25013C0203E, 25013C0204E, 25013C0211E, 25013C0213E, 25013C0401E, 25013C0402E, 25013C0404E
West Springfield, Town of; Westfield, City of	Westfield River	N/A	N/A	N/A	N/A	N/A	25013C0170F, 25013C0190F, 25013C0376F, 25013C0382E, 25013C0384E, 25013C0401E, 25013C0403E

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 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-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2-percent-annual-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 chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 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 community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

In addition to these flood events, the “1-percent-plus”, or “1%+”, annual chance flood elevation has been modeled and included on the flood profile for certain flooding sources in this FIS Report. While not used for regulatory or insurance purposes, this flood event has been calculated to help illustrate the variability range that exists between the regulatory 1-percent-annual-chance flood elevation and a 1-percent-annual-chance elevation that has taken into account an additional amount of uncertainty in the flood discharges (thus, the 1% “plus”). For flooding sources whose discharges were estimated using regression equations, the 1%+ flood elevations are derived by taking the 1-percent-annual-chance flood discharges and increasing the modeled discharges by a percentage equal to the average predictive error for the regression equation. For flooding sources with gage- or rainfall-runoff-based discharge estimates, the upper 84-percent confidence limit of the discharges is used to compute the 1%+ flood elevations.

The engineering analyses described here incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 26, “Incorporated Letters of Map Change”, which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, “FIRM Revisions.”

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for

each stream is provided in Table 12. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 9. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 10. Stream gage information is provided in Table 11.

Table 9: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Austin Brook	At confluence with Walker Brook	1.4	180	*	350	470	*	860
Bradley Brook	At mouth	10.8	2,800	*	5,100	6,400	*	10,200
Broad Brook	At confluence with Chicopee River	14.3	410	*	700	860	*	1,370
Broad Brook (Lower)	At Holyoke-Southampton corporate limits	3.3	170	*	250	300	*	400
Broad Brook (Lower)	Upstream of Keys Road	2.3	130	*	190	220	*	300
Broad Brook (Upper)	Upstream of Cherry Street Extension	1.0	70	*	100	115	*	150
Chicopee Brook	At confluence with Quaboag River	23.7	1,370	*	3,000	4,120	*	8,420
Chicopee Brook	At Ellis Mill No.1	15.1	450	*	980	1,430	*	3,200
Chicopee River	At mouth	721.0	11,000	*	23,800	32,500	*	63,000
Chicopee River	At USGS gage no. 01177000	688.0	10,800	*	23,400	32,000	*	62,100
Chicopee River	At USGS gage at Indian Orchard	688.0	10,795	*	23,400	32,000	*	62,000
Chicopee River	At Springfield- Wilbraham corporate limits	684.9	10,760	*	23,320	31,890	*	61,890
Chicopee River	At Collins Company Dam	678.0	10,680	*	23,140	31,650	*	61,420
Chicopee River	At Red Bridge Dam	659.2	10,460	*	22,260	30,990	*	60,140
Connecticut River	At confluence of Westfield River	9575.0	137,000	*	179,000	197,000	*	241,000
Connecticut River	At confluence of Chicopee River	9046.0	135,000	*	175,000	193,000	*	235,000
Connecticut River	At Holyoke’s upstream corporate limits	8275.0	132,000	*	170,000	187,000	*	226,000
Foskett Mill Stream	At confluence with the Quaboag River	10.1	614	*	1,030	1,255	*	1,944

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Foskett Mill Stream	Above State Route 20	8.0	481	*	804	977	*	1,508
Great Brook	At mouth	24.7	600	*	900	1,000	*	1,300
Great Brook	At State Route 57	23.1	780	*	1,300	1,600	*	2,500
Great Brook	At outlet of Congammond Lakes	11.0	50	*	110	165	*	230
Hamilton Reservoir	At spillway	14.8	1,400	*	2,200	3,000	*	4,200
Higher Brook	At Chicopee-Ludlow corporate limits	10.3	375	*	650	800	*	1,260
Higher Brook	At Fish and Game Club Road	5.0	150	*	260	320	*	505
Little River	Above mouth	84.0	6,800	*	14,600	19,300	*	35,900
Little River	At Lower Dam	81.0	6,600	*	14,200	18,900	*	35,000
Little River	At Upper Dam	77.7	6,400	*	13,800	18,300	*	34,000
Little River	At confluence of Munn Brook	56.5	5,100	*	11,100	14,700	*	27,200
Longmeadow Brook	At confluence with Connecticut River	5.3	189	*	320	403	*	660
Longmeadow Brook	At confluence of Mill Brook	4.1	160	*	272	342	*	554
May Brook	At outlet of Hamilton Reservoir	5.9	1,050	*	1,750	2,000	*	2,900
Middle Branch Westfield River	At Goss Heights gaging station No. 01180500	53.0	7,000	*	14,700	19,800	*	38,000
Middle Branch Westfield River	At Kinne brook Road	49.0	6,700	*	14,000	18,900	*	36,000
Middle Branch Westfield River	At Town of Chester corporate limits	34.0	5,300	*	11,200	15,000	*	29,000
Munn Brook	At mouth	21.7	1,300	*	2,200	2,600	*	3,700

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Munn Brook	At Westfield-Southwick corporate limits	19.2	1,300	*	2,200	2,600	*	3,700
Munn Brook	Upstream of confluence with Shurtleff Brook	14.3	800	*	1,340	1,630	*	2,500
Ninemile Pond	At downstream limit of study	1.4	6	*	6	6	*	6
Ninemile Pond	At upstream limit of study	1.3	70	*	110	120	*	170
North Branch Mill River	At Wilbraham Road	13.9	430	*	690	820	*	1,130
North Branch Mill River	Above Fox Road	11.5	380	*	610	720	*	1,000
North Branch Mill River	Above Loon Pond Brook	10.2	350	*	560	670	*	920
North Branch Mill River	Above Park Street	9.8	320	*	515	610	*	840
North Branch Mill River	At Springfield-Wilbraham corporate limits	8.3	260	*	390	460	*	620
North Branch Mill River	Downstream of confluence with Tributary C	5.9	240	*	350	400	*	515
North Branch Mill River	At upstream limit of study	2.4	140	*	220	250	*	330
North Brook	Downstream of North Branch Parkway culvert	1.1	55	*	70	75	*	80
North Brook	Upstream of North Branch Parkway culvert	1.1	70	*	100	110	*	140
North Brook	Above Lumae Street	0.5	46	*	62	72	*	87
North Brook	Above Parker St	0.2	25	*	35	40	*	50
Otis Wait Brook	At confluence with West Branch of the Westfield River	1.6	200	*	400	530	*	980

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Potash Brook	At mouth	6.6	2,000	*	3,600	4,500	*	7,200
Potash Brook	At Dickinson Hill Road	2.4	970	*	1,770	2,200	*	3,540
Powdermill Brook	At mouth	19.1	75	*	750	1,000	*	1,400
Quaboag River	At confluence with the Chicopee River	210.0	4,205	*	9,120	12,470	*	24,205
Quaboag River	Upstream of confluence with Chicopee Brook	179.0	3,265	*	7,060	9,645	*	18,456
Quaboag River	At West Brimfield USGS gage	151.0	2,475	*	5,080	6,850	*	13,510
Quinebaug River	At East Brimfield Dam	61.8	43	44	45	46	47	48
Sawmill Brook	Upstream of confluence with South Branch Mill River	2.8	190	*	300	350	*	480
Sawmill Brook	At upstream limit of study	2.5	180	*	290	340	*	470
Scantic River	At State Line Sommers, CT	26.7	1,130	*	1,978	2,442	*	3,700
Scantic River	Above Tributary A	25.1	1,072	*	1,879	2,320	*	3,500
Scantic River	At Somers Road	23.2	1,031	*	1,806	2,229	*	3,326
Scantic River	Above West Brook	21.7	1,007	*	1,776	2,198	*	3,300
Scantic River	Above Big Brook	17.5	858	*	1,502	1,851	*	2,810
Sherman Brook	1,200 feet below State Route 2	6.0	336	*	574	703	*	1,094
Shurtleff Brook	At mouth	2.9	500	*	900	1,200	*	1,900
South Branch Mill River	Above Park Street	9.7	450	*	740	870	*	1,250
South Branch Mill River	Above White Oak Road	8.3	415	*	680	810	*	1,170

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
South Branch Mill River	At Springfield-East Longmeadow corporate limits	7.1	360	*	590	700	*	1,010
South Branch Mill River	Upstream from Tributary C	5.5	305	*	490	580	*	815
South Branch Mill River	At East Longmeadow-Hampden corporate limits	5.3	310	*	500	600	*	860
South Branch Mill River	At Hampden-Wilbraham corporate limits	5.2	310	*	500	600	*	850
South Branch Mill River	Downstream of confluence with Sawmill Brook	4.4	270	*	410	475	*	630
South Branch Mill River	At Wilbraham- Hampden corporate limits	1.7	80	*	110	120	*	160
South Branch Mill River	Upstream of confluence with Sawmill Brook	1.6	80	*	110	120	*	160
Stevens Brook	At outlet to Hamilton Reservoir	4.3	440	*	750	870	*	1,250
Still Brook	Regional Frequency Analysis	5.9	340	*	540	630	*	880
Swift River	At confluence with Ware River	216.0	1,420	*	3,090	4,210	*	8,180
Swift River	Upstream of confluence with Jabish Brook	196.0	620	*	1,360	1,850	*	3,590
Tannery Brook	900 feet North of Lower Westfield Road	0.8	97	*	139	156	*	200
Tannery Brook	700 feet South of Westfield Road	0.4	45	*	63	69	*	87
Thayer Brook	At inlet to Pulpit Rock Lake upstream of confluence with Twelvemile Brook	1.3	105	*	160	195	*	285
Tributary A (East Longmeadow)	At confluence with Watchaug Brook	3.7	180	*	270	310	*	410

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Tributary A (East Longmeadow)	At upstream State Route 20	1.7	90	*	120	140	*	180
Tributary C	At upstream confluence with North Branch Mill River	1.9	130	*	200	230	*	310
Tributary C	At upstream limit of study	1.1	90	*	140	160	*	220
Tributary To Great Brook	At mouth	0.9	350	*	610	730	*	1,100
Twelvemile Brook	At Dam (outlet) from Pulpit Rock Lake	6.8	300	*	500	605	*	850
Twelvemile Brook	At inlet to Pulpit Rock Lake upstream of confluence with Thayer Brook	5.3	255	*	420	510	*	720
Wales Brook	At Brimfield State Forest	4.7	272	*	472	581	*	901
Wales Brook	At Holland Road	3.6	206	*	360	443	*	688
Wales Brook	At Sizer Drive	3.0	164	*	289	356	*	553
Wales Brook	At Laurel Hill Road	2.2	92	*	165	203	*	311
Wales Brook	At State Route 19 near school	2.0	81	*	145	180	*	274
Wales Brook	At Lake George Outfall	1.2	20	*	40	50	*	70
Wales Brook	At Lake George Road	0.4	53	*	94	116	*	185
Walker Brook	At confluence with West Branch Westfield River	19.0	1,400	*	2,700	3,400	*	5,800
Walker Brook	At gaging station No. 01180800	3.0	380	*	740	940	*	1,600
Ware River	At Three Rivers	337.0	5,890	*	12,780	17,470	*	33,910
Ware River	Upstream of confluence with Swift River	219.0	5,000	*	10,850	14,840	*	28,800

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Watchuag Brook	At Somer, CT Town line	7.4	345	*	545	645	*	900
Watchuag Brook	Upstream from Tributary A	3.6	190	*	285	330	*	450
Watchuag Brook	Upstream from Tributary F	2.8	155	*	230	265	*	350
Watchuag Brook	At cross section H	2.3	140	*	210	240	*	330
Watchuag Brook	At East Longmeadow- Hampden corporate limits	1.9	120	*	185	215	*	280
Watchuag Brook	Above Tributary B	1.1	85	*	125	145	*	190
West Branch Farmington River	At downstream Tolland corporate limits	103.0	7,300	*	18,000	26,200	*	60,200
West Branch Farmington River	At New Boston gaging station	92.0	6,600	*	16,400	23,800	*	55,000
West Branch Farmington River	At upstream Tolland corporate limits	49.0	4,000	*	9,900	14,400	*	33,200
West Branch Westfield River	At Huntington gaging station No. 01181000	94.0	11,900	*	23,000	29,500	*	50,000
West Branch Westfield River	At downstream corporate limits	88.0	11,400	*	22,100	28,300	*	48,000
West Branch Westfield River	At upstream corporate limits	48.0	4,000	*	9,900	14,400	*	33,200
Westfield River	At confluence of Connecticut River (Modified Conditions)	517.0	19,800	*	68,500	50,200	*	92,500
Westfield River	At Westfield gaging station (Natural Conditions)	497.0	32,500	*	60,500	80,000	*	145,000
Westfield River	At USGS Gage No. 01183500 (Natural Conditions)	497.0	31,700	*	61,400	80,000	*	148,000
Westfield River	At USGS Gage No. 01183500 (Modified Conditions)	497.0	19,300	*	37,500	48,800	*	90,000

Table 9: Summary of Discharges (continued)

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% + Annual Chance	0.2% Annual Chance
Westfield River	Below Little River	452.0	16,000	*	38,500	68,000	*	150,000
Westfield River	At Westfield River, Fowler St. Extension	360.0	14,900	*	38,500	58,000	*	135,000
Westfield River	Below Route 90	354.0	13,600	*	38,500	60,000	*	141,000
Westfield River	At upstream corporate limits	140.0	14,800	*	34,800	50,000	*	109,000
Westfield River	At upstream of confluence with Potash Brook	128.0	14,700	*	31,700	43,700	*	88,000
Westfield River	At downstream corporate limits	108.0	14,600	*	26,600	33,000	*	53,000
Willimansett Brook	At mouth	4.5	260	*	410	470	*	650

*Not calculated for this Flood Risk Project

Figure 7: Frequency Discharge-Drainage Area Curves

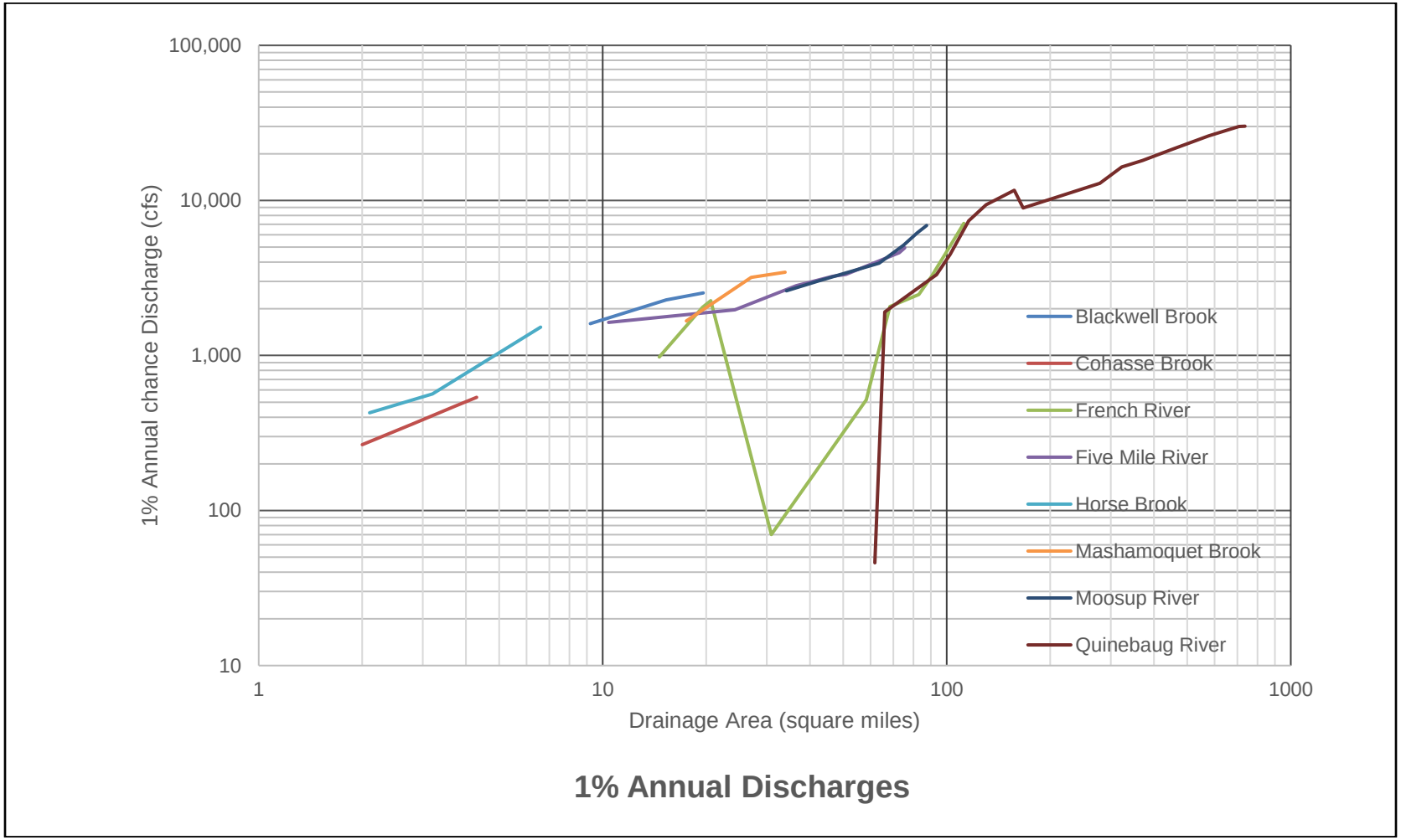


Table 10: Summary of Non-Coastal Stillwater Elevations

[Not applicable to this Flood Risk Project]

Table 11: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Blackwell Brook	01126600	USGS	Blackwell Brook near Brooklyn, CT	17.0	4/1/1962	1/26/1976
Browns Brook	01124750	USGS	Browns Brook near Webster, MA	0.5	3/27/1963	3/13/1977
Connecticut River	01171910	USGS	Broad Brook	N/A	1967	N/A
Connecticut River	01177000	USGS	Chicopee River Bircham Bend	N/A	1928	1938
Connecticut River	01177000	USGS	Chicopee River Indian Orchard	N/A	1938	N/A
Connecticut River	01170500	USGS	Connecticut River in Montague City, MA	N/A	1904	2004
Connecticut River	01172003	USGS	Connecticut River below power dam at Holyoke	N/A	1983	N/A
Connecticut River	01172010	USGS	Connecticut River at I-391	N/A	2002	N/A
Connecticut River	01184000	USGS	Connecticut River in Thompsonville, CT	N/A	1929	2004
Connecticut River	01190070	USGS	Connecticut River in Hartford, CT	N/A	1929	2004
Connecticut River	01193000	USGS	Connecticut River in Middletown, CT	N/A	1947	2004
Connecticut River	01173500	USGS	Gibbs Crossing	N/A	1913	N/A
Connecticut River	01180500	USGS	Goss Heights	N/A	1936	1978
Connecticut River	01181000	USGS	Huntington	N/A	1936	1978

Table 11: Stream Gage Information used to Determine Discharges (continued)

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Connecticut River	01183810	USGS	Longmeadow Brook	N/A	1964	N/A
Connecticut River	01178000	USGS	Mill River at Springfield	N/A	1938	1999
Connecticut River	unknown	USGS	Sykes Brook	N/A	1946	1974
Fivemile River	1126000	USGS	Fivemile River at Killingly, CT	57.8	3/12/1936	4/6/1984
French River	1124350	USGS	French River below dam, at Hodges Village, MA	31.2	4/4/1962	10/23/1989
French River	1125000	USGS	French River at Webster, MA	86	3/19/1936	3/1/1981
Little River	1124500	USGS	Little River near Oxford, MA	27.4	4/13/1940	1/31/1990
Little River	1125490	USGS	Little River at Harrisville, CT	35.8	3/19/1936	3/27/2015
Mashamoquet Brook	1125600	USGS	Mashamoquet Brook at Abington, CT	11.1	3/6/1963	1/28/1976
Moosup River	1126500	USGS	Moosup River at Moosup, CT	83.6	11/11/1932	4/6/1984
Pachaug River	1126950	USGS	Pachaug River at Pachaug, CT	53	3/12/1936	2/4/1973
Quinebaug River	1123360	USGS	Quinebaug River BL E Brimfield Dam at Fiskdale, MA	62.6	3/18/1936	2/26/2016
Quinebaug River	1123600	USGS	Quinebaug River BL Westville Dam near Southbridge, MA	94.4	3/30/1963	2/25/2016
Quinebaug River	1124000	USGS	Quinebaug River at Quinebaug, CT	155	4/1/1932	1/28/2015
Quinebaug River	1124151	USGS	Quinebaug River at West Thompson, CT	172	4/6/1967	4/6/2015
Quinebaug River	1125500	USGS	Quinebaug River at Putnam, CT	328	3/26/1930	4/6/2015

Table 11: Stream Gage Information used to Determine Discharges (continued)

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Quinebaug River	1127000	USGS	Quinebaug River at Jewett City, CT	713	4/18/1919	3/28/2015

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. 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.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed in Table 23, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 12. Roughness coefficients are provided in Table 13. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 12: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Austin Brook	Walker Brook	Approximately 1,000 feet upstream of W Main Street/ U.S. Highway 20	OTHER	OTHER	Aug-81	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Bradley Brook	Westfield River	Approximately 1,600 feet upstream of U.S. Highway 20/Huntington Road	OTHER	OTHER	Dec-90	AE w/ Floodway	Discharge frequencies were derived by drainage area ratio to the 0.7 power multiplied by the discharge frequencies computed for the long-term USGS West Branch Gage No. 01183500. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Broad Brook	Chicopee River	Approximately 0.5 miles upstream of Piney Lane	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Broad Brook (Lower)	Downstream City of Holyoke corporate limits	Farm Bridge	OTHER	OTHER	Mar-78	AE w/ Floodway	USGS Gage No. 01171910 was used to aid in defining frequency-discharge relationships. Peak discharges calculated using weighted average log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Broad Brook (Upper)	Approximately 4.1 miles upstream of City of Holyoke corporate limits	Approximately 4.5 miles upstream of City of Holyoke corporate limits	OTHER	OTHER	Mar-78	AE	USGS Gage No. 01171910 was used to aid in defining frequency-discharge relationships. Peak discharges calculated using weighted average log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Browns Brook	Confluence with May Brook	Approximately 8,746 feet above confluence with May Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Chicopee Brook	Quaboag River	Approximately 1.5 miles upstream of Main St/ State Highway 32	Regression Equations	OTHER	Jul-96	AE	Discharges were developed from a regional correlation of annual peak flow data from gaging station records for Mt. Hope River at Warrenille, CT. Natural discharges were modified to account for the degree of flood control by Conant Brook Dam and Reservoir. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Chicopee River	Connecticut River	Ware River and Quaboag River	OTHER	OTHER	Mar-78	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Connecticut River	Agawam / Enfield corporate limits	Hampden County Boundary	HEC-HMS 3.0 and up (Dec 2005)	HEC-RAS 3.1.1 and up	Nov-06	AE w/ Floodway	An interior drainage analysis was performed on those areas protected by levees along the main stem of the Connecticut River. No tributaries were restudied. Peak flood discharges for this restudy of the Connecticut River were developed by the USGS 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.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Foskett Mill Stream	Quaboag River	Approx 0.16 miles upstream U.S. Highway 20/ Palmer Road	Regression Equations	OTHER	Feb-82	AE	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Great Brook	Westfield River	Approximately 100 feet upstream of Berkshire Avenue (Lake Outlet)	Regression Equations	OTHER	Jan-84	AE	Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Higher Brook	Approximately 0.60 miles downstream of West Street	Approximately 160 feet upstream of US Hwy 21/Center Street	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Little River	Westfield River	City of Westfield corporate limits	OTHER	OTHER	Nov-77	AE	Gage Analysis completed for hydrology. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Longmeadow Brook	Connecticut River	Approximately 600 feet above Shaker Road/ State Highway 192	Regression Equations	HEC-2 4.6.2 (May 1991	Jun-91	AE	
May Brook	Outlet of Hamilton Reservoir and Upstream from Maybrook Road	Approximately 9,997 feet above outlet of Hamilton Reservoir and upstream from Maybrook Road	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
May Brook	May Brook Road	2,500 feet upstream	Regression Equations	OTHER	Jul-81	AE w/ Floodway	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Middle Branch of the Westfield River	Kinne Brook Road	Hampden County Boundary	OTHER	OTHER	Aug-81	AE	Gage Analysis completed for hydrology. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Mill Brook	Confluence with Quinebaug River	Approximately 39,260 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Mill Brook-Unnamed Tributary 1	Confluence with Mill Brook	Approximately 4,636 feet above confluence with Mill Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Mountain Brook	Confluence with Mill Brook	Approximately 4,927 feet above confluence with Mill Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Munn Brook	Little River	Approximately 2,300 feet upstream of covered bridge	Regression Equations	OTHER	Nov-77	AE	Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Ninemile Pond	Entire length within Town of Wilbraham	Entire length within Town of Wilbraham	OTHER	OTHER	Jun-88	AE	Peak discharges determined by the modified Puls method. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
North Branch Mill River	South Face of Wilbraham Road bridge in Springfield	Approximately 0.25 miles upstream of N Main Street	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
North Brook	North Branch Mill River	Approximately 2,000 feet upstream Parker Street	Regression Equations	HEC-2 4.6.2 (May 1991	Jun-91	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Otis Wait Brook	West Branch of the Westfield River	Approximately 2,845 feet above confluence with West Branch of the Westfield River	OTHER	OTHER	Aug-81	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Potash Brook	Confluence with Westfield River	Russell corporate limits	Regression Equations	OTHER	Dec-90	AE	Discharge frequencies were derived by drainage area ratio to the 0.7 power multiplied by the discharge frequencies computed for the long-term USGS West Branch Gage No. 01183500. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Powdermill Brook	Railroad	Approximately 4,450 feet upstream of Lower Sandy Hill Road	Regression Equations	OTHER	Nov-77	AE	Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Quaboag River	Chicopee River	Approximately 2 miles upstream Massachusetts Turnpike/ Interstate 90	OTHER	OTHER	Feb-82	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Quinebaug River	Approximately 300 feet downstream of Long Pond	Approximately 130 feet upstream of Sturbridge Road	HEC-HMS 3.0 and up (Dec 2005)	HEC-RAS 5.0 and up	Oct-19	A	
Quinebaug River	Approximately 130 feet upstream of Sturbridge Road	Approximately 1,200 feet downstream of Holland Road	Regression Equations	HEC-RAS 5.0 and up	Oct-19	AE w/ Floodway	
Quinebaug River-Unnamed Tributary 10	Confluence with Quinebaug River	Approximately 5,290 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Quinebaug River-Unnamed Tributary 7	Confluence with Quinebaug River	Approximately 29,968 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Quinebaug River-Unnamed Tributary 8	Confluence with Quinebaug River	Approximately 7,149 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Quinebaug River-Unnamed Tributary 9	Confluence with Quinebaug River	Approximately 1,865 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Sawmill Brook	South Branch Mill River	Approximately 0.5 miles upstream of Soule Road	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Scantic River	State Boundary/ Tirbutary A	Approximately 0.4 miles upstream of Chapin Road	Regression Equations	OTHER	May-78	AE	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Sessions Brook	Confluence with Sherman Brook	Approximately 4,041 feet above confluence with Sherman Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Sherman Brook	Cemetery Road in Brimfield	Approximately 1.74 miles upstream of Cemetery Road	Regression Equations	OTHER	Oct-79	AE w/ Floodway	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Sherman Brook	Approximately 1.74 miles upstream Cemetery Road in Brimfield	Approximately 3.74 miles above confluence with Sherman Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Shurtleff Brook	Munn Brook	Approximately 3,000 feet upatream of N Loomis Street	Regression Equations	OTHER	Jan-84	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
South Branch Mill River	Northern most headwall of Plumtree Road bridge	Approximately 50 feet upstream of Sessions Drive	Regression Equations	OTHER	Jun-91	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Stevens Brook	Approximately 8,120 feet upsream of Hamilton Reservoir	Approximately 15,488 feet above confluence with Quinebaug River	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Stevens Brook	Hamilton Reservoir	Approximately 8,120 feet upsream of Hamilton Reservoir	Regression Equations	OTHER	Jul-81	AE w/ Floodway	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Still Brook	Agawam corporate limits	Approximately 4,500 feet upstream of State Highway 187/ Pine Street	OTHER	OTHER	Mar-77	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Swift River	Ware River	County Boundary	N/A	N/A	Oct-79	AE	
Tannery Brook	Connecticut River	Approximately 0.20 miles upstream of Kane Road	Regression Equations	OTHER	Feb-79	AE	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Thayer Brook	Pulpit Rock Pond (Twelvemile Brook)	Approximately 50 feet above Lake Shore Drive	OTHER	HEC-2 4.6.2 (May 1991	Jul-96	AE	Flood flows were calculated using USGS regional flood flow formulas. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Tributary A (Wilbraham)	Chicopee River	Aproximately 0.1 miles upstream of Oxford Drive	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Tributary A to Scantic River	Scantic River	Approximately 0.83 miles upstream	Regression Equations	OTHER	May-78	AE	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Tributary A to Watchaug Brook	Watchaug Brook	Approximately 1.87 miles upstream	Regression Equations	OTHER	Mar-78	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Tributary C	North Branch Mill River	Approximately 1.5 miles upstream of Miles Morgan Court	Regression Equations	OTHER	Jun-88	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Tributary to Great Brook	Great Brook	Approximately 500 feet above Granville Road/ State Highway 57	Regression Equations	OTHER	Jan-84	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Twelvemile Brook	Monson corporate limits	Approximately 1,500 feet upstream of weir	Regression Equations	HEC-2 4.6.2 (May 1991	Jul-96	AE	Flood flows were calculated using USGS regional flood flow formulas. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Valley Brook	See FIRMs	See FIRMs	OTHER	HEC-RAS 3.1.1 and up	Mar-12	A	Peak flows along the lower reaches of Valley Brook were determined using gage date from USGS gage no. 01187400, Valley Brook near West Hartland, Connecticut and methods described in USGS *"Bulletin 17B Guidelines for Determining Flood-flow Frequency"*, dated 1976. The gage analysis was computed using HEC-SSP v2.0. Hydraulic 1% annual chance flood elevations were determined using USGS Regression Equations and the USACE HEC-RAS computer program
Wales Brook	Confluence with Mill Brook	Approximately 15,829 feet above confluence with Mill Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Wales Brook	Approximately 0.15 miles downstream of Holland Road in Wales	Approximately 2.89 miles upstream of Holland Road in Wales	Regression Equations	OTHER	Jul-79	AE w/ Floodway	Discharge frequency records were determined using a method developed by the USGS specifically for Massachusetts. The methodology takes into consideration both the slope of the main channel and drainage area in its evaluation. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Walker Brook	West Branch of the Westfield River	Hampden County Boundary	OTHER	OTHER	Aug-81	AE	Gage Analysis completed for hydrology. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Ware River	Chicopee River	County Boundary	N/A	N/A	Oct-79	AE	
Watchaug Brook	East Longmeadow corporate limits	Approximately 0.25 miles upstream of Allens Street	Regression Equations	OTHER	Mar-78	AE	Peak discharges obtained using USGS regional frequency-discharge formulas for Massachusetts. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
West Branch Farmington River	Tolland corporate limits	Hampden County Boundary	OTHER	OTHER	Aug-90	AE	Discharges calculated using a log-Pearson Type III Statistical Analysis using annual peak discharges from New Boston gage located immediately downstream of confluence with Clam River (1914-1978). Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
West Branch of the Westfield River	Town of Chester corporate limits	Hampden County Boundary	OTHER	OTHER	Aug-81	AE	Gage Analysis completed for hydrology. Discharges calculated using a net drainage area ratio. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
West Brook	Confluence with Mill Brook	Approximately 5,282 feet above confluence with Mill Brook	Regression Equations	HEC-RAS 5.0 and up	Jul-19	A	BLE TIER A
Westfield River	Connecticut River	Hampden County Boundary	OTHER	OTHER	Dec-90	AE	Discharges calculed using a net drainage area ratio, using gaging records at USGS gage 01183500 at West Branch. Discharge frequencies were calculated using a log-Pearson Type III distribution. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 12: Summary of Hydrologic and Hydraulic Analyses (continued)

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Willimansett Brook	Mouth	Downstream of Mountain Lake	Regression Equations	OTHER	Mar-78	AE	Discharges developed by regional-frequency analysis. No routing or subsequent reduction of flows were performed through Mountain Lake. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.
Zone A Flooding Sources (miscellaneous	See FIRMs	See FIRMs	Regression Equations	HEC-RAS 3.1.1 and up	Mar-12	A	Peak flows were determined using the three parameter rural regression equations for Connecticut. The 1% annual chance flood elevations were determined using USGS Regression Equations and the USACE HEC-RAS computer program
Zone A Flooding Sources (Black Brook, Borden Brook Reservoir, Cooley Lake, Granville Reservoir, miscellaneous)	See FIRMs	See FIRMs	TR-20 Win 1.00 (Jan 2005)	HEC-RAS 3.1.1 and up	Mar-12	A	Peak flows were determined using the NRCS WINTR-20 program dated March, 2009. The runoff curve numbers and times of concentration for the subareas were derived from the method specified in the NRCS Technical Release No. 55, dated June 1986. The Hydrologic Soil Groups were obtained from the NRCS SSURGO-Certified Soils data for Hampden County. The 1% annual chance flood elevations were determined using USGS Regression Equations and the USACE HEC-RAS computer program
Zone A Flooding Sources	See FIRMs	See FIRMs	OTHER	OTHER	1977-1991	A	Hydrology completed using approximate methods. Hydraulics completed using a version of HEC-2 that predates version 4.6.2.

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Austin Brook	0.035-0.045	0.040-0.100
Bradley Brook	0.035-0.400	0.065-0.070
Broad Brook	0.035-0.050	0.035-0.110
Browns Brook	0.070	0.013-0.120
Chicopee Brook	0.020-0.050	0.020-0.120
Chicopee River	0.019-0.050	0.035-0.800
Connecticut River	0.028-0.029	0.014-0.300
Foskett Mill Stream	0.035	0.050-0.080
Great Brook	0.015-0.045	0.055-0.100
Hamilton Reservoir	0.020-0.040	0.055-0.080
Higher River (Brook)	0.035-0.050	0.035-0.085
Little River	0.035-0.050	0.050-0.151
Longmeadow Brook	0.020-0.040	0.045-0.095
May Brook	0.020-0.040	0.055-0.080
May Brook	0.030-0.070	0.013-0.120
Middle Branch Westfield River	0.035-0.045	0.040-0.100
Mill Brook	0.030-0.150	0.030-0.150
Mill Brook-Unnamed Tributary 1	0.030-0.070	0.013-0.120
Mountain Brook	0.030-0.070	0.013-0.120
Munn Brook	0.015-0.045	0.055-0.100
Ninemile Pond	0.019-0.060	0.035-0.180
North Branch Mill River	0.019-0.060	0.035-0.500
North Brook	0.025	0.050
Otis Wait Brook	0.035-0.045	0.040-0.100
Paucatuck*	0.035-0.040	0.010
Pecousic Brook	0.040-0.050	0.060-0.120
Potash Brook	0.035-0.400	0.065-0.070
Powdermill Brook	0.035	0.070
Quaboag River	0.035-0.100	0.030-0.100
Quinebaug River	0.035-0.550	0.040-0.120
Quinebaug River	0.030-0.100	0.013-0.120
Quinebaug River-Unnamed Tributary 10	0.030-0.070	0.013-0.120
Quinebaug River-Unnamed Tributary 7	0.050	0.030-0.120
Quinebaug River-Unnamed Tributary 8	0.070	0.013-0.120
Quinebaug River-Unnamed Tributary 9	0.040-0.070	0.013-0.120
Sawmill Brook	0.019-0.060	0.035-0.180
Scantic River	0.025-0.050	0.065-0.100
Sessions Brook	0.030-0.070	0.013-0.120

Table 13: Roughness Coefficients (continued)

Flooding Source	Channel “n”	Overbank “n”
Sherman Brook	0.040	0.065-0.080
Sherman Brook	0.030-0.070	0.013-0.120
Shurtleff Brook	0.015-0.045	0.055-0.080
South Branch Mill River	0.019-0.060	0.035-0.180
Stevens Brook	0.020-0.040	0.055-0.080
Stevens Brook	0.030-0.070	0.035-0.120
Still Brook	0.035-0.400	0.050-0.070
Swift River	0.035-0.550	0.020-0.090
Tannery Brook	0.040-0.070	0.050-0.110
Thayer Brook	0.020-0.050	0.020-0.120
Tributary A (E. Longmeadow)	0.040-0.050	0.060-0.120
Tributary A (Hampden)	0.025-0.050	0.065-0.100
Tributary A (Wilbraham)	0.019-0.060	0.035-0.180
Tributary C (E. Longmeadow)	0.019-0.060	0.035-0.180
Tributary C (Wilbraham)	0.019-0.060	0.035-0.180
Tributary E (Hampden)	0.025-0.050	0.065-0.100
Tributary of Great Brook	0.015-0.045	0.055-0.080
Twelvemile Brook	0.020-0.050	0.020-0.120
Wales Brook	0.015-0.035	0.050-0.080
Wales Brook	0.015-0.035	0.050-0.080
Wales Brook	0.050-0.070	0.013-0.120
Walker Brook	0.035-0.045	0.040-0.100
Ware River	0.035-0.050	0.020-0.075
Watchaug Brook	0.025-0.050	0.065-0.120
West Branch Farmington River	0.035-0.400	0.055-0.081
West Branch Westfield River	0.035-0.045	0.040-0.100
West Brook	0.040-0.070	0.013-0.100
Westfield River	0.035-0.400	0.050-0.070
Willimansett Brook	0.019-0.050	0.035-0.800

5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

Table 14: Summary of Coastal Analyses

[Not applicable to this Flood Risk Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas

[Not applicable to this Flood Risk Project]

Table 15: Tide Gage Analysis Specifics

[Not applicable to this Flood Risk Project]

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 16: Coastal Transect Parameters

[Not applicable to this Flood Risk Project]

Figure 9: Transect Location Map

[Not applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 17: Summary of Alluvial Fan Analyses

[Not applicable to this Flood Risk Project]

Table 18: Results of Alluvial Fan Analyses

[Not applicable to this Flood Risk Project]

SECTION 6.0 – MAPPING METHODS

6.1 Vertical and Horizontal Control

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 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov.

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

To obtain current elevation, description, and/or location information for benchmarks in the area, please visit the NGS website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Hampden County are provided in Table 19.

Table 19: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Average Conversion from NGVD29 to NAVD88 = -0.67 feet				

Table 20: Stream-Based Vertical Datum Conversion

[Not applicable to this Flood Risk Project]

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM Database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/media-library/resources-documents/collections/361.

Base map information shown on the FIRM was derived from the sources described in Table 21.

Table 21: Base Map Sources

Data Type	Data Provider	Data Date	Data Scale	Data Description
Transportation Features	U.S. Census	1/1/2016	1:6,000	US Census Tiger Lines - Transportation
Digital Orthophoto	NAIP	2018	0.6 m	2018 Color Digital Orthoimagery
Black and White Orthophotography	MassGIS	2009	30 cm	Massachusetts 2009 Black and White Orthophotography (FIRMs effective July 16, 2013 and September 17, 2014)
Political boundaries	Massachusetts Executive Office for Administration and Finance	2/1/2014	1:6,000	Spatial and attribute information for political boundaries in Massachusetts
Surface Water Features	U.S. Geological Survey	9/1/2016	1:6,000	National Hydrography Dataset

6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 22.

In cases where the 1-percent and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM 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. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 23, “Floodway Data.”

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Hampden County	All within HUC 01100001	Light Detection and Ranging data (LiDAR)	0.138m NVA	1 meter at 95% confidence level	MassGIS 2015
Agawam, Town of; Chicopee, City of; Holyoke, City of; Longmeadow, Town of; Springfield, City of; West Springfield, Town of	Connecticut River	Project LiDAR survey including topo and digital color orthophotography	RMSE = 0.483	2 foot contour	N/A
Agawam, Town of; Chicopee, City of; Holyoke, City of; Longmeadow, Town of; Springfield, City of; West Springfield, Town of	Connecticut River	7.5-minute USGS Quads and Digital Ortho Quarter Quads	1:24,000	10 foot contour	USGS
Montgomery, Town of; Russell, Town of	Westfield River (between XS BM-BU)	Digital Terrain Model	N/A	N/A	MassGIS 2005
Montgomery, Town of; Russell, Town of	Westfield River (between XS BM-BU)	Digital Elevation Points	N/A	N/A	MassGIS 2005
Montgomery, Town of; Russell, Town of	Westfield River (between XS BM-BU)	3-foot contour lines and breaklines	N/A	3 foot contour	MassGIS 1999
Montgomery, Town of; Russell, Town of	Westfield River (between XS BM-BU)	Digital Terrain Model	N/A	2 foot contour	Connecticut DEP 2000
Hampden County	Unrevised Zone AE streams in Hampden County (precountywide)	Flood Boundary and Floodway Maps and FIRMs delineated on MassGIS 2005 color digital orthophotography	Varies	Varies	FEMA (date varies)

Table 22: Summary of Topographic Elevation Data used in Mapping (continued)

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Cities of Chicopee, Holyoke, and Westfield; and the Towns of Agawam, Brimfield, Chester, East Longmeadow, Hampden, Holland, Ludlow, Munson, Palmer, Southwick, Tolland, Wales, and Wilbraham	Unrevised Zone A streams in Hampden County (precountywide)	Flood Hazard Boundary Maps	Varies	Varies	FEMA (date varies)

BFEs shown at cross sections on the FIRM represent the 1-percent-annual-chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in areas of ponding, and other areas with static base flood elevations.