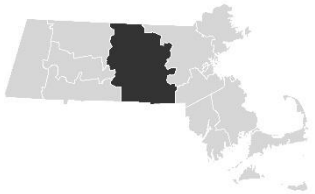
FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 3 OF 12



WORCESTER COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

COMMUNITY NAME	NUMBER	COMMUNITY NAME	NUMBER
ASHBURNHAM, TOWN OF	250290	NEW BRAINTREE, TOWN OF	250320
ATHOL, TOWN OF	250291	NORTH BROOKFIELD, TOWN OF	250323
AUBURN, TOWN OF	250292	NORTHBOROUGH, TOWN OF	250321
BARRE, TOWN OF	250293	NORTHBRIDGE, TOWN OF	250322
BERLIN, TOWN OF	250294	OAKHAM, TOWN OF	250324
BLACKSTONE, TOWN OF	250295	OXFORD, TOWN OF	250325
BOLTON, TOWN OF	250296	PAXTON, TOWN OF	250326
BOYLSTON, TOWN OF	250297	PETERSHAM, TOWN OF	250327
BROOKFIELD, TOWN OF	250298	PHILLIPSTON, TOWN OF	250328
CHARLTON, TOWN OF	250299	PRINCETON, TOWN OF	250329
CLINTON, TOWN OF	250300	ROYALSTON, TOWN OF	250330
DOUGLAS, TOWN OF	250301	RUTLAND, TOWN OF	250331
DUDLEY, TOWN OF	250302	SHREWSBURY, TOWN OF	250332
EAST BROOKFIELD, TOWN OF	250303	SOUTHBOROUGH, TOWN OF	250333
FITCHBURG, CITY OF	250304	SOUTHBRIDGE, TOWN OF	250334
GARDNER, CITY OF	250305	SPENCER, TOWN OF	250335
GRAFTON, TOWN OF	250306	STERLING, TOWN OF	250336
HARDWICK, TOWN OF	250307	STURBRIDGE, TOWN OF	250337
HARVARD, TOWN OF	250308	SUTTON, TOWN OF	250338
HOLDEN, TOWN OF	250309	TEMPLETON, TOWN OF	250339
HOPEDALE, TOWN OF	250310	UPTON, TOWN OF	250340
HUBBARDSTON, TOWN OF	250311	UXBRIDGE, TOWN OF	250341
LANCASTER, TOWN OF	250312	WARREN, TOWN OF	250342
LEICESTER, TOWN OF	250313	WEBSTER, TOWN OF	250343
LEOMINSTER, CITY OF	250314	WEST BOYLSTON, TOWN OF	250345
LUNENBURG, TOWN OF	250315	WEST BROOKFIELD, TOWN OF	250346
MENDON, TOWN OF	250316	WESTBOROUGH, TOWN OF	250344
MILFORD, TOWN OF	250317	WESTMINSTER, TOWN OF	250347
MILLBURY, TOWN OF	250318	WINCHENDON, TOWN OF	250348
MILLVILLE, TOWN OF	250319	WORCESTER, CITY OF	250349

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Flood Insurance Rate Map (FIRM)

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
Round Meadow Pond Brook	Confluence with Whitman River (Lower Reach)	Round Meadow Pond Dam	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Overbank portions of cross sections were from topographic maps (MADPW 1968, Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (MADPW 1968, Teledyne 1977). Starting water-surface elevations were from known water-surface elevations on downstream studies. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Rutters Brook	Confluence with Sullivan Brook	Approximately 300 feet above Wessonville Village Way	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.
Rutters Brook Tributary 1	Confluence with Rutters Brook	Approximately 250 feet above Walkup Street	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.
Rutters Brook Tributary 1.1	Confluence with Rutters Brook Tributary 1	Approximately 200 feet above Research Drive	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.
Salisbury Street pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (746.1 feet NAVD88).
Scanlon Brook	Confluence with Stillwater River	Fox Fire Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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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
Scott Reservoir	Entire shoreline	Entire shoreline	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	AE	Stillwater water-surface elevations were taken from the upper limit of study of Baker Brook 2.
Sevenmile River	East Brookfield/ Spencer corporate limits	Approximately 1,200 feet above State Route 31	TR-20 (SCS 1965)	WSP-2 (SCS 1976)	10/1/1988	AE w/ floodway	Hydrologic computations were taken from an SCS study of the upper Quaboag River and its tributaries (SCS 1978). In that study, each watershed was divided into areas of relatively uniform characteristics. Each watershed's slope, soils, vegetative cover, land use, and stream channels were analyzed to compute composite runoff curve numbers, times of concentration, and travel times. Storage-capacity and stage-discharge curves were computed for all significant reservoirs and natural storage areas. Synthetic storms were determined from Weather Bureau rainfall data (USWB 1961, USWB 1964) and routed through the watersheds. Discharges were verified against discharges from USGS streamgages on Quaboag River in West Brimfield and Sevenmile River in Spencer. Cross sections and structures were from field surveys. Roughness factors were from engineering judgment and field inspection. The hydraulic model did not include a certain bridge constructed in 1972 but accounted for its effects using backwater.
Sewall Brook	Approximately 1,400 feet below Sewall Pond	New England Telephone Company culvert below Shrewsbury Street	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	5/1/1984	AE w/ floodway	Overbank portions of cross sections were from topographic maps (USGS various). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from headwater elevations above the Mill Road culvert.
Shrewsbury Street swamp	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (550.1 feet NAVD88).

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
Singletary Brook	Confluence with Blackstone River	Confluence with Unnamed Tributary to Mayo Pond	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Mayo Pond is included in this reach. Runoff curve numbers used for the hydrologic analysis were from soils mapping (SCS 1971). Overbank portions of cross sections were from field surveys and topographic maps (USGS various). Underwater portions and structures were from field surveys. Roughness factors were from field inspection. Starting water-surface elevations were from normal depth.
Singletary Pond	Entire shoreline	Entire shoreline	unknown	unknown	1/1/1978	AE	
Smith Brook	Wyman Pond	Worcester Road	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Overbank portions of cross sections were from topographic maps (MADPW 1968, Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (MADPW 1968, Teledyne 1977). Starting water-surface elevations were from the slope-area method.
Smith Brook	Worcester Road	Meetinghouse Pond	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Snow Pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (656.4 feet NAVD88).
South Branch Souhegan River	County boundary	Stodge Meadow Pond	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
South Branch Souhegan River Tributary C	Confluence with South Branch Souhegan River	State Route 119	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Branch Souhegan River Tributary D	Confluence with South Branch Souhegan River	Approximately 4,800 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Branch Souhegan River Tributary E	Confluence with South Branch Souhegan River	Second crossing of Rindge Turnpike	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Meadow Brook	Mouth at Coachlace Pond	Approximately 3,700 feet above mouth	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Wachusett Brook	Mouth at Quinapoxet Reservoir	Approximately 4,600 feet above Thompson Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Wachusett Brook Tributary A	Confluence with South Wachusett Brook	Brooks Station Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Wachusett Brook Tributary B	Confluence with South Wachusett Brook	Approximately 2,800 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
South Wachusett Brook Tributary C	Confluence with South Wachusett Brook	Approximately 1,900 feet above State Route 62	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
South Wachusett Brook Tributary D	Confluence with South Wachusett Brook	Approximately 1,900 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Southwick Brook	Confluence with Mumford River	Weeks Pond	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	11/1/1980	AE w/ floodway	Overbank portions of cross sections were from topographic maps (Quinn 1979). Underwater portions were from field surveys. Structures were from construction plans, where available, or field surveys otherwise. Roughness factors were from field inspection. Starting water-surface elevations were from the slope-area method.
Spectacle Brook	Confluence with North Nashua River	Spectacle Pond	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Spring Basin	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (545.5 feet NAVD88).
Springfield Terminal pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (745.0 feet NAVD88).

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
Stall Brook	County boundary	Approximately 100 feet above Beaver Street	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	7/1/1980	AE w/ floodway	Overbank portions of cross sections were from topographic maps (Quinn 1979). Underwater portions were from field surveys. Structures were from construction plans, where available, or field surveys otherwise. Roughness factors were from field inspection. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Charles Watershed revision.
Steam Mill Brook	Confluence with Bartlett Pond Brook	Bartlett Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Steam Mill Brook Tributary A	Confluence with Steam Mill Brook	Approximately 800 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Steam Mill Brook Tributary B	Confluence with Steam Mill Brook	Approximately 1,600 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Still River Tributary A	Confluence with Still River	Second crossing of Green Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Stillwater River	Mouth at Wachusett Reservoir	Approximately 360 feet below Muddy Pond Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Stillwater River	Approximately 360 feet below Muddy Pond Road	Approximately 1,620 feet above Houghton Road	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from normal depth. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Stillwater River	Approximately 1,620 feet above Houghton Road	Headwaters at confluence of Justice Brook and Keyes Brook	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Stone Brook	Pondville Pond	South Street	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1977	AE w/ floodway	Overbank portions of cross sections were from topographic maps (USGS various). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and reference texts (Barnes 1967). Starting water-surface elevations were from known water-surface elevations on Pondville Pond.
Stoneville Pond	Entire shoreline	Entire shoreline	Log-Pearson type III flood-frequency analysis (WRC 1976)	HEC-2 (USACE 1973a)	1/1/1977	AE	Stillwater water-surface elevations were derived from model developed for Kettle Brook.
Stony Brook	County boundary	Deerfoot Road	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.

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
Stony Brook Tributary 2	Mouth at Sudbury Reservoir	Approximately 4,400 feet above mouth	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	11/1/1979	AE w/ floodway	Formerly called Tributary to Sudbury Reservoir. Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (Teledyne 1977). Starting water-surface elevations were from known water-surface elevations on Sudbury Reservoir.
Sudbury River	County boundary	Confluence of Sullivan Brook	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.
Sudbury River Split 1	Confluence with Sudbury River	Diversion from Sudbury River	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.
Sudbury River Tributary 12	Confluence with Sudbury River	Approximately 80 feet above Cordaville Road	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	11/1/1979	AE w/ floodway	Formerly called Tributary to Sudbury River. Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (Teledyne 1977). Starting water-surface elevations were from known water-surface elevations on Sudbury River.
Sullivan Brook	Confluence with Sudbury River	Headwaters at confluence of Jackstraw Brook and Rutters Brook	Regression equations	HEC-RAS 4.1	10/1/2012	AE w/ floodway	See special considerations for Assabet River dated 10/1/2012.

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
Tatnuck Brook	Confluence with Beaver Brook	Holden/ Worcester corporate limits	HEC-1 (USACE 1973b)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Overbank portions of cross sections were from topographic maps (Moore 1975). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from known water-surface elevations on Beaver Brook.
Thompson Road swamp	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (1,046.0 feet NAVD88).
Town Meadow Brook	Confluence with French River	Sargent Pond	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	3/1/1980	AE w/ floodway	Overbank portions of cross sections were from aerial photography (Quinn 1978a). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from known water-surface elevations on French River.
Tributary 1	New Pond	Approximately 1,000 feet above Mason Road	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	2/1/1980	AE w/ floodway	Overbank portions of cross sections were from aerial photography (Quinn 1978a). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from a rating curve.
Tributary A Dam Pond	Entire shoreline	Entire shoreline	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	5/1/1980	AE	Stillwater water-surface elevations were taken from the upper limit of study of Tributary A to Fall Brook.

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
Tributary A to Fall Brook	Confluence with Fall Brook	Approximately 750 feet above Union Street	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	5/1/1980	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary B to Fall Brook	Confluence with Fall Brook	Anthony Road	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	5/1/1980	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary C to Fall Brook	Confluence with Fall Brook	Anthony Road	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	5/1/1980	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.

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
Tributary to Catacoonamug Brook	Confluence with Catacoonamug Brook	Page Street	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from known water-surface elevations on Catacoonamug Brook. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary to Catacoonamug Brook	Page Street	Approximately 600 feet below State Route 2	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Tributary to Elizabeth Brook	Confluence with Elizabeth Brook	Stow Road	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1952). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography. Starting water-surface elevations were from normal depth.
Tributary to Monoosnoc Brook	Confluence with Monoosnoc Brook	Exchange Street	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	5/1/1980	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.

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
Tributary to Monoosnoc Brook	Exchange Street	Confluence with unnamed tributary from Morse Reservoir	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Tributary to Pearl Hill Brook	Confluence with Pearl Hill Brook	Approximately 3,500 feet above confluence with Pearl Hill Brook	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from critical depth. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary to Round Meadow Pond	Confluence with Round Meadow Pond Brook	Ellis Road	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Overbank portions of cross sections were from topographic maps (MADPW 1968, Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (MADPW 1968, Teledyne 1977). Starting water-surface elevations were from known water-surface elevations on downstream studies. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary to Round Meadow Pond Tributary A	Confluence with Tributary to Round Meadow Pond	State Route 2A	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Tributary to Waushacum Brook	Confluence with Waushacum Brook	Approximately 50 feet below Fairbanks Street	Regression equations (Wandle 1983)	HEC-2 (USACE 1973a)	5/1/1988	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Wandle 1983). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from photogrammetric maps (Sewall 1985). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from known water-surface elevations on Waushacum Brook. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary to Wyman Pond	Wyman Pond	Approximately 1,000 feet above Wyman Pond	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968, Teledyne 1977). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (MADPW 1968, Teledyne 1977). Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Tributary to Wyman Pond	Approximately 1,000 feet above Wyman Pond	Headwaters at unnamed ponds	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Trout Brook	Confluence with Quinapoxet River	Headwaters at confluence of Cold Brook and Governor Brook	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Turkey Brook	Pine Hill Reservoir	Headwaters at unnamed pond below State Route 56	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Turkey Hill Pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (373.6 feet NAVD88).
Turner Pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (370.1 feet NAVD88).
Unnamed Tributary	Leesville Pond	Rockland Road	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1977	AE w/ floodway	Overbank portions of cross sections were from topographic maps (USGS various). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and reference texts (Barnes 1967). Starting water-surface elevations were from known water-surface elevations on Leesville Pond.
Unnamed Tributary to Mayo Pond	Confluence with Singletary Brook	Millbury/ Sutton corporate limits	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Runoff curve numbers used for the hydrologic analysis were from soils mapping (SCS 1971). Overbank portions of cross sections were from field surveys and topographic maps (USGS various). Underwater portions and structures were from field surveys. Roughness factors were from field inspection. Starting water-surface elevations were from known water-surface elevations on Mayo Pond.
Upper Crocker Pond	Entire shoreline	Entire shoreline	unknown	unknown	1/1/1978	AE	Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.

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
Wachusett Reservoir	Entire shoreline	Entire shoreline	Log-Pearson type III flood-frequency analysis (IACWD 2018)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	AE	Stillwater water-surface elevations were taken from the upper limit of study of Nashua River.
Walker Pond	Walker Pond Dam	Approximately 1.38 miles above Walker Pond Dam	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	11/1/1980	AE w/ floodway	Overbank portions of cross sections were from aerial photography (Quinn 1978a). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from elevation-discharge curves.
Warren Tannery Brook	Confluence with Asnebumskit Brook	Confluence with unnamed tributary in swamp below railroad	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Waushacum Brook	Approximately 150 feet above Wachusett Reservoir	Boylston/ Sterling corporate limits	Regression equations (Wandle 1983)	HEC-2 (USACE 1973a)	5/1/1988	AE w/ floodway	Drainage areas used in the regression equations did not include the upper 5.1 square miles controlled by surcharge storage in East Waushacum and West Waushacum Ponds. Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Wandle 1983). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from photogrammetric maps (Sewall 1985). Underwater portions and structures were from field surveys. Roughness factors were from engineering judgment and field observations. Starting water-surface elevations were from the slope-area method. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Waushacum Brook	Boylston/ Sterling corporate limits	Approximately 1,700 feet above Wyman Way	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Weasel Brook	Boston and Maine Railroad	Brooks Street	unknown	unknown	1/1/1978	AE, AH, AO	Flooding is caused by the inadequate capacity of culverts conveying Weasel Brook underneath a factory. Hydraulic calculations were made to determine the quantity of water and depth of flooding in both ponding areas and along West Boylston Street.
Wekepeke Brook	Confluence with North Nashua River	Approximately 70 feet below Pratt Junction Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook	Approximately 70 feet below Pratt Junction Road	Approximately 50 feet above Boston and Maine Railroad	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	1/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Johnson and Tasker 1974). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from normal depth. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Wekepeke Brook	Approximately 50 feet above Boston and Maine Railroad	Confluence with unnamed tributary below State Route 12	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary A	Confluence with Wekepeke Brook	Approximately 5,000 feet above Brockelman Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary A1	Confluence with Wekepeke Brook Tributary A	Approximately 400 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Wekepeke Brook Tributary B	Confluence with Wekepeke Brook	Approximately 600 feet above Legate Hill Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary C	Confluence with Wekepeke Brook	Approximately 1,000 feet above Hilltop Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary D	Confluence with Wekepeke Brook	Heywood Reservoir	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary D1	Confluence with Wekepeke Brook Tributary D	Approximately 2,500 feet above Pratt Junction Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary D2	Confluence with Wekepeke Brook Tributary D	Approximately 1,200 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wekepeke Brook Tributary D3	Confluence with Wekepeke Brook Tributary D	Lynde Basins	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
West Boylston Road ponding	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (347.9 feet NAVD88).

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
West Brook	Culvert entrance below Oregon Avenue	Approximately 1,000 feet above Main Street	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	3/1/1978	AE w/ floodway	Discharges for the 10-, 2-, and 1-percent-annual-chance events were determined from regression equations (Wandle 1977). The 0.2-percent-annual-chance discharge was computed from the others using a log-Pearson type III distribution. Overbank portions of cross sections were from topographic maps (Teledyne 1976). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and aerial photography (Teledyne 1976). Starting water-surface elevations were from the slope-area method.
West Princeton Road swamp	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (1,004.0 feet NAVD88).
West River (Town of Uxbridge)	Confluence with Blackstone River	West Hill Dam	multiple	HEC-2 (USACE 1973a)	8/1/1980	AE w/ floodway	The area contributing runoff between the West Hill Dam and the mouth has a short time-to-peak compared to the area above the dam. Therefore, peak discharges below the West Hill Dam were determined by adding a constant 100 cfs (the dam outflow, as determined by analysis of USGS streamgage 01111200 just below the dam) to discharges determined using regression equations (Wandle 1977) for just the area below the dam. Overbank portions of cross sections were from topographic maps (Quinn 1979). Underwater portions were from field surveys. Structures were from construction plans, where available, or field surveys otherwise. Roughness factors were from field inspection. Starting water-surface elevations were from the slope-area method.
West River	Hartford Avenue	Approximately 2,700 feet above Silver Lake Dam	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	8/1/1980	AE w/ floodway	Overbank portions of cross sections were from topographic maps (Quinn 1979). Underwater portions were from field surveys. Structures were from construction plans, where available, or field surveys otherwise. Roughness factors were estimated. Starting water-surface elevations were from the slope-area method.

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
Whitins Pond	Entire shoreline	Entire shoreline	unknown	unknown	11/1/1980	AE	Elevations for Whitins Pond were taken from the profiles for Mumford River.
Whitman River (Lower Reach)	Confluence with Flagg Brook	Fitchburg/ Westminster corporate limits	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	6/1/1980	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Results were adjusted to account for a high-water mark on a control structure from the 1936 flood (MAGS 1939). Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from normal depth. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.
Whitman River (Middle)	Fitchburg/ Westminster corporate limits	Ashburnham/ Westminster corporate limits	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River (Upper Reach)	Ashburnham/ Westminster corporate limits	Whitney Pond	Regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	6/1/1980	AE w/ floodway	Discharges at the downstream study limit were from downstream studies in the City of Fitchburg. They reflect the effect of impoundments in Ashburnham and are regarded as regulated flows. Flows between the downstream limit and the impoundments were extrapolated by adjusting the natural component of the downstream-limit flows using regression equations (Wandle 1977). Overbank portions of cross sections were from topographic maps (Moore 1980). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and standard texts (Barnes 1967). Starting water-surface elevations were from known water-surface elevations on downstream studies. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.

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
Whitman River	Whitney Pond	Approximately 3,700 feet above State Route 140	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary A	Confluence with Whitman River (Middle Reach)	Approximately 3,000 feet above railroad	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary B	Confluence with Whitman River (Middle Reach)	Confluence with unnamed tributary approximately 2,100 feet above railroad	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary B1	Confluence with Whitman River Tributary B	Unnamed pond above Beech Hill Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary C	Confluence with Whitman River (Upper Reach)	Headwaters at unnamed swamp above State Route 12	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary C1	Confluence with Whitman River Tributary C	Approximately 1,200 feet above Williams Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary C2	Confluence with Whitman River Tributary C	Oldtown Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.

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
Whitman River Tributary C3	Confluence with Whitman River Tributary C	Approximately 2,900 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary C4	Confluence with Whitman River Tributary C	Approximately 1,900 feet above confluence	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Whitman River Tributary D	Confluence with Whitman River	Headwaters at swamp above Hosley Road	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wilder Brook	Confluence with Perley Brook	Approximately 750 feet above Clark Street	Streamgage analysis and regression equations (Wandle 1977)	HEC-2 (USACE 1973a)	5/1/1978	AE w/ floodway	A log-Pearson type III statistical analysis (WRC 1976) of records at USGS streamgage 01163100 (Wilder Brook at Clark Street, period of record 11 years) was developed. Final discharges were calculated as a weighted average between results of the streamgage analysis and regression equations (Wandle 1977). Overbank portions of cross sections were from topographic maps. Underwater portions and structures were from field surveys. Roughness factors were from field inspection. Starting water-surface elevations were from known water-surface elevations on Perley Brook.
Willard Brook Tributary E	County Boundary	Point of one square mile of drainage area	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Willow Brook Road pond	Entire shoreline	Entire shoreline	none	none	11/1/2019	A	Analysis of lidar DEM (FEMA 2011, USGS 2014b), guided by shape of existing waterbody feature (e.g., effective FIRM, National Wetland Inventory, or National Hydrography Dataset), if extant, was used to determine a stillwater elevation corresponding to the expected 1-percent-annual-chance floodplain (793.5 feet NAVD88).

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
Winnekeag Lake	Entire shoreline	Entire shoreline	Regression equations (Johnson and Tasker 1974)	HEC-2 (USACE 1973a)	6/1/1980	AE	Stillwater water-surface elevations were taken from the upper limit of study of Phillips Brook.
Worcester Brook	Pine Hill Reservoir	Swamp above trail from Claire Lane	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Worcester Brook Diversion	Confluence with Worcester Brook	Confluence with Worcester Brook	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Wrack Meadow Brook	Confluence with North Brook	Berlin/ Boylston corporate limits	TR-20 (SCS 1965)	WSP-2 (SCS 1976)	11/1/1977	AE w/ floodway	Hydrologic computations and hydraulic profiles were taken from an SCS study of the upper Assabet River and its tributaries (SCS 1975a). At the confluence with North Brook, the profiles were modified to incorporate backwater.
Wyman Pond	Entire shoreline	Entire shoreline	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	6/1/1980	AE	Stillwater water-surface elevations were taken from the upper limit of study of Wyman Pond Brook.
Wyman Pond Brook	Confluence with Flagg Brook	Worcester Road	Rainfall-runoff routing (SCS 1972)	HEC-2 (USACE 1973a)	6/1/1980	AE w/ floodway	10-, 2-, 1-, and 0.2-percent-annual-chance rainfall depths were applied to each sub-basin, from which runoff was calculated and discharge routed through reaches and control structures. Overbank portions of cross sections were from topographic maps (MADPW 1968). Underwater portions and structures were from field surveys. Roughness factors were from field inspection and photography. Starting water-surface elevations were from normal depth. Floodplain was redelineated (FEMA 2011) in 2022 Nashua Watershed revision.

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
Wyman Pond Brook	Worcester Road	Swamp approximately 1,800 feet above inlet to Wyman Pond	Regression equations (Zarriello 2017)	HEC-RAS 5.0 (USACE 2016)	7/15/2019	A	See special considerations for Asnebumskit Brook.
Zone A flooding sources (Concord River HUC8 Watershed)	See FIRMs	See FIRMs	Regression equations	HEC-RAS	10/1/2012	A	
Zone A flooding sources (miscellaneous streams and ponds)	See FIRMs	See FIRMs	OTHER	OTHER	1977-2003	A	
Zone A flooding sources (French River, Mill Brook, Quinebaug River)	See FIRMs	See FIRMs	HEC-HMS 3.0 and up (Dec 2005)	HEC-RAS 5.0 and up	10/10/2019	A	
Zone A flooding sources (Quinebaug River HUC8 Watershed)	See FIRMs	See FIRMs	Regression equations	HEC-RAS 5.0 and up	10/10/2019	A	

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Asnebumskit Brook	*	*
Asnebumskit Brook Tributary A	*	*
Asnebumskit Brook Tributary B	*	*
Assabet River (Berlin)	0.040-0.055	0.040-0.120
Assabet River (Northborough)	0.015-0.050	0.040-0.120
Assabet River (Lower Reach)	0.010-0.050	0.025-0.100
Assabet River (Upper Reach)	0.010-0.050	0.025-0.100
Assabet River Branch No. 2	0.018-0.05	0.05-0.12
Axtell Brook	0.030-0.060	0.040-0.016
Babcock Brook	0.015-0.045	0.050-0.090
Babcock Brook	*	*
Babcock Brook Tributary A	*	*
Babcock Brook Tributary B	*	*
Baker Brook 1	0.030-0.050	0.050-0.120
Baker Brook 2	0.030-0.055	0.035-0.110
Baker Brook 2 Tributary A	*	*
Bartlett Pond Brook	*	*
Beaver Brook	0.013-0.045	0.035-0.110
Beaver Brook (Bellingham)	*	*
Beaver Brook 4 Tributary B	*	*
Beaver Brook 4 Tributary C	*	*
Beaver Pond Brook	*	*
Bennetts Brook	0.015-0.035	0.045-0.075
Bennetts Brook	*	*
Bennetts Brook Tributary H	*	*
Bennetts Brook Tributary I	*	*
Bennetts Brook Tributary J	*	*
Big Bummet Brook	0.013-0.050	0.060-0.110
Blackstone River	0.025-0.050	0.025-0.120
Bow Brook	*	*
Bow Brook Tributary A	*	*
Bowers Brook	0.015-0.035	0.045-0.075

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Bowers Brook	*	*
Brierly Pond	0.030-0.040	0.040-0.12
Broad Meadow Brook	0.013-0.045	0.035-0.110
Brook to Saima Pond	0.035	0.050-0.080
Brown Brook	*	*
Brown Brook Tributary A	*	*
Cady Brook	0.020-0.035	0.060-0.090
Canesto Brook	0.015-0.070	0.070-0.100
Catacoonamug Brook	0.035	0.050-0.070
Catacoonamug Brook	*	*
Catacoonamug Brook Tributary A	*	*
Cedar Meadow Brook	0.022-0.045	0.060-0.095
Cedar Pond	0.035	0.060-0.090
Center Brook	0.024-0.050	0.070
Chaffin Pond Tributary A	*	*
Chaffin Pond Tributary B	*	*
Charles River	0.015-0.060	0.040-0.100
Cobb Brook	*	*
Cohasse Brook	0.030-0.080	0.040-0.120
Cold Brook	*	*
Cold Harbor Brook (Lower Reach)	0.015-0.050	0.040-0.120
Cold Harbor Brook (Town of Boylston)	0.035-0.040	0.045-0.100
Cold Harbor Brook (Upper Reach)	0.015-0.050	0.040-0.120
Cold Spring Brook (Town of Harvard)	0.015-0.035	0.045-0.075
Cold Spring Brook (Town of Sutton)	0.020-0.050	0.070-0.080
Connelly Brook	*	*
Connelly Brook	0.015-0.035	0.060-0.200
Connelly Brook	*	*
Counterpane Brook	0.030-0.035	0.070
Counterpane Brook	*	*
Cronin Brook	0.020-0.045	0.020-0.110
Dark Brook	0.030-0.040	0.08

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Dark Brook No. 1	0.019-0.040	0.040-0.100
Dark Brook No. 2	0.030-0.040	0.040-0.090
Deans Brook	0.035-0.060	0.080-0.120
Deer Brook	*	*
Denny Brook	0.040-0.060	0.040-0.100
Dorothy Brook	0.030-0.040	0.040-0.12
East Branch Ware River (Hubbardston)	0.012-0.070	0.090-0.100
East Branch Ware River (Rutland)	0.06	0.060-0.110
East Wachusett Brook	*	*
East Wachusett Brook	0.022-0.045	0.050-0.100
East Wachusett Brook	*	*
East Wachusett Brook Tributary A	*	*
Easter Brook	*	*
Easter Brook Tributary A	*	*
Echo Lake	*	*
Elizabeth Brook	0.015-0.055	0.040-0.120
Fall Brook	0.030-0.055	0.045-0.100
Flagg Brook	0.035	0.050-0.080
Flagg Brook	*	*
Flagg Brook Tributary A	*	*
Foster Brook	0.030-0.050	0.050-0.120
French Brook	*	*
French River	0.030-0.120	0.060-0.120
Gates Brook	*	*
Gates Brook	0.030-0.045	0.060-0.100
Gates Brook	*	*
Godfrey Brook	0.03-0.28	0.038-0.120
Goodridge Brook	0.035	0.050
Goodridge Brook	*	*
Governor Brook	*	*
Governor Brook	0.045	0.080
Governor Brook Tributary A	*	*

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Great Brook	0.02-0.07	0.05-0.10
Greenwood Brook	0.030-0.050	0.050-0.120
Hamant Brook	0.015-0.040	0.060-0.100
Hop Brook	0.030-0.060	0.030-0.150
Hop Brook Tributary 4	0.045-0.060	0.045-0.150
Hop Brook Tributary 4.1	0.060	0.060-0.150
Howard Brook	0.015-0.050	0.040-0.120
Huckleberry Brook	0.012-0.070	0.050-0.080
Ivy Brook	0.013-0.060	0.050-0.060
Jackstraw Brook	0.035-0.060	0.035-0.150
Justice Brook	*	*
Kettle Brook (East)	0.020-0.040	0.040-0.090
Kettle Brook (Town of Auburn)	0.030-0.040	0.040-0.090
Kettle Brook (West)	0.020-0.040	0.040-0.090
Keyes Brook	*	*
Keyes Brook	0.035	0.050-0.080
Keyes Brook	*	*
Keyes Brook Tributary A	*	*
Keyes Brook Tributary C	*	*
Leadmine Brook	0.015-0.040	0.065-0.100
Lebanon Brook	0.025-0.045	0.060-0.120
Little Nugget Brook	0.020-0.045	0.050-0.075
Little River	0.035-0.060	0.065-0.080
Lowes Brook	0.036-0.042	0.070-0.110
Lynde Brook	0.030-0.035	0.060-0.100
Mahoney Brook	0.030-0.050	0.050-0.120
Malagasco Brook	*	*
Malden Brook	*	*
McGovern Brook	*	*
McKinstry Brook	0.036-0.044	0.080-0.100
Meadow Brook	0.015-0.050	0.07-0.110
Middle River	0.020-0.040	0.040-0.090

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Mill Brook (Town of Bolton)	0.02-0.07	0.05-0.10
Mill Brook (Town of Webster)	0.035	0.080
Mill Brook Conduit	0.013-0.045	0.035-0.110
Mill River	0.020-0.060	0.040-0.100
Miscoe Brook	0.025-0.040	0.030-0.090
Monoosnoc Brook	0.025-0.055	0.035-0.110
Monoosnoc Brook	*	*
Moulton Pond Brook	0.015-0.055	0.045-0.070
Muddy Brook	0.030-0.055	0.050-0.100
Mulpus Brook	0.035	0.050-0.070
Mulpus Brook	*	*
Mulpus Brook Tributary A	*	*
Mulpus Brook Tributary B	*	*
Mumford River	0.025-0.090	0.030-0.100
Muschopauge Brook	*	*
Nashua River	0.030-0.055	0.035-0.100
Nashua River Tributary G	*	*
Nashua River Tributary I	*	*
North Brook	0.018-0.05	0.05-0.120
North Nashua River (below Phillips Brook)	0.035-0.055	0.030-0.100
North Nashua River (above Phillips Brook)	0.035-0.045	0.08
North Nashua River Tributary A	*	*
North Nashua River Tributary A1	*	*
North Nashua River Tributary A2	*	*
North Nashua River Tributary B	*	*
North Nashua River Tributary C	*	*
North Nashua River Tributary D	*	*
O'Brien Brook	0.025-0.060	0.040-0.070
Otter River	0.030-0.050	0.050-0.120
Pearl Hill Brook	0.035	0.050-0.080
Perley Brook	0.030-0.050	0.050-0.120
Phillips Brook	0.035-0.060	0.050-0.080

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Phillips Brook	*	*
Phillips Brook Tributary A	*	*
Phillips Brook Tributary B	*	*
Phillips Brook Tributary C	*	*
Phillips Brook Tributary D	*	*
Piccadilly Brook	0.010-0.050	0.025-0.100
Pikes Pond Tributary	0.020-0.040	0.060-0.090
Pine Hill Reservoir Tributary A	*	*
Pine Hill Reservoir Tributary B	*	*
Pond Brook	0.030-0.050	0.050-0.120
Poor Farm Brook	*	*
Pondville Pond	0.030-0.040	0.040-0.120
Quick Stream	0.034-0.035	*
Quinapoxet River	*	*
Quinapoxet River	0.035-0.040	0.050-0.080
Quinapoxet River	*	*
Quinapoxet River Tributary A	*	*
Quinapoxet River Tributary B	*	*
Quinapoxet River Tributary C	*	*
Quinapoxet River Tributary D	*	*
Quinebaug River	0.035-0.050	0.040-0.120
Quinsigamond River	0.011-0.055	0.070-0.080
Ramshorn Brook (Town of Auburn)	0.030-0.040	0.040-0.090
Ramshorn Brook (Town of Millbury)	0.030-0.040	0.040-0.120
Rawson Hill Brook	0.015-0.050	0.07-0.11
Riverdale Mills Sluice Gates & Tail Race	0.025-0.055	0.050-0.100
Rocky Brook 2	*	*
Round Meadow Pond Brook	0.035	0.050-0.060
Rutters Brook	0.035-0.060	0.035-0.120
Rutters Brook Tributary 1	0.040-0.060	0.040-0.100
Rutters Brook Tributary 1.1	0.040-0.060	0.040-0.100
Scanlon Brook	*	*

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Sevenmile River	0.025-0.045	0.050-0.085
Sewall Brook	0.035-0.045	0.05-0.090
Singletary Brook	0.030-0.040	0.040-0.12
Singletary Pond	0.030-0.040	0.040-0.12
Smith Brook	0.035	0.050-0.060
Smith Brook	*	*
South Branch Souhegan River	*	*
South Branch Souhegan River Tributary C	*	*
South Branch Souhegan River Tributary D	*	*
South Branch Souhegan River Tributary E	*	*
South Meadow Brook	*	*
South Wachusett Brook	*	*
South Wachusett Brook Tributary A	*	*
South Wachusett Brook Tributary B	*	*
South Wachusett Brook Tributary C	*	*
South Wachusett Brook Tributary D	*	*
Southwick Brook	0.040	0.080
Spectacle Brook	*	*
Stall Brook	0.024-0.050	0.024-0.090
Steam Mill Brook	*	*
Steam Mill Brook Tributary A	*	*
Steam Mill Brook Tributary B	*	*
Still River Tributary A	*	*
Stillwater River	*	*
Stillwater River	0.035	0.070-0.100
Stillwater River	*	*
Stony Brook	0.033-0.050	0.032-0.090
Stony Brook Tributary 2	0.025-0.035	0.040-0.060
Sudbury River	0.032-0.090	0.032-0.100
Sudbury River Split 1	0.050	0.040-0.090
Sudbury River Tributary 12	0.025-0.035	0.040-0.060
Sullivan Brook	0.030-0.060	0.030-0.090

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Tatnuck Brook	0.020-0.040	0.040-0.090
Town Meadow Brook	0.030-0.040	0.065-0.090
Tributary 1	0.035-0.040	0.080-0.100
Tributary A to Fall Brook	0.035	0.050-0.060
Tributary B to Fall Brook	0.035	0.050-0.060
Tributary C to Fall Brook	0.035	0.050-0.060
Tributary to Catacoonamug Brook	0.035	0.050-0.070
Tributary to Catacoonamug Brook	*	*
Tributary to Elizabeth Brook	0.015-0.035	0.045-0.075
Tributary to Monoosnoc Brook	0.035	0.050-0.060
Tributary to Monoosnoc Brook	*	*
Tributary to Pearl Hill Brook	0.035	0.050-0.070
Tributary to Round Meadow Pond	0.035	0.050-0.060
Tributary to Round Meadow Pond Tributary A	*	*
Tributary to Waushacum Brook	0.030	0.020-0.100
Tributary to Wyman Pond	0.035	0.050-0.060
Tributary to Wyman Pond	*	*
Trout Brook	*	*
Tupperware Mill Canal	0.034-0.035	*
Turkey Brook	*	*
Unnamed Tributary	0.030-0.040	0.040-0.090
Unnamed Tributary to Mayo Pond	0.030-0.040	0.040-0.12
Walker Pond	0.018-0.035	0.018-0.080
Warren Tannery Brook	*	*
Waushacum Brook	0.030	0.020-0.100
Waushacum Brook	*	*
Weasel Brook	*	*
Wekepeke Brook	*	*
Wekepeke Brook	0.015-0.035	0.060-0.200
Wekepeke Brook	*	*
Wekepeke Brook Tributary A	*	*
Wekepeke Brook Tributary A1	*	*

Table 13: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Wekepeke Brook Tributary B	*	*
Wekepeke Brook Tributary C	*	*
Wekepeke Brook Tributary D	*	*
Wekepeke Brook Tributary D1	*	*
Wekepeke Brook Tributary D2	*	*
Wekepeke Brook Tributary D3	*	*
West Brook	0.015-0.050	0.07-0.11
West River (Town of Uxbridge)	0.013-0.060	0.060-0.085
West River	0.015-0.060	0.030-0.090
Whitman River (Lower Reach)	0.035	0.050-0.080
Whitman River (Middle Reach)	*	*
Whitman River (Upper Reach)	0.025-0.055	0.055-0.080
Whitman River	*	*
Whitman River Tributary A	*	*
Whitman River Tributary B	*	*
Whitman River Tributary B1	*	*
Whitman River Tributary C	*	*
Whitman River Tributary C1	*	*
Whitman River Tributary C2	*	*
Whitman River Tributary C3	*	*
Whitman River Tributary C4	*	*
Whitman River Tributary D	*	*
Wilder Brook	0.030-0.050	0.050-0.120
Worcester Brook	*	*
Wrack Meadow Brook	0.018-0.05	0.05-0.12
Wyman Pond Brook	0.035	0.050-0.080
Wyman Pond Brook	*	*
Zone A flooding sources (Quinebaug River HUC8 Watershed)	0.020-0.120	0.013-0.150

*Data not available

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 Worcester County are provided in Table 19.

Table 19: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
All in Worcester County				-0.7
Average Conversion from NGVD29 to NAVD88 = -0.7 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/guidelines-and-standards-flood-risk-analysis-and-mapping.

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
Digital orthophoto	MassGIS	2008	1:5,000	Orthoimagery for all FIRMs dated July 4, 2011, or July 16, 2014 (MassGIS 2008)
Digital orthophoto	USGS	2018	1:6,000	Orthoimagery for all FIRMs dated June 7, 2023 (USGS 2018)
Digital orthophoto	USGS	2019	0.15-m resolution	Orthoimagery for all FIRMs dated July 8, 2025 (USGS 2019)
Levee	USACE	2019	1:6,000	Spatial and attribute information for Southbridge Levee
Political boundaries	MassGIS	2017	1:5,000	Municipal and county boundaries (MassGIS 2017)
Transportation features	MassGIS	-	-	Roads and railroads derived from orthophotography for all FIRMs dated July 4, 2011, or July 16, 2014 (MassGIS undated)
Transportation features	MassGIS	2015	-	Railroads for all FIRMs dated July 8, 2025 (MassGIS 2015)
Transportation features	USCB	2016	-	Roads for all FIRMs in Charles Watershed dated July 8, 2025 (USCB 2016)
Transportation features	USCB	2019	-	Roads for all FIRMs in Merrimack and Nashua Watersheds dated July 8, 2025 (USCB 2019)
Watershed boundaries	USGS	2020	1:24,000	Watershed boundaries

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. For each coastal flooding source studied as part of this FIS Report, the mapped floodplain boundaries on the FIRM have been delineated using the flood and wave elevations determined at each transect; between transects, boundaries were delineated using land use and land cover data, the topographic elevation data described in Table 22, and knowledge of coastal flood processes. In ponding areas, flood elevations were determined at each junction of the model; between junctions, boundaries were interpolated using the topographic elevation data described in Table 22.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% 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 23 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
Ashburnham, Town of; Bolton, Town of; Boylston, Town of; Clinton, Town of; Fitchburg, City of; Gardner, City of; Harvard, Town of; Holden, Town of; Hopedale, Town of; Hubbardston, Town of; Lancaster, Town of; Leominster, City of; Lunenburg, Town of; Mendon, Town of; Milford, Town of; Paxton, Town of; Princeton, Town of; Rutland, Town of; Sterling, Town of; West Boylston, Town of; Westminster, Town of; Worcester, City of	All sources studied or redelineated in 2025 Merrimack & Nashua Watersheds revision, except portions of Chaffin Pond Tributary A, Chaffin Pond Tributary B, Poor Farm Brook, and Quinapoxet River Tributary C	Lidar	8.5 cm	16.6 cm	FEMA 2011
Holden, Town of	Portions of Chaffin Pond Tributary A, Chaffin Pond Tributary B, Poor Farm Brook, and Quinapoxet River Tributary C	Lidar	5.0 cm	9.25 cm	USGS 2014b

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Auburn, Town of; Charlton, Town of; Douglas, Town of; Dudley, Town of; Leicester, Town of; Millbury, Town of; Oxford, Town of; Southbridge, Town of; Spencer, Town of; Sturbridge, Town of; Sutton, Town of; Webster, Town of	All sources studied or redelineated in 2023 Quinebaug Watershed revision	Lidar	0.167 m	1 m	MassGIS 2014a
Berlin, Town of; Bolton, Town of; Boylston, Town of; Clinton, Town of; Harvard, Town of; Northborough, Town of; Shrewsbury, Town of; Southborough, Town of; Westborough, Town of	All sources studied or redelineated in 2014 Concord Watershed revision	Lidar	0.03 ft	N/A	PS 2010
Worcester, City of	All sources except Beaver Brook, Blackstone River, Broad Meadow Brook, and Mill Brook Conduit	Topographic maps	2 ft contour	1:1,200 scale	Moore 1975
Worcester, City of	Beaver Brook, Broad Meadow Brook, Mill Brook Conduit	Topographic maps	2 ft contour	1:6,000 scale	Worcester 1996
Athol, Town of; Barre, Town of; Hardwick, Town of; Winchendon, Town of	All sources studied by detailed methods	Topographic maps	5 ft contour	1:4,800 scale	Lockwood 1979
Brookfield, Town of; East Brookfield, Town of; North Brookfield, Town of; West Brookfield, Town of	All sources studied by detailed methods	Topographic maps	10 ft contour	1:24,000 scale	USGS various
Blackstone, Town of	Mill River, Quick Stream	Topographic maps	10 ft contour	1:24,000 scale	USGS various
Warren, Town of	Quaboag River	Topographic maps	5 ft contour	1:4,800 scale	Lockwood 1979
Athol, Town of; Barre, Town of; Brookfield, Town of; East Brookfield, Town of; Hardwick, Town of; New Braintree, Town of; Oakham, Town of; Phillipston, Town of; Royalston, Town of; Templeton, Town of; Warren, Town of; Winchendon, Town of	All sources studied by approximate methods except those restudied in 2023 Quinebaug Watershed revision	Topographic maps	10 ft contour	1:24,000 scale	USGS various

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Ashburnham, Town of; Gardner, City of; Hubbardston, Town of; Paxton, Town of; Rutland, Town of	All sources studied by approximate methods except those restudied in 2025 Nashua Watershed revision	Topographic maps	10 ft contour	1:24,000 scale	USGS various
Grafton, Town of; Northbridge, Town of; Sutton, Town of; Uxbridge, Town of	All sources studied by detailed methods except Blackstone River	Topographic maps	5 ft contour	1:2,400 scale	Quinn 1979
Douglas, Town of; Leicester, Town of; Upton, Town of	All sources studied by detailed methods except those studied or redelineated in 2023 Quinebaug Watershed revision	Topographic maps	5 ft contour	1:2,400 scale	Quinn 1979
Templeton, Town of	Otter River	Topographic maps	5 ft contour	1:4,800 scale	Lockwood 1979
Spencer, Town of	Sevenmile River	Topographic maps	10 ft contour	1:25,000 scale	USGS various
Shrewsbury, Town of	All sources studied by detailed methods except Rawson Hill Brook	Topographic maps	4 ft contour	1:2,400 scale	Teledyne 1977
Gardner, City of; Hubbardston, Town of; New Braintree, Town of; Oakham, Town of; Phillipston, Town of; Royalston, Town of; Rutland, Town of	All sources studied by detailed methods	Topographic maps	5 ft contour	1:4,800 scale	Moore 1980
Millbury, Town of	All sources studied by detailed methods except Blackstone River	Topographic maps	10 ft contour	1:24,000 scale, 1:25,000 scale	USGS various
Milford, Town of	Mill River	Topographic maps	5 ft contour	1:2,400 scale	Quinn 1979

Table 22: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data			
		Description	Vertical Accuracy	Horizontal Accuracy	Citation
Hopedale, Town of; Mendon, Town of	All sources studied by detailed methods not redelineated in 2025 Charles Watershed revision	Topographic maps	5 ft contour	1:2,400 scale	Quinn 1979
Boylston, Town of	Sewall Brook	Topographic maps	10 ft contour	1:24,000 scale	USGS various
Auburn, Town of	All sources studied by detailed methods except Dark Brook No. 1	Topographic maps	10 ft contour	1:24,000 scale	USGS various
Auburn, Town of	Dark Brook No. 1	Topographic maps	10 ft contour	1:25,000 scale	USGS various

BFEs shown at cross sections on the FIRM represent the 1% 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 coastal areas, areas of ponding, and other areas with static base flood elevations.

Table 23: Floodway Data

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	111,999	79 / 363[2]	2,158	1.1	214.0	214.0	214.5	0.5
B	113,023	154 / 233[2]	1,305	1.8	214.2	214.2	214.8	0.6
C	113,336	152	1,033	2.3	214.3	214.3	214.9	0.6
D	116,245	228	1,301	1.8	215.6	215.6	216.4	0.8
E	117,076	342	1,798	1.3	215.8	215.8	216.7	0.9
F	119,234	112	706	0.9	216.0	216.0	216.9	0.9
G	125,629	521	6,758	0.4	232.6	232.6	232.7	0.1
H	125,860	295	5,896	0.4	232.6	232.6	232.7	0.1
I	128,566	439	6,812	0.4	232.6	232.6	232.7	0.1
J	131,131	40	209	9.3	232.6	232.6	233.0	0.4
K	132,287	170	820	2.4	237.6	237.6	238.5	0.9
L	133,011	35	195	10.0	240.4	240.4	240.4	0.0
M	133,111	49	351	5.6	243.7	243.7	243.7	0.0
N	133,201	50	518	3.8	243.9	243.9	243.9	0.0
O	133,259	90	898	2.2	249.8	249.8	249.8	0.0
P	133,322	140	621	3.2	251.5	251.5	251.5	0.0
Q	133,417	180	1,457	1.4	251.6	251.6	251.6	0.0
R	133,491	180	1,445	1.4	251.6	251.6	251.6	0.0
S	133,591	250	3,055	0.6	251.7	251.7	251.7	0.0
T	133,692	200	1,898	1.0	251.7	251.7	251.7	0.0
U	134,331	120	860	2.2	251.7	251.7	251.7	0.0

[1]Feet above confluence with Concord River

[2]Width within county/total width

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: ASSABET RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	159,444	25	137	5.4	274.1	274.1	275.1	1.0
B	160,642	30	145	5.1	276.9	276.9	277.3	0.4
C	161,645	40	191	3.8	278.4	278.4	278.9	0.5
D	161,761	37	122	6.0	279.5	279.5	280.5	1.0
E	161,862	15	63	11.7	281.5	281.5	281.5	0.0
F	162,210	25	83	8.9	284.3	284.3	285.3	1.0
G	162,342	64	144	5.1	286.9	286.9	286.9	0.0
H	162,701	35	100	7.3	286.9	286.9	286.9	0.0
I	162,817	18	87	8.5	286.9	286.9	287.9	1.0
J	162,934	38	96	7.6	288.2	288.2	288.2	0.0
K	163,451	23	73	10.1	295.9	295.9	295.9	0.0
L	163,562	25	126	5.9	297.3	297.3	298.3	1.0
M	163,673	20	69	10.6	298.0	298.0	298.3	0.3
N	164,771	25	75	9.8	311.5	311.5	311.5	0.0

[1]Feet above confluence with Concord River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: ASSABET RIVER (LOWER REACH)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	116	240	0.5	312.3	312.3	313.3	1.0
B	830	9	15	7.5	319.5	319.5	319.5	0.0
C	2,180	10	25	4.5	330.1	330.1	330.5	0.4
D	2,294	10	27	4.2	330.8	330.8	331.8	1.0
E	2,408	10	25	4.6	331.8	331.8	332.0	0.2
F	2,828	6	14	6.5	333.8	333.8	334.3	0.5
G	2,955	6	19	4.7	334.4	334.4	335.4	1.0
H	3,081	37	31	2.9	335.7	335.7	336.0	0.3
I	3,881	6	11	7.9	351.6	351.6	351.8	0.2

[1]Feet above mouth at Assabet Reservoir

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	750	30	117	1.3	268.8	268.8	268.8	0.0
B	861	8	19	8.4	268.9	268.9	268.9	0.0
C	1,663	9	25	6.3	292.0	292.0	292.9	0.9
D	2,983	11	21	7.5	315.2	315.2	315.9	0.7
E	3,115	71	274	0.6	319.7	319.7	319.7	0.0
F	3,216	68	226	0.7	319.7	319.7	319.8	0.1
G	3,865	66	129	1.2	319.8	319.8	319.8	0.0

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: ASSABET RIVER BRANCH NO. 2

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	41	85	2.1	307.1	305.8[2]	305.8	0.0
B	150	40	78	2.3	307.1	306.3[2]	306.3	0.0
C	1,680	34	78	2.2	309.6	309.6	309.7	0.1
D	1,890	8	38	4.6	310.5	310.5	311.1	0.6
E	3,230	20	27	6.6	342.7	342.7	343.5	0.8
F	3,390	22	49	3.6	347.6	347.6	347.7	0.1
G	3,860	15	24	7.3	355.8	355.8	355.8	0.0
H	3,960	11	38	4.6	357.8	357.8	357.8	0.0
I	4,190	30	55	3.2	358.6	358.6	359.1	0.5
J	5,300	24	70	1.8	359.8	359.8	360.8	1.0

[1]Feet above confluence with Lake Ripple

[2]Elevation computed without consideration of backwater effects from Lake Ripple

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: AXTELL BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	628	39	57	6.7	641.3	641.3	641.6	0.3
B	855	90	124	3.1	644.0	644.0	644.9	0.9
C	1,315	88	354	1.1	653.8	653.8	653.8	0.0

[1]Feet above confluence with East Wachusett Brook

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BABCOCK BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	861	20	50	2.5	998.9	997.8[2]	998.8	1.0
B	1,331	20	60	2.0	998.9	998.6[2]	999.4	0.8
C	1,484	50	300	0.4	1,002.1	1,002.1	1,002.1	0.0
D	2,925	45	235	0.5	1,002.1	1,002.1	1,002.2	0.1
E	4,536	40	230	0.5	1,002.2	1,002.2	1,002.3	0.1
F	5,460	30	135	0.9	1,002.2	1,002.2	1,002.5	0.3
G	5,660	60	395	0.3	1,008.0	1,008.0	1,008.0	0.0
H	6,093	40	270	0.4	1,008.0	1,008.0	1,008.0	0.0
I	6,241	200	1,223	0.1	1,008.0	1,008.0	1,008.0	0.0
J	7,059	10	34	3.5	1,008.0	1,008.0	1,008.4	0.4

[1]Feet above confluence with Mahoney Brook

[2]Elevation computed without consideration of backwater effects from Mahoney Brook

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	84	86	340	6.1	339.8	334.6[2]	334.6	0.0
B	533	49	214	9.6	339.8	337.4[2]	337.4	0.0
C	2,014	99	414	5.0	344.7	344.7	344.7	0.0
D	2,538	57	252	8.2	346.1	346.1	346.1	0.0
E	2,786	133	671	3.1	350.1	350.1	350.1	0.0
F	3,545	48	185	11.1	351.4	351.4	351.4	0.0
G	5,020	57	514	4.0	357.6	357.6	358.6	1.0
H	5,070	60	502	4.1	357.7	357.7	358.7	1.0
I	5,158	72	563	3.7	360.3	360.3	360.3	0.0
J	5,453	44	378	5.5	360.5	360.5	360.6	0.1
K	5,860	37	326	6.3	361.1	361.1	361.5	0.4
L	6,157	59	531	3.9	362.8	362.8	363.2	0.4
M	6,547	228	1458	1.4	366.0	366.0	366.0	0.0
N	6,794	337	1889	1.1	366.1	366.1	366.5	0.4
O	7,101	230	1911	1.1	366.2	366.2	366.5	0.3
P	8,062	317	1854	1.1	366.3	366.3	366.7	0.4
Q	9,122	46	256	8.0	366.3	366.3	367.2	0.9
R	9,882	84	474	4.4	370.4	370.4	370.6	0.2
S	10,843	57	368	5.6	372.2	372.2	372.7	0.5
T	11,560	87	494	4.2	374.3	374.3	374.4	0.1
U	12,417	160	422	4.9	376.0	376.0	376.4	0.4

[1]Feet above confluence with North Nashua River

[2]Elevation computed without consideration of backwater effects from North Nashua River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BAKER BROOK 2

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	13,164	538	897	2.3	377.0	377.0	378.0	1.0
W	13,971	106	263	6.1	378.4	378.4	378.9	0.5
X	14,580	64	285	5.6	382.0	382.0	382.2	0.2
Y	14,773	58	319	5.0	384.1	384.1	384.1	0.0
Z	15,146	63	312	5.1	385.0	385.0	385.0	0.0
AA	15,789	58	186	8.5	387.5	387.5	388.5	1.0
AB	16,283	44	240	6.6	393.2	393.2	394.1	0.9
AC	16,477	65	304	5.2	395.4	395.4	395.6	0.2
AD	17,505	37	155	10.7	403.1	403.1	403.1	0.0
AE	18,176	47	194	8.2	413.3	413.3	413.3	0.0
AF	18,909	47	160	9.9	422.5	422.5	422.8	0.3
AG	19,264	97	246	6.5	428.2	428.2	428.5	0.3
AH	19,395	234	534	3.0	432.0	432.0	432.0	0.0
AI	19,819	51	155	10.3	437.3	437.3	437.3	0.0
AJ	19,959	58	340	4.2	442.4	442.4	442.4	0.0
AK	20,134	336	1327	1.1	449.0	449.0	449.0	0.0
AL	20,582	200	989	1.4	449.0	449.0	449.0	0.0
AM	20,808	126	329	4.3	453.0	453.0	453.0	0.0
AN	21,657	81	187	7.6	466.2	466.2	466.2	0.0
AO	22,756	26	131	10.9	482.7	482.7	482.7	0.0
AP	24,275	39	177	8.0	500.2	500.2	500.5	0.3

[1]Feet above confluence with North Nashua River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BAKER BROOK 2

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AQ	24,693	150	757	1.9	506.8	506.8	506.8	0.0
AR	24,835	63	338	4.2	506.8	506.8	506.8	0.0
AS	24,977	119	662	2.1	509.4	509.4	509.4	0.0
AT	25,661	78	219	6.5	511.4	511.4	512.4	1.0
AU	25,984	70	376	3.8	517.9	517.9	517.9	0.0
AV	26,548	160	1318	1.1	523.6	523.6	523.8	0.2
AW	27,529	522	1976	0.6	523.7	523.7	523.9	0.2
AX	27,844	93	202	6.2	523.7	523.7	524.5	0.8
AY	28,766	57	129	7.5	549.4	549.4	549.4	0.0
AZ	28,890	152	391	2.5	554.0	554.0	554.0	0.0
BA	29,308	47	127	7.6	558.0	558.0	558.7	0.7
BB	29,544	98	206	4.7	562.4	562.4	562.4	0.0
BC	30,088	57	137	7.1	578.1	578.1	578.2	0.1
BD	30,146	53	134	7.2	581.2	581.2	581.2	0.0
BE	30,296	37	128	7.6	585.2	585.2	585.2	0.0
BF	31,044	17	85	11.5	624.0	624.0	624.1	0.1
BG	31,654	16	85	11.3	639.1	639.1	639.2	0.1
BH	32,408	105	208	4.6	651.8	651.8	652.2	0.4
BI	32,534	102	180	5.4	656.3	656.3	656.3	0.0
BJ	32,579	64	206	4.7	657.4	657.4	657.4	0.0
BK	33,046	22	92	10.5	681.6	681.6	681.6	0.0

[1]Feet above confluence with North Nashua River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BAKER BROOK 2

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BL	33,108	37	106	9.1	684.8	684.8	684.8	0.0
BM	33,180	33	123	7.9	688.3	688.3	688.3	0.0
BN	33,708	22	37	7.3	721.8	721.8	721.8	0.0
BO	34,242	6	34	8.0	759.6	759.6	759.6	0.0
BP	34,834	7	37	7.4	794.9	794.9	794.9	0.0
BQ	35,729	13	33	8.3	818.5	818.5	818.8	0.3
BR	35,974	19	31	6.9	839.4	839.4	839.4	0.0
BS	36,435	22	30	7.3	869.3	869.3	869.3	0.0
BT	36,585	19	33	6.6	879.3	879.3	879.3	0.0

[1]Feet above confluence with North Nashua River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BAKER BROOK 2

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	787	90	654	6.3	478.7	478.7	478.7	0.0
B	1,917	263	939	2.9	479.0	479.0	479.3	0.3
C	2,467	26	267	2.6	482.3	482.3	482.3	0.0
D	2,692	66	205	3.3	482.4	482.4	482.4	0.0
E	4,052	24	226	3.0	482.6	482.6	482.7	0.1
F - H*	*	*	*	*	*	*	*	*

[1]Feet above confluence with Curtis Pond Outflow and Middle River

*No floodway data computed

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BEAVER BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	200	210	823	0.3	265.6	265.6	265.6	0.0
B	1,150	128	594	0.4	265.6	265.6	265.6	0.0
C	2,808	50	208	0.7	265.7	265.7	265.8	0.1
D	3,365	65	282	0.5	265.7	265.7	265.8	0.1
E	3,805	46	214	0.7	269.0	269.0	269.0	0.0
F	3,985	140	518	0 3	269.0	269.0	269.0	0.0
G	4,980	455	1,596	0.1	269.0	269.0	269.0	0.0
H	5,280	724	1,877	0.1	269.0	269.0	269.0	0.0

[1]Feet above Shaker Road

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BENNETTS BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	240	515	3,735	0.1	308.7	308.7[2]	309.7	1.0
B	415	715	6,254	0.1	308.8	308.8	309.7	0.9
C	1,230	294	1,191	0.5	308.8	308.8	309.7	0.9
D	1,450	200	594	0.9	310.3	310.3	310.4	0.1
E	1,658	225	559	1.0	310.3	310.3	310.4	0.1
F	1,770	450	2,864	0.2	314.6	314.6	314.6	0.0
G	2,840	55	212	2.5	314.6	314.6	314.6	0.0
H	4,020	70	100	5.4	316.6	316.6	316.8	0.2
I	4,545	20	102	5.3	319.9	319.9	320.8	0.9
J	5,030	155	1,202	0.5	339.5	339.5	339.5	0.0
K	6,743	40	83	6.5	339.9	339.9	340.4	0.5
L	7,793	31	100	5.4	349.5	349.5	350.3	0.8
M	8,061	14	44	8.6	355.1	355.1	355.1	0.0
N	8,296	45	386	1.0	362.5	362.5	362.5	0.0
O	9,016	22	60	6.3	374.0	374.0	374.7	0.7
P	9,166	150	665	0.6	384.9	384.9	385.2	0.3
Q	10,170	30	114	3.1	384.9	383.2	384.2	1.0
R	10,300	30	99	3.6	384.9	383.5	384.3	0.8
S	10,430	23	68	5.2	384.9	384.4	384.8	0.4
T	10,750	33	58	6.1	389.2	389.2	389.5	0.3
U	10,865	15	68	5.2	390.0	390.0	390.9	0.9

[1]Feet above confluence with Quinsigamond River

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

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BIG BUMMET BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	10,980	20	104	3.4	391.1	391.1	391.6	0.5
W	11,580	20	123	2.9	392.1	392.1	392.7	0.6
X	11,700	33	224	1.6	396.0	396.0	396.0	0.0
Y	11,780	30	265	1.3	396.0	396.0	396.0	0.0
Z	11,875	31	267	1.3	397.4	397.4	397.4	0.0
AA	11,920	30	300	1.2	397.4	397.4	397.4	0.0
AB	12,830	80	391	0.9	400.9	400.9	401.9	1.0
AC	13,430	32	50	7.1	403.9	403.9	403.9	0.0
AD	13,540	83	481	0.7	409.1	409.1	409.1	0.0
AE	13,650	100	558	0.6	409.1	409.1	409.1	0.0
AF	15,880	21	40	7.7	422.3	422.3	422.3	0.0
AG	17,330	50	112	2.8	433.1	433.1	433.8	0.7
AH	19,080	29	59	5.2	443.2	443.2	443.4	0.2
AI	19,190	30	160	1.9	448.5	448.5	448.5	0.0
AJ	19,210	30	179	1.7	448.5	448.5	448.5	0.0
AK	19,290	30	160	1.9	448.5	448.5	448.5	0.0
AL	19,305	286	856	0.4	448.6	448.6	448.6	0.0
AM	19,915	50	67	4.6	452.7	452.7	453.4	0.7
AN	21,330	20	71	4.3	466.5	466.5	466.6	0.1

[1]Feet above confluence with Quinsigamond River

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	84,785	137	3,009	6.2	159.1	159.1	159.4	0.3
B	85,996	134	1,826	11.0	159.3	159.3	159.7	0.5
C	86,924	107	1,551	11.8	162.8	162.8	163.3	0.5
D	87,437	97	1,200	15.3	163.1	163.1	164.0	0.9
E	87,845	288	2,065	9.5	168.3	168.3	168.7	0.4
F	87,985	124	1,865	9.8	168.7	168.7	169.7	1.0
G	88,177	366	2,259	8.4	171.2	171.2	171.6	0.4
H	88,779	456	5,291	5.0	173.3	173.3	173.6	0.3
I	89,462	299	4,258	5.2	173.8	173.8	174.0	0.2
J	94,835	141	966	15.3	186.8	186.8	186.8	0.0
K	95,300	392	4,240	5.6	199.4	199.4	199.4	0.0
L	96,600	630	6,931	2.7	200.0	200.0	200.0	0.0
M	97,447	470	4,282	4.9	199.9	199.9	200.0	0.0
N	99,385	276	3,692	4.2	200.4	200.4	200.5	0.0
O	99,606	180	2,715	5.8	200.4	200.4	200.4	0.0
P	100,133	698	5,211	5.8	203.9	203.9	203.9	0.0
Q	101,474	255	3,002	6.4	204.2	204.2	204.2	0.0
R	101,851	326	4,639	5.6	206.8	206.8	206.9	0.0
S	103,740	490	3,593	6.3	207.5	207.5	207.5	0.0
T	104,660	193	2,775	5.2	208.6	208.6	208.7	0.1
U	105,197	158	2,231	6.5	209.3	209.3	209.3	0.0

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	105,550	160	1,909	8.8	209.4	209.4	209.4	0.0
W	109,151	485	3,438	7.4	213.2	213.2	213.9	0.8
X	112,371	355	3,490	5.8	215.9	215.9	216.3	0.5
Y	116,500	395	4,703	5.7	217.9	217.9	218.9	1.0
Z	121,470	660	6,966	4.2	220.3	220.3	221.0	0.7
AA	122,846	600	5,388	5.3	220.6	220.6	221.4	0.8
AB	123,541	460	4,833	5.9	222.5	222.5	222.8	0.4
AC	124,154	450	5,783	5.2	222.7	222.7	223.2	0.4
AD	124,722	1,000	15,376	1.2	223.9	223.9	224.5	0.5
AE	130,796	1,110	10,964	3.4	224.0	224.0	224.6	0.6
AF	135,121	1,025	8,325	4.2	224.4	224.4	225.2	0.8
AG	138,103	366	2,526	5.1	225.1	225.1	226.0	0.9
AH	138,527	524	3,747	4.9	226.1	226.1	226.7	0.5
AI	139,140	787	4,303	5.1	226.4	226.4	227.0	0.6
AJ	143,316	1,148	3,890	4.5	228.8	228.8	229.5	0.8
AK	146,915	241	1,859	4.6	233.0	233.0	233.5	0.5
AL	147,138	854	11,330	1.4	247.9	247.9	248.0	0.1
AM	147,250	583	13,929	0.6	247.9	247.9	248.0	0.1
AN	149,088	400	6,632	1.5	247.9	247.9	248.0	0.1
AO	151,094	510	7,594	1.6	247.9	247.9	248.0	0.1
AP	153,132	825	9,345	2.2	247.9	247.9	248.1	0.2

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AQ	156,223	1,585	12,825	2.1	248.0	248.0	248.2	0.2
AR	159,040	1,505	5,154	5.2	248.1	248.1	248.4	0.3
AS	162,881	1,034	3,585	6.7	248.9	248.9	249.5	0.6
AT	164,391	671	1,715	8.2	250.8	250.8	251.2	0.4
AU	164,636	865	5,145	3.6	253.9	253.9	254.1	0.2
AV	166,975	900	5,103	3.7	254.5	254.5	255.0	0.5
AW	168,491	804	4,006	3.8	254.9	254.9	255.5	0.6
AX	169,548	140	1,388	4.5	255.6	255.6	256.1	0.5
AY	169,596	96	993	6.3	256.2	256.2	256.5	0.4
AZ	169,712	99	908	6.8	258.3	258.3	258.3	0.0
BA	171,247	570	4,002	3.3	259.2	259.2	259.1	0.0
BB	173,044	1,010	1,699	5.0	260.6	260.6	260.7	0.1
BC	175,391	145	1,311	6.3	263.6	263.6	263.6	0.0
BD	175,890	78	973	7.8	264.8	264.8	265.0	0.3
BE	177,223	245	1,888	5.7	266.7	266.7	267.3	0.6
BF	177,604	67	849	8.7	266.9	266.9	267.3	0.4
BG	177,890	145	1,215	7.6	267.4	267.4	268.4	1.0
BH	178,161	230	2,365	3.8	268.5	268.5	269.2	0.7
BI	181,489	299	2,069	5.5	270.8	270.8	271.2	0.4
BJ	185,115	162	1,341	7.2	274.2	274.2	274.5	0.3
BK	187,939	840	3,395	4.7	276.2	276.2	277.1	0.9

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BL	188,581	622	2,287	4.5	276.6	276.6	277.3	0.7
BM	189,205	1,150	3,982	2.5	281.3	281.3	281.4	0.0
BN	192,312	435	1,492	7.0	283.7	283.7	283.8	0.1
BO	192,720	155	1,441	5.4	284.2	284.2	284.3	0.2
BP	193,046	137	1,519	5.0	285.4	285.4	285.6	0.3
BQ	193,720	228	2,060	3.8	286.1	286.1	286.4	0.3
BR	194,299	1,520	7,550	2.2	293.2	293.2	293.2	0.0
BS	196,991	935	3,486	5.1	293.6	293.6	293.7	0.1
BT	197,656	1,017	3,562	6.8	293.9	293.9	294.2	0.3
BU	199,249	974	2,503	7.4	295.8	295.8	296.3	0.5
BV	199,975	434	877	12.3	298.9	298.9	299.9	1.0
BW	200,714	171	1,421	6.6	304.0	304.0	304.1	0.1
BX	201,224	278	1,434	7.7	304.9	304.9	305.1	0.1
BY	201,797	102	690	11.2	305.3	305.3	305.4	0.1
BZ	202,450	125	541	14.6	309.4	309.4	309.4	0.0
CA	203,053	476	2,091	6.6	313.6	313.6	313.6	0.0
CB	204,720	64	616	11.5	316.7	316.7	316.9	0.2
CC	204,986	78	740	11.2	318.2	318.2	318.7	0.4
CD	205,588	215	1,736	6.0	321.6	321.6	321.9	0.3
CE	205,870	426	2,436	3.3	322.2	322.2	322.4	0.2
CF	206,956	319	953	7.9	322.5	322.5	322.7	0.2

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CG	207,483	154	814	10.8	323.9	323.9	324.1	0.2
CH	208,018	128	769	10.1	326.0	326.0	326.2	0.1
CI	208,475	259	2,010	3.8	338.8	338.8	339.4	0.6
CJ	210,594	381	2,426	3.0	339.2	339.2	339.8	0.5
CK	211,021	330	2,252	3.7	339.4	339.4	339.9	0.5
CL	212,439	197	1,206	7.4	340.2	340.2	340.6	0.3
CM	214,614	114	647	11.0	344.1	344.1	344.2	0.0
CN	215,253	229	1,435	6.7	352.9	352.9	353.1	0.2
CO	216,013	194	1,379	6.3	353.1	353.1	353.8	0.7
CP	216,462	192	1,130	7.0	355.2	355.2	356.2	1.0
CQ	216,756	78	741	9.3	355.2	355.2	356.1	0.9
CR	217,213	63	767	8.7	359.0	359.0	359.1	0.1
CS	218,279	109	504	12.3	361.5	361.5	361.5	0.0
CT	218,784	64	435	15.3	369.3	369.3	369.4	0.1
CU	219,030	63	582	12.7	380.5	380.5	380.5	0.0
CV	219,165	83	790	10.8	381.7	381.7	381.7	0.0
CW	219,627	106	517	14.3	382.7	382.7	382.7	0.0
CX	219,862	95	1,124	6.2	392.8	392.8	393.0	0.2
CY	219,956	110	1,291	5.6	393.0	393.0	393.2	0.2
CZ	220,819	67	729	8.3	393.4	393.4	393.6	0.2
DA	220,978	86	825	8.1	393.7	393.7	393.8	0.2

[1]Feet above Main Street, Pawtucket, Rhode Island

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DB	221,187	113	1,188	5.7	394.5	394.5	394.7	0.2
DC	222,108	160	1,392	6.6	394.7	394.7	395.1	0.4
DD	222,583	116	1,312	4.7	395.6	395.6	395.9	0.3
DE	223,033	147	1,512	4.0	395.8	395.8	396.1	0.4
DF	223,278	81	1,001	5.8	396.4	396.4	396.8	0.4
DG	223,714	68	770	8.1	396.7	396.7	397.1	0.4
DH	224,635	173	887	7.7	397.9	397.9	398.3	0.4
DI	228,325	192	1,293	7.3	403.1	403.1	404.0	0.9
DJ	228,846	164	1,201	6.9	404.1	404.1	404.8	0.7
DK	229,396	100	798	8.0	405.3	405.3	405.6	0.3
DL	229,869	121	1,214	5.2	406.4	406.4	406.5	0.1
DM	230,289	155	1,388	6.7	407.7	407.7	407.7	0.0
DN	231,982	191	1,218	7.0	408.4	408.4	408.9	0.6
DO	232,661	153	1,210	4.4	409.1	409.1	410.1	1.0
DP	233,019	181	1,368	5.0	409.7	409.7	410.6	0.9
DQ	233,214	194	1,261	5.6	410.0	410.0	410.7	0.6
DR	233,550	455	1,734	5.3	411.8	411.8	411.8	0.0
DS	233,740	502	2,449	3.6	412.0	412.0	412.0	0.0
DT	234,522	196	1,459	3.7	412.2	412.2	412.4	0.1
DU	234,728	228	1,680	3.5	412.3	412.3	412.5	0.2
DV	235,626	265	2,121	4.9	417.1	417.1	417.6	0.5

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DW	237,292	103	852	7.5	417.5	417.5	418.0	0.4
DX	237,861	88	710	8.6	419.3	419.3	419.6	0.3
DY	238,039	88	866	6.7	420.5	420.5	421.0	0.5
DZ	238,371	95	767	7.9	420.6	420.6	421.1	0.5
EA	238,735	74	629	9.3	420.8	420.8	421.1	0.3
EB	239,667	84	653	10.7	422.7	422.7	422.7	0.0
EC	240,193	182	760	11.2	423.2	423.2	423.4	0.2
ED	240,665	685	1,858	4.4	426.1	426.1	426.1	0.0
EE	241,753	75	658	8.7	426.9	426.9	426.9	0.0
EF	242,835	160	766	9.5	429.6	429.6	429.6	0.0
EG	243,094	87	649	9.9	431.4	431.4	431.4	0.0
EH	243,266	63	599	9.6	432.9	432.9	433.0	0.1
EI	243,429	62	714	7.8	433.8	433.8	433.9	0.1
EJ	243,835	30	304	19.2	434.0	434.0	434.0	0.0
EK	243,864	50	498	13.3	438.5	438.5	439.4	0.9
EL	244,003	70	829	10.0	441.3	441.3	441.6	0.3
EM	244,117	44	615	9.8	441.2	441.2	441.6	0.3
EN	244,264	57	673	10.0	441.4	441.4	441.7	0.3
EO	244,480	82	1,138	5.2	443.4	443.4	443.9	0.6

[1]Feet above Main Street, Pawtucket, Rhode Island

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BLACKSTONE RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,100	265	1,236	0.9	227.2	221.3[2]	221.5	0.2
B	2,280	165	80 0	1.4	227.2	221.4[2]	221.7	0.3
C	4,470	175	982	1.1	227.2	221.6[2]	222.0	0.4
D	6,070	400	2,219	0.4	227.2	221.6[2]	222.0	0.4
E	7,530	100	386	2.1	227.2	221.8[2]	222.3	0.5
F	7,950	55	193	4.2	227.2	222.6[2]	223.1	0.5
G	8,830	200	990	0.7	235.4	235.4	235.4	0.0
H	9,330	36	168	4.2	235.5	235.5	235.6	0.1
I	9,730	25	98	7.2	236.5	236.5	236.8	0.3
J	10,560	31	118	6.0	240.9	240.9	241.8	0.9
K	11,240	28	121	5.8	244.3	244.3	245.0	0.7
L	11,630	35	143	4.9	246.2	246.2	246.7	0.5
M	11,920	85	376	1.9	250.3	250.3	250.3	0.0
N	12,150	100	528	1.3	250.4	250.4	250.4	0.0
O	12,960	175	837	0.8	250.4	250.4	250.5	0.1
P	14,860	300	1,112	0.6	250.5	250.5	250.7	0.2
Q	15,375	130	709	1.8	251.5	251.5	251.6	0.1
R	16,150	100	591	2.1	251.5	251.5	251.7	0.2
S	18,150	185	915	1.4	252.6	252.6	253.3	0.7
T	19,295	190	817	1.2	255.5	255.5	255.5	0.0
U	20,490	125	403	2.4	255.7	255.7	256.0	0.3

[1]Feet above Barnum Road

[2]Elevation computed without consideration of backwater effects from Nonacoicus Brook

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BOWERS BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	22,140	298	786	0.6	256.1	256.1	256.9	0.8
W	23,550	76	214	2.1	276.0	276.0	276.0	0.0
X	24,350	160	212	2.1	284.0	284.0	284.5	0.5
Y	25,152	180	394	1.1	301.8	301.8	301.8	0.0
Z	26,220	310	1,317	0.3	316.9	316.9	316.9	0.0
AA	27,070	50	149	2.9	335.0	335.0	335.0	0.0
AB	27,650	80	310	1.4	335.3	335.3	335.4	0.1
AC	28,510	170	617	0.7	335.4	335.4	335.8	0.4
AD	29,630	140	634	0.7	335.5	335.5	336.0	0.5
AE	30,680	40	208	2 5	339.5	339.5	339.5	0.0
AF	31,700	40	235	2.2	339.5	339.5	340.4	0.9
AG	38,995	22	46	2.4	339.5	339.5	340.4	0.9
AH	39,587	60	181	0.6	366.6	366.6	366.6	0.0
AI	39,950	90	266	0.4	366.6	366.6	366.6	0.0
AJ	40,675	85	311	0.4	370.4	370.4	370.4	0.0
AK	41,075	55	206	0.5	370.4	370.4	370.4	0.0
AL	41,535	50	108	1.0	370.4	370.4	370.5	0.1
AM	41,747	280	662	0.2	373.1	373.1	373.1	0.0

[1]Feet above Barnum Road

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BOWERS BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	-240	34	98	3.9	449.1	449.1	450.1	1.0
B	40	35	124	3.0	452.2	452.2	452.2	0.0
C	1,290	40	87	4.3	452.7	452.7	453.5	0.8
D	2,040	217	299	1.2	453.6	453.6	454.6	1.0
E	2,890	70	65	5.5	468.3	468.3	468.3	0.0
F	3,440	106	281	1.3	470.5	470.5	470.5	0.0
G	4,140	20	77	4.6	471.9	471.9	471.9	0.0
H	5,324	127	525	0.6	476.4	476.4	476.4	0.0
I	6,399	208	1,030	0.3	476.4	476.4	476.4	0.0
J	7,749	28	134	2.2	476.5	476.5	476.5	0.0
K	8,626	110	60	4.3	483.4	483.4	483.4	0.0

[1]Feet above U.S. Highway 20

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: BROAD MEADOW BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,190	10	21	8.6	555.9	555.9	555.9	0.0
B	3,300	10	28	8.9	612.2	612.2	612.8	0.6
C	5,790	23	63	3.9	657.3	657.3	658.0	0.7
D	6,260	32	53	4.6	663.6	663.6	663.7	0.1

[1]Feet above confluence with Falulah Brook

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0.028	75	370	11.3	424.9	421.9[2]	421.9	0.0
B	0.135	45	327	12.9	424.9	424.1[2]	424.6	0.5
C	0.323	35	267	15.7	432.2	432.2	432.3	0.1
D	0.498	50	319	13.2	439.0	439.0	439.1	0.1
E	0.555	60	375	11.2	441.9	441.9	442.3	0.4
F	0.652	45	305	13.8	446.2	446.2	446.2	0.0
G	0.762	200	823	5.1	451.7	451.7	452.3	0.6
H	0.883	50	355	11.8	456.2	456.2	456.2	0.0
I	0.985	200	754	5.6	461.5	461.5	461.8	0.3
J	1.069	150	759	5.5	464.4	464.4	464.9	0.5
K	1.408	150	521	8.1	475.1	475.1	475.1	0.0
L	1.707	100	515	8.2	486.0	486.0	486.0	0.0
M	1.743	200	1,589	2.6	490.9	490.9	491.7	0.8
N	1.824	140	945	4.0	491.2	491.2	492.0	0.8
O	1.922	95	462	8.1	494.2	494.2	494.2	0.0
P	2.503	60	298	12.6	511.7	511.7	511.8	0.1
Q	2.557	45	310	12.2	517.3	517.3	517.3	0.0
R	2.749	240	692	5.0	526.0	526.0	526.7	0.7
S	3.029	125	441	7.8	540.1	540.1	540.4	0.3
T	3.282	70	367	9.4	555.5	555.5	555.5	0.0
U	3.311	130	1,130	3.0	563.1	563.1	563.1	0.0

[1]Miles above confluence with Quinebaug River

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

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CADY BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	3.437	100	522	6.6	563.2	563.2	563.2	0.0
W	3.921	60	377	9.1	580.2	580.2	580.3	0.1
X	4.252	170	624	5.5	594.7	594.7	595.1	0.4
Y	4.952	125	788	4.4	618.3	618.3	619.1	0.8
Z	5.090	180	826	2.5	620.1	620.1	620.8	0.7
AA	5.315	90	287	7.1	627.9	627.9	628.4	0.5
AB	5.476	70	256	8.0	641.4	641.4	641.4	0.0
AC	5.506	50	278	7.3	643.9	643.9	643.9	0.0
AD	5.712	25	153	13.3	665.5	665.5	665.5	0.0
AE	5.720	80	216	9.4	669.9	669.9	670.0	0.1

[1]Miles above confluence with Quinebaug River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CADY BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	54	263	4.6	749.7	749.7	750.7	1.0
B	1,500	245	1,188	1.0	756.4	756.4	757.4	1.0
C	5,000	36	104	6.5	781.0	781.0	781.2	0.2
D	6,900	21	92	7.1	805.0	805.0	805.8	0.8
E	9,550	38	155	3.9	827.0	827.0	827.9	0.9
F	10,910	36	77	7.5	840.8	840.8	841.1	0.3
G	12,202	116	956	0.6	847.5	847.5	847.5	0.0
H	13,602	32	274	1.8	847.6	847.6	847.6	0.0

[1]Feet above corporate limits

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CANESTO BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	20,285	38	134	5.8	302.4	302.4	302.4	0.0
B	20,840	145	819	0.9	309.3	309.3	309.3	0.0
C	23,000	67	233	3.3	310.1	310.1	310.6	0.5
D	23,430	179	947	0.8	315.9	315.9	315.9	0.0

[1]Feet above confluence with Nashua River

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0.231	20	127	2.3	578.9	578.9	579.0	0.1
B	0.343	30	119	2.4	579.0	579.0	579.5	0.5
C	0.391	40	171	1.7	579.1	579.1	579.9	0.8
D	0.429	60	243	1.2	579.2	579.2	580.1	0.9
E	0.568	15	50	5.7	585.3	585.3	585.9	0.6
F	0.689	15	51	5.7	592.3	592.3	593.0	0.7
G	0.708	10	30	9.5	594.1	594.1	594.4	0.3
H	0.863	20	60	4.8	608.0	608.0	608.8	0.8
I	1.019	10	29	9.8	635.2	635.2	635.4	0.2
J	1.166	20	54	5.3	653.7	653.7	654.2	0.5
K	1.408	40	230	1.2	654.6	654.6	655.3	0.7
L	1.680	25	45	6.4	658.1	658.1	658.4	0.3

[1]Miles above confluence with Quinebaug River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CEDAR MEADOW BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0.125	775	6,601	0.1	575.2	575.2	576.0	0.8
B	0.645	755	6,296	0.1	575.2	575.2	576.0	0.8
C	0.979	630	5,176	0.1	575.2	575.2	576.0	0.8
D	1.532	145	1,007	0.4	575.2	575.2	576.0	0.8
E	1.589	30	158	2.4	575.2	575.2	576.0	0.8

[1]Miles above Cedar Pond Dam

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CEDAR POND

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	-40	21	82	4.4	272.6	272.6	273.5	0.9
B	65	15	61	5.9	273.5	273.5	274.0	0.5
C	745	73	229	1.6	275.2	275.2	276.2	1.0
D	2,130	15	39	9.2	280.5	280.5	280.5	0.0
E	2,235	15	66	5.5	282.9	282.9	282.9	0.0
F	2,750	16	74	4.9	285.6	285.6	286.6	1.0
G	2,895	73	813	0.4	298.1	298.1	298.1	0.0
H	4,385	80	547	0.7	298.2	298.2	298.2	0.0
I	4,540	30	195	1.9	299.0	299.0	299.0	0.0
J	4,685	148	957	0.4	299.1	299.1	299.0	0.1

[1]Feet above Station Street

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CENTER BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	31,395	*	3,524	0.2	272.0	272.0	272.0	0.0
B	32,355	*	9,810	0.1	272.0	272.0	272.0	0.0
C	33,335	*	6,744	0.1	272.0	272.0	272.0	0.0
D	34,125	*	137	6.2	272.1	272.1	272.1	0.0
E	34,305	*	153	3.3	273.7	273.7	274.0	0.3
F	35,595	50	178	2.8	277.4	277.4	277.4	0.0
G	36,695	129	477	1.1	280.6	280.6	280.6	0.0
H	37,255	50	356	1.4	284.3	284.3	284.9	0.6
I	37,600	20	113	4.4	284.6	284.6	285.0	0.4
J	38,455	20	84	6.0	288.3	288.3	288.8	0.5
K	38,567	*	51	9.9	292.2	292.2	292.2	0.0
L	38,677	*	4,393	0.1	299.3	299.3	299.3	0.0
M	39,055	*	904	0.6	299.3	299.3	299.3	0.0
N	39,093	*	53	9.4	299.3	299.3	299.3	0.0
O	39,655	140	222	2.3	306.3	306.3	307.1	0.8
P	39,796	18	83	6.0	309.4	309.4	310.1	0.7
Q	40,675	58	213	2.4	317.5	317.5	318.5	1.0
R	41,605	80	382	1.3	319.1	319.1	320.1	1.0
S	42,615	126	446	1.1	320.2	320.2	321.2	1.0
T	42,725	440	203	2.5	322.2	322.2	322.2	0.0
U	43,800	105	413	0.8	323.1	323.1	323.9	0.8

[1]Feet above Box Pond Dam

*Floodway coincident with channel banks

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CHARLES RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	43,955	52	257	1.3	323.1	323.1	324.0	0.9
W	45,315	119	560	0.6	323.4	323.4	324.3	0.9

[1]Feet above Box Pond Dam

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CHARLES RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	696	37	183	2.9	436.0	436.0	436.1	0.1
B	1,059	19	58	8.1	436.6	436.6	436.7	0.1
C	1,454	23	54	8.7	441.3	441.3	441.3	0.0
D	1,635	34	149	3.2	446.9	446.9	446.9	0.0
E	2,229	51	179	2.6	447.3	447.3	447.4	0.1
F	2,767	36	106	4.4	448.1	448.1	448.2	0.1
G	2,958	102	267	1.8	451.2	451.2	452.1	0.9
H	3,078	62	79	6.0	453.0	453.0	453.0	0.0
I	3,142	42	94	5.0	454.2	454.2	454.2	0.0
J	3,356	10	63	7.5	462.9	462.9	463.3	0.4
K	3,568	27	85	5.5	465.1	465.1	466.0	0.9
L	3,995	22	53	8.8	469.2	469.2	469.2	0.0
M	4,252	21	53	8.9	472.0	472.0	472.0	0.0
N	4,470	42	151	3.1	477.4	477.4	477.4	0.0
O	4,914	31	54	6.7	479.0	479.0	479.1	0.1
P	5,261	107	142	2.5	482.8	482.8	483.7	0.9
Q	5,676	90	83	4.4	490.6	490.6	491.6	1.0
R	5,904	25	48	7.6	495.9	495.9	495.9	0.0
S	7,135	19	49	7.3	530.6	530.6	530.7	0.1
T	7,597	24	46	7.9	534.0	534.0	534.0	0.0
U	7,800	81	425	0.9	540.5	540.5	540.5	0.0

[1]Feet above confluence with Quinebaug River

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	8,149	45	104	3.5	540.5	540.5	540.5	0.0
W	8,325	39	100	3.6	542.4	542.4	543.3	0.9
X	8,832	83	300	1.2	551.5	551.5	551.7	0.2
Y	9,266	222	158	2.3	560.7	560.7	560.7	0.0
Z	13,713	61	117	2.3	572.6	572.6	573.0	0.4

[1]Feet above confluence with Quinebaug River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COHASSE BROOK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	34	189	4.9	254.0	254.0	255.0	1.0
B	180	22	126	7.3	254.6	254.6	255.6	1.0
C	232	14	74	12.5	255.3	255.3	255.6	0.3
D	269	52	386	2.4	258.5	258.5	258.5	0.0
E	300	81	533	1.7	259.6	259.6	259.6	0.0
F	430	242	1,022	0.9	259.8	259.8	259.8	0.0
G	690	462	1,834	0.5	259.8	259.8	259.8	0.0
H	791	16	114	8.0	262.9	262.9	262.9	0.0
I	820	53	219	4.2	263.9	263.9	263.9	0.0
J	990	33	93	9.8	265.5	265.5	265.5	0.0
K	1,210	29	53	7.7	270.0	270.0	270.0	0.0
L	1,340	37	58	7.1	274.0	274.0	274.0	0.0
M	1,630	243	840	0.5	287.3	287.3	287.3	0.0
N	1,700	175	410	1.0	287.3	287.3	287.3	0.0
O	1,790	44	81	5.0	287.3	287.3	287.3	0.0
P	1,850	89	288	1.4	290.9	290.9	290.9	0.0
Q	1,987	48	165	2.5	291.6	291.6	291.6	0.0
R	2,034	7	33	12.3	291.6	291.6	291.6	0.0
S	2,166	34	192	2.1	294.4	294.4	294.4	0.0
T	2,367	78	502	0.8	294.5	294.5	294.5	0.0
U	3,043	363	1,884	0.2	294.5	294.5	294.5	0.0

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD HARBOR BROOK (LOWER REACH)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	4,046	44	168	2.4	294.5	294.5	294.5	0.0
W	4,326	97	438	0.7	294.5	294.5	294.6	0.1
X	5,044	26	67	4.6	294.6	294.6	294.6	0.0
Y	6,184	57	201	1.3	295.7	295.7	296.5	0.8
Z	6,786	38	136	1.7	295.9	295.9	296.7	0.8
AA	6,897	5	21	11.3	297.8	297.8	297.8	0.0
AB	6,982	304	1,628	0.1	300.8	300.8	300.8	0.0
AC	7,700	55	206	1.0	300.8	300.8	300.8	0.0
AD	8,661	29	69	2.6	301.0	301.0	301.2	0.2

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD HARBOR BROOK (LOWER REACH)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	27,509	60	173	4.7	407.4	407.4	407.4	0.8
B	27,958	330	682	1.2	408.3	408.3	408.3	0.8
C	29,758	30	97	7.5	447.2	447.2	447.2	0.2

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD HARBOR BROOK (TOWN OF BOYLSTON)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	15,840	135	379	2.2	314.6	314.6	315.6	1.0
B	15,940	250	1,088	0.8	318.3	318.3	318.3	0.0
C	16,479	268	1,220	0.7	318.3	318.3	318.4	0.1
D	16,722	175	519	1.6	318.7	318.7	318.7	0.0
E	16,822	185	567	1.4	318.8	318.8	318.8	0.0
F	17,662	40	102	7.8	319.3	319.3	319.3	0.0
G	18,538	125	529	1.5	321.3	321.3	321.8	0.5
H	18,660	140	549	1.4	321.4	321.4	322.0	0.6
I	19,657	100	311	2.4	321.8	321.8	322.4	0.6
J	20,661	45	113	6.4	323.8	323.8	324.3	0.5
K	20,761	70	215	3.4	325.6	325.6	325.8	0.2
L	20,861	60	132	5.5	325.7	325.7	325.8	0.1
M	21,257	280	918	0.8	326.5	326.5	327.4	0.9
N	21,701	21	70	10.4	343.3	343.3	343.5	0.2
O	21,864	25	109	6.8	353.7	353.7	353.7	0.0
P	22,012	130	697	1.0	354.3	354.3	355.1	0.8
Q	22,187	80	192	3.9	354.3	354.3	355.1	0.8
R	22,218	12	59	12.6	360.8	360.8	360.8	0.0
S	22,276	13	89	0.3	366.0	366.0	366.0	0.0
T	22,297	13	90	8.4	366.1	366.1	366.1	0.0
U	22,392	230	1,179	0.6	367.5	367.5	367.5	0.0

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD HARBOR BROOK (UPPER REACH)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	22,757	33	84	9.0	368.7	368.7	368.7	0.0
W	22,810	137	697	1.1	374.8	374.8	375.1	0.3
X	22,899	21	145	5.3	374.8	374.8	375.1	0.3
Y	23,068	151	952	0.8	378.3	378.3	378.3	0.0
Z	23,169	33	279	2.7	378.3	378.3	378.3	0.0

[1]Feet above confluence with Assabet River

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD HARBOR BROOK (UPPER REACH)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	350	60	61	2.6	227.2	217.7[2]	218.2	0.5
B	1,860	70	187	0.9	227.2	222.6[2]	223.6	1.0
C	2,910	25	61	2.6	227.2	223.9[2]	224.9	1.0
D	4,140	100	1,080	0.1	239.2	239.2	239.3	0.1
E	4,800	100	734	0.1	239.2	239.2	239.3	0.1
F	5,600	80	411	0.2	239.2	239.2	239.3	0.1

[1]Feet above confluence with Bowers Brook

[2]Elevation computed without consideration of backwater effects from Bowers Brook

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD SPRING BROOK (TOWN OF HARVARD)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	40	96	289	2.6	322.5	321.5[2]	322.5	1.0
B	1,105	99	207	3.7	325.5	325.5	326.2	0.7
C	1,265	19	88	8.6	328.5	328.5	328.6	0.1
D	1,985	36	195	3.9	331.8	331.8	332.4	0.6
E	2,420	25	76	10.0	336.8	336.8	336.9	0.1
F	3,870	37	111	6.8	356.0	356.0	356.4	0.4
G	5,980	35	130	5.8	370.5	370.5	370.7	0.2
H	6,150	460	4,814	0.2	383.3	383.3	383.3	0.0
I	7,250	130	592	1.3	383.3	383.3	383.3	0.0
J	8,370	22	73	10.4	383.5	383.5	383.5	0.0
K	9,040	58	296	2.6	386.2	386.2	387.1	0.9
L	9,400	38	88	8.6	389.9	389.9	389.9	0.0

[1]Feet above confluence with Blackstone River

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

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: COLD SPRING BROOK (TOWN OF SUTTON)

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	925	18	31	6.6	448.7	448.7	448.7	0.0
B	2,700	20	49	4.2	458.5	458.5	458.8	0.3
C	4,410	15	32	6.4	464.1	464.1	464.1	0.0
D	5,630	15	27	7.6	485.4	485.4	485.4	0.0

[1]Feet above State Route 12

TABLE 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

WORCESTER COUNTY, MA

(ALL JURISDICTIONS)

FLOODWAY DATA

FLOODING SOURCE: CONNELLY BROOK