

TOWN OF HAMPDEN HAZARD MITIGATION PLAN Update 2015



Adopted by the Hampden Board of Selectmen on ____

Prepared by:

Hampden Hazard Mitigation Committee

and

The Pioneer Valley Planning Commission

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John Flynn, SelectBoard
Vinnie Villamaino, SelectBoard
Norman Charest, SelectBoard
Mike Gorski, Fire Chief/ Emergency Management Director
Dana Pixley, Highway Superintendent
Pam Courtney, Administrative Assistant
John Matthews, Chair-Planning Board
Nancy Zebert, Volunteer
Ted Zebert, Volunteer

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1: PLANNING PROCESS

Introduction

The Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA) define hazard mitigation as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc. Mitigation efforts undertaken by communities will help to minimize damages to buildings and infrastructure, such as water supplies, sewers, and utility transmission lines, as well as natural, cultural and historic resources.

Planning efforts, like the one undertaken by the Town of Hampden and the Pioneer Valley Planning Commission, make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that may threaten it.

Preparing, and updating every five years, a hazard mitigation plan before a disaster saves communities money and facilitates post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in their plan.

FEMA requires that a community adopt a hazard mitigation plan to be eligible for mitigation funding from the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation (PDM) Program are programs with this requirement.

This plan is an update of Hampden's Hazard Mitigation plan which was approved by FEMA on 10/31/08, and it has been revised to reflect the progress in local mitigation efforts since the 2008 plan was adopted.

Hazard Mitigation Committee

Planning for hazard mitigation in Hampden involved a nine member committee:

John Flynn, SelectBoard
Vinnie Villamaino, SelectBoard
Norman Charest, SelectBoard
Mike Gorski, Fire Chief/ Emergency Management Director
Dana Pixley, Highway Superintendent
Pam Courtney, Administrative Assistant
John Matthews, Chair-Planning Board
Nancy Zebert, Volunteer
Ted Zebert, Volunteer

All nine committee members were not able to meet together. John Flynn, SelectBoard, who had worked on the 2008 plan, coordinated the plan update process. The members of the SelectBoard and Administrative Assistance Pam Courtney met together four times with PVPC staff. Community Volunteers Ted and Nancy Zebert joined two of these meetings. Outside of the scheduled meetings, John Flynn consulted with the other members of the Hampden Hazard Mitigation committee to assure their input and active participation in the planning process.

The process the local Hazard Mitigation Committee, with technical assistance provided by PVPC, followed to update Hampden's plan included the following tasks:

- Reviewing and incorporating existing plans and other information including considering how development that has happened in the last seven years since the previous Hazard Mitigation plan was approved by FEMA in October 2008, might have affected the Town's vulnerability to Natural Hazards,
- Updating the documentation of natural hazards that may impact the community since the previous plan
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages
- Identifying deficiencies in the current capabilities, strategies and establishing goals for updating, revising or adopting new strategies
- Adopting and implementing the final updated Hazard Mitigation Plan

The key product of this process is the development of an updated Action Plan with a Prioritized Implementation Schedule.

Committee Meetings

Meetings of the Hazard Mitigation Committee, all of which took place at Town Hall were held on the dates listed below. Agendas for these meetings are included in Appendix B.

February 12, 2015

Meeting included hazard mitigation planning overview, identify and organizing of the planning team, identifying critical facilities, an initial discussion of hazard identification and risk assessment, and existing mitigation strategies undertaken by the town.

May 14, 2015

Committee revisited critical facilities, discussed history of natural hazard events, and discussed potential mitigation strategies to be implemented.

July 23, 2015

Committee provided preliminary update of status of action strategies from 2008 plan and affirmed hazard experience of Town since 2008 plan.

July 27, 2015

Committee finalized status update of planned/current mitigation strategies undertaken by the town and affirmed prioritized list of mitigation strategies. Committee affirmed revised vulnerability assessment, finalized map of location of critical facilities and natural hazards, and signed off on plan update.

January-February, 2016

Following receipt of comments and feedback from FEMA, the members of the local Hazard Committee met with PVPC staff and communicated with MEMA staff to address requested revisions in the draft plan.

Agendas and sign-in sheets for each meeting can be found in Appendix B. While not all members of the Hazard Mitigation Committee were able to attend each meeting, all members collaborated on the plan and were updated on progress by fellow Committee members after meetings occurred.

Participation by Stakeholders

A variety of stakeholders were provided with an opportunity to be involved in the development of the Hampden Hazard Mitigation Plan. The different categories of stakeholders that were involved, and the engagement activities that occurred, are described below.

Local and regional agencies involved in hazard mitigation activities

The Pioneer Valley Planning Commission is a regional planning agency for 43 towns and cities in Massachusetts' Hampden and Hampshire Counties. PVPC regularly engages with the Town of Hampden as part of its regional planning efforts, which include the following:

- Developing the Pioneer Valley Regional Land Use Plan, Valley Vision 2, which advocates for sustainable land use throughout the region and consideration for the impact of flooding and other natural hazards on development.
- Developing the Pioneer Valley Climate Action and Clean Energy Plan, which assesses the impact that climate change will have on the region and recommends strategies for mitigation that can be implemented by local municipalities and businesses.
- Collaborating with state agencies, such as the Department of Conservation and Recreation, to maintain inventories of critical infrastructure throughout the region.

All of these PVPC initiatives considered the impact of natural hazards on the region and strategies for reducing their impact to people and property through hazard mitigation activities. The facilitation of the Hampden Hazard Mitigation Plan by PVPC ensured that the information from these plans and collaborations was incorporated into the Hazard Mitigation Planning process.

In addition, the Pioneer Valley Planning Commission is actively involved in the Western Region Homeland Security Advisory Council (WRHSAC). WRHSAC, which includes representatives from Western Massachusetts municipalities, Fire Departments, Public Works Departments, Police Departments, area hospitals and regional transit from throughout the four counties of western Massachusetts, is responsible for allocating emergency preparedness funding from the US Department of Homeland Security. The representatives of these disciplines who serve on the WRHSAC are charged with sharing the information discussed at meetings with their colleagues at their regular meetings. PVPC staff attend all WRHSAC meetings and all WRHSAC members are aware of the fact that Hampden was updating their Hazard Mitigation plan. Meetings of WRHSAC regularly involve discussion about how to improve emergency preparedness in western Massachusetts, and hazard mitigation activities are included in this discussion.

For the development of this Hazard Mitigation Plan Update, PVPC staff verbally informed WRHSAC members that they were working on the Hampden plan as the Council's Planning sub-committee was deliberating about how to disseminate information about their work to sub-regions of the Pioneer Valley.

In addition, PVPC staff regularly present to their Executive Committee and Commission (representatives from the 43 cities and towns that comprise the Pioneer Valley), when new projects are launched and when funding opportunities are available. As result, all the communities in the region were informed of Hampden's hazard mitigation plan development process and encouraged to comment.

PVPC staff included a summary article on the status of Hazard Mitigation planning in the region in the quarterly Regional Reporter that is mailed to area Chambers of Commerce, all member municipalities, area colleges and universities and other key stakeholders in the region. In this way, businesses, educational institutions and other key stakeholders were educated about and informed of Hampden's hazard mitigation planning work.

Agencies that have the authority to regulate development

Hampden is a relatively small community with limited professional staff. The entities that have the authority to regulate development include the Select Board, the Planning Board, the Conservation Commission, the Board of Health and the Highway Superintendent. The Select Board was actively engaged in this hazard mitigation planning work and the Planning Board was represented on the hazard mitigation plan committee, as was the Emergency Management Director/Fire Chief. The de facto local Hazard Mitigation committee Chair, John Flynn, consulted with the Con Comm and Board of Health and their input was integrated into the plan. The Highway Superintendent served on the Committee and provided input into the plan update process.

The input provided by the local Hazard Mitigation committee members and the other municipal staff and volunteers from whom they solicited input included all the information necessary to update this plan, that was not able to be researched by PVPC staff. This included but was not limited to: details for the local Capability Assessment, updates on specifics of the effects of natural hazards on the community since the 2008 plan was approved, details on changes in capabilities and any new development since the 2008 plan, status of recommended actions from the previous plan, and changes in local policies, procedures, rules and regulations.

In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Hampden, including state agencies, such as the Department of Conservation and Recreation and MassDOT. This regular involvement ensured that during the update of the Hampden Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan.

Participation by Public & Entities in Surrounding Communities

Two public planning sessions were held as part of the development of the Hampden plan – on May 18, 2015 and July 27, 2015 Both meetings occurred after the Hazard Mitigation Committee had provided input on hazards and mitigation strategies relevant to the community. Notice of both public meetings was posted at Hampden Town Hall in compliance with the Commonwealth of Massachusetts’ open meeting law and the meetings were advertised via a media releases issued by PVPC to area media outlets included in Appendix.

On May 13, 2015 the Pioneer Valley Planning Commission sent a press release to all area media outlets announcing that the hazard mitigation planning process was underway and that the first public outreach meeting would be held on May 18, 2015. On July 23, 2015 PVPC sent out another press release stating that the second public outreach meeting would take place on July 27, 2015 and that a draft of the final plan had been placed on PVPC’s website. The press release also indicated that hard copies of the plan were available at PVPC’s offices and at Hampden Town Hall, and that all residents, businesses and other concerned parties of Hampden were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or Town staff.

The two press releases also encouraged citizens and municipal officials from nearby communities to

comment on Hampden's plan by e-mailing or calling staff contacts at PVPC or the town. The Pioneer Valley Planning Commission's regional scope ensured that residents and government officials throughout the Pioneer Valley saw the press release and request for comments. Neighboring communities were also provided with an opportunity to provide feedback through the Pioneer Valley Planning Commission. At the same that PVPC was working with the Town of Hampden on their Hazard Mitigation plan update, PVPC staff were also working with the neighboring communities of Wilbraham, Monson, Longmeadow, and East Longmeadow, among other communities. While there was no feedback offered by these surrounding communities to the Town of Hampden in their local hazard mitigation planning process, surrounding communities did have the opportunity to provide input.

A list of media organizations that were sent the two press releases is provided in Appendix B. The list of media included television stations, radio stations, and newspapers located in western Massachusetts, northern Connecticut, and southern Vermont.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process, as discussed in Chapter 6: Plan Review, Evaluation, Implementation, and Adoption.

Five members of the public attended the first Public Meeting and two of the members of the public volunteered to join the local hazard mitigation Committee.

Comments received at the first public meeting, with responses/manner in which the comment was or was not integrated into the plan update:

"Town regulations say you can't dredge, but does this apply to the Army Corps of Engineers?"

Response: It is our understanding that the Army Corps of Engineers has jurisdiction over all rivers and that they could over-rule local regulations but that in practice they would probably consult with the Town. Follow-up from public- The comment was not meant as something that should be incorporated into the plan, but rather as a point of clarification.

"FEMA/USGS is in the process of defining and clarifying the Flood Plan--people need to be educated about the dangers of flooding"

Response: The Town included this recommendation in their Strategy List.

"Forest Fires are a concern"

Response: The SelectBoard members present addressed this concern explaining that while there have been some recent fires in surrounding communities that were covered in the local papers, and while brushfires are somewhat common, the majority of fires are small and quickly contained. There are no records of wildfires or burned acreage reported to the Massachusetts' National Fire Incident Reporting System for in Hampden. And, according to the Hampden Fire Department, there are approximately 12 unauthorized burns (or brushfires) per year, on average. compared to over 1,000 burn permits which are issued annually.

"The little stone dam across the street (from Town Hall) --the Town talked about dredging it and repairing the stone, but not sure what happened."

Response: The Town was not able to address this issue because the Town is not allowed to dredge the river.

Two community members (Ted and Nancy Zebert) attended the final Public Outreach meeting, but they were integrated into the local Hazard Mitigation Committee by then. They had a number of typographical edits and clarifying comments on the draft plan, all of which were discussed and integrated into the proposed final plan.

Select Board Meeting

In 2011, the Select Board agreed to begin the process of updating its Hazard Mitigation Plan. Once the plan was provisionally approved by FEMA, the Select Board held a public hearing on the plan and adopted it.



2: LOCAL PROFILE

Community Setting

Geography

Hampden is located in the eastern portion of Hampden County in the Pioneer Valley region of Massachusetts. The town is located along the northern banks of the Scantic River, and comprises a total area of 19.65 square miles. It is bordered by East Longmeadow on the west, Wilbraham on the north, Monson on the east, and Somers and Stafford, Connecticut on the south. Springfield is 10 miles to the east and Hartford, Connecticut is 30 miles northeast.

Population Characteristics

There are 5,139 Hampden residents (2010 US Census) and a total of 1,934 housing units (2009-2013 American Community Survey). The median household income is \$80,582 with 4.6 percent of residents below the poverty line (American Community Survey (ACS) of the US Census 2009-13).

Climate

Annual rainfall averages 44 inches and is distributed throughout the year. In addition to rain, snowfall averages 40 inches per season. Prevailing winds from the south (and from the north/northwest to a lesser extent) reach their highest average speed during the month of April. In the past few decades, Hampden and all of New England have seen an increase in the number of extreme rainfall events, defined as large amounts of rain in a short period of time. In Massachusetts, the increase since 1948 has been 81 percent (Environment America Research & Policy Center, 2012). Extreme rainfall is a cause of flooding, which is a major concern of this plan. In the last five years, there has also been an increased occurrence of tornadoes and large storms that generate strong wind gusts.

Infrastructure

Roads and Highways

There are no state highways in town, but local roads are in good condition. The nearest state highway is Route 83 in the neighboring town of East Longmeadow. The principal roadway is Main Street, traveling east-west through town, and connecting to South Monson Road on the eastern side of town and East Longmeadow Road on the western side of town. Other key routes include:

- Hampden Road/Somers Road and Allen Street, traveling north-south through the west side of town
- Glendale Road/North Monson Road and Scantic Road, traveling north-south through the west side of town
- North Road, connecting to Wilbraham
- South Road and Chapin Road, connecting to Connecticut

Rail

There is no passenger or freight rail service in Hampden.

Public Transportation

There is no public transportation service in Hampden, although the Pioneer Valley Regional Transit Authority offers paratransit service through MV Transportation and the Hampden Council on Aging.

Water and Sewer

There is no town-wide system of water distribution or sewer. The vast majority of residents rely on private, individual wells and independent septic systems. The town's Scantic Valley Water District has 9 active water services, providing drinking water to 8 homes and one Laughing Brook property.

Schools

Hampden is part of the Hampden-Wilbraham Regional School District, with Thornton Burgess Middle School and Green Meadows Elementary School located in town.

Natural Resources

Water

The Scantic River enters Hampden at its southwestern corner and extends to the town's southern line, from where it follows a southwesterly course and eventually drains into the Connecticut River in East Windsor, Connecticut. There are several tributaries flowing into the Scantic River, most notably Rockadundee Brook and Temple Brook in the southeastern corner of town; and East Brook and Big Brook flowing from the northeastern corner. The Watchaug Brook and the South Branch of the Mill River can be found on the western side of town. The entire western border of Hampden has a low topography that results in a larger floodplain.

In addition to the Scantic River and the above-mentioned brooks, there are numerous smaller brooks, as well as ponds and impoundments throughout the town. Goodwill Pond, at the confluence of East Brook and one of its smaller tributaries, is such an example. Many of the ponds are natural, but some are old farm ponds that are used for irrigation, water supply, fire protection, and recreation.

Hampden has many areas where the water table is at or near the land surface. As a result, the land characteristics range from seasonally wet or flooded to deep marsh or open water. The town has 117 acres of freshwater wetlands, primarily located in the western portion of Hampden. Some wetland areas also exist in other parts of town along streams and brooks.

Forests and Vegetation

Approximately 7,918 acres (63 percent) of land in Hampden is forested. The most heavily forested areas are located in the Minnechaug and Hampden Mountain complex, and the upland area in the eastern section of town.

Development

Hampden is primarily a rural residential town. The majority of the town's 12,569 acres is undeveloped land, totaling nearly 9,140 acres (73 percent). Residential land totaling 2,162 acres (17 percent) and agricultural land totaling 943 acres (7.5 percent) account for the majority of the remaining area. Commercial and industrial uses consist of approximately 87 acres (0.7 percent), with public/urban open and recreational land contributing an additional 255 acres (2 percent). Residential and commercial land is centered in the town center or in a predominantly business area in the western part of the town. There are also many subdivisions scattered throughout the western section of town.

Hampden has undergone various transitions throughout its history. Once a farming community, it became a mill town. During the 20th Century, the town's proximity to Springfield and Hartford has drawn commuters and created a bedroom community. A majority of the town's population commutes to work in metropolitan areas including but not limited to Springfield, Hartford and Worcester.

With the great recession of 2008, and Hampden's relatively rural location, there has not been any significant development in the last 5 years since the Town first created a Hazard Mitigation Plan. There have been no new subdivisions and no new industrial development. In 2015, the Town reported 3 new residential building permits and 8 new commercial building permits.

As described in the Town's documentation of existing mitigation capabilities, the Town has robust land use zoning in place to prevent development in hazard areas, so no new development is happening in hazard areas.

Zoning

Hampden has 9 general zoning districts and 2 overlay districts. The districts define the allowed uses and dimensional requirements in all parts of the town. The districts are:

- **Residential District R-6:** Areas of town which are best suited for low to medium-density residential single-family development as well as non-commercial land uses and activities in keeping with the Town's rural character.
- **Residential District R-4:** Areas of town which are best suited for the same uses as R-6; but also allowing elderly persons and group housing.
- **Multi-Unit Dwelling District (MD):** Areas of town which are best suited for the same uses as R-4, but also allowing garden-type apartments and other multi-unit dwellings.
- **Business District (B):** Areas of town which are best suited for consumer goods and services

uses.

- **Commercial District (C):** Areas of town which are best suited for goods and services uses for transients or tourists, and non-consumer goods and services uses.
- **Light Industrial District (LI):** Areas of town which are best suited for use by research laboratories, office buildings and light industries which are compatible with a low density, rural residential community uses.
- **Floodplain/Wetland District (FP/W):** This is an overlay district, designated for areas within the floodway of the Scantic River and its tributaries and well as other areas of town within the 100-year floodplain and/or covered by wetlands. No new development is allowed in either district without special permit. These districts establish additional regulations to prevent flooding and manage stormwater and water quality.
- **Golf Recreational District (GR):** Areas of town intended for a commercial golf course and the normal and usual accessory uses.
- **Non-Profit Educational and Recreation District (N-PER):** Areas of town intended to permit the study of natural history including examination and preservation of plant and wildlife species, and for related non-profit recreational activities.
- **Water Supply Protection Overlay District (WSP):** This overlay district sets forth standards, rules and permitting procedure for uses that are located within the town's groundwater source recharge areas.
- **Ridgeline and Hillside Protective Overlay District:** This overlay district is currently under revision; it sets forth standards, rules, and permitting procedure for uses that are located in sensitive mountains or steep slope areas of scenic and natural resource value.

National Flood Insurance Program

The National Flood Insurance Program has produced maps that identify floodways across America. Hampden is a participating member of the National Flood Insurance Program, and had the following NFIP policy and claim statistics as of 2014.

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file with the Hampden Planning Board.
- FIRMs have been effective since November 15, 1978 with the current map in effect since July 16, 2013.
- Hampden has 25 in-force policies in effect for a total of \$5,318,900 worth of insurance.
- There have been a total of 18 NFIP claims for which \$469,760 has been paid.

- As of 2014, there have been two Repetitive Loss Property occurrences in Hampden of residential properties.

The Town will maintain compliance with the NFIP throughout the next 5-year Hazard Mitigation Planning cycle by monitoring its Floodplain / Wetland District and ensuring that the district accurately reflects the 100-year flood plain and FEMA Flood Insurance Rate Map (FIRM).

3: HAZARD IDENTIFICATION & ANALYSIS

This chapter examines all hazards identified by the Massachusetts State Hazard Mitigation Plan which are identified as likely to affect Hampden. Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to develop this list. Identified hazards are the following:

- Floods
- Severe snowstorms / ice storms
- Hurricanes/Tropical Storms
- Severe thunderstorms / wind / tornadoes
- Wildfires / brushfires
- Earthquakes
- Dam failure
- Drought

Natural Hazard Analysis Methodology

The hazard analysis is organized into the following sections: Hazard Description, Location, Extent, Previous Occurrences, Probability of Future Events, Impact, and Vulnerability. A description of each of these analysis categories is provided below.

Hazard Description

The natural hazards identified for Hampden are: floods, severe snowstorms/ice storms, hurricanes, severe thunderstorms / wind / tornadoes, wildfire/brushfire, earthquakes, dam failure, and drought. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

Location

Location refers to the geographic areas within the planning area that are affected by the hazard. Some hazards affect the entire planning area universally, while others apply to a specific portion, such as a floodplain or area that is susceptible to wild fires. Classifications are based on the area that would potentially be affected by the hazard, on the following scale:

Location of Occurrence, Percentage of Town Impacted by Given Natural Hazard	
Location of Occurrence	Percentage of Town Impacted
Large	More than 50% of the town affected
Medium	10 to 50% of the town affected
Small	Less than 10% of the town affected

Extent

Extent describes the strength or magnitude of a hazard. Where appropriate, extent is described using an established scientific scale or measurement system. Other descriptions of extent include water depth, wind speed, and duration.

Previous Occurrences

Previous hazard events that have occurred are described. Depending on the nature of the hazard, events listed may have occurred on a local, state-wide, or regional level.

Probability of Future Events

The likelihood of a future event for each natural hazard was classified according to the following scale:

Frequency of Occurrence and Annual Probability of Given Natural Hazard	
Frequency of Occurrence	Probability of Future Events
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

Impact

Impact refers to the effect that a hazard may have on the people and property in the community, based on the assessment of extent described above. Impacts are classified according to the following scale:

Extent of Impacts, Magnitude of Multiple Impacts of Given Natural Hazard	
Extent of Impacts	Magnitude of Multiple Impacts
Catastrophic	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Vulnerability

Based on the above metrics, a hazard index rating was determined for each hazard. The hazard index ratings are based on a scale of 1 through 5 as follows:

- 1 – Highest risk
- 2 – High risk
- 3 – Medium risk
- 4 – Low risk
- 5 – Lowest risk

The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable. However; many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability.

Hazard Identification and Analysis Worksheet for Hampden				
Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Vulnerability
Flooding	Large	Low	Limited	2 - High Risk changed from 2 (100 yr/ 1-localized) in 2008 plan based on actual experience with flooding in last 5 yrs and culvert repair work
Severe Snowstorms / Ice Storms	Large	Very High	Limited	3 - Medium Risk Changed from 1 in 2008 plan based on actual experiences in last 5 yrs
Hurricanes/Tropical Storms	Large	Low	Limited	4 - Low Risk
Severe Thunderstorms / Wind / Tornadoes	Small	Tornadoes: Low Severe Thunderstorms and Wind: High	Limited	3 - Medium Risk
Wildfires / Brushfires	Large	High	Minor	3 - Medium Risk
Earthquakes	Large	Low	Catastrophic	4 - Low Risk
Dam Failures	Small	Very Low	Minor	5 - Very Low Risk
Drought	Large	Low	Minor	5 - Very Low Risk

Flooding

Hazard Description

There are three major types of storms that can generate flooding in Hampden:

- **Continental storms** are typically low-pressure systems that can be either slow or fast moving. These storms originate from the west and occur throughout the year.
- **Coastal storms**, also known as nor'easters, usually occur in late summer or early fall and originate from the south. The most severe coastal storms, hurricanes, occasionally reach Massachusetts and generate very large amounts of rainfall.
- **Thunderstorms** form on warm, humid summer days and cause locally significant rainfall, usually over the course of several hours. These storms can form quickly and are more difficult to predict than continental and coastal storms.

A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into fertile, productive farmland like that found in the Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard.

Location

There are approximately 716 acres of land within the FEMA mapped 100-year floodplain and 597 acres of land within the 500-year floodplain within Hampden.

Hampden’s floodplains are narrow corridors that follow very closely the paths of rivers and brooks. These are highly susceptible to flooding at any time of the year when heavy storms can dramatically increase stream levels within a short period. The floodplains of the Scantic River, Watchaug Brook, Big Brook, and East Brook are most prone to flooding. Most smaller streams feed into the Scantic River, which can experience heavy flooding and cause damage during prolonged rainfall. The low-lying areas along Watchaug Brook, in the northwest corner of town, are also cause for concern.

In addition to damage of buildings directly in the floodplain, development can result in a loss of natural flood storage capacity and increase the water level of the lakes. Flood levels may then increase, causing damage to structures not normally in the floodplain.

Hampden also experiences localized flooding at isolated locations due to drainage problems and problem culverts. Most of the areas listed below were identified based on past occurrences of flooding,

but there are also many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff.

Additionally, the vast majority of culverts throughout town tend to be impacted by beavers, so localized flooding could potentially occur at any culvert crossing.

Based on the assessment of flooding locations in Hampden, the location of occurrence for this hazard is determined to be “large,” with more than 50 percent of the town affected.

- **River Park Drive** - built into the 100-year floodplain, during heavy rain events, the end of this road tends to experience flooding. Although there are no critical facilities in this problem spot, during recent flooding, residents needed to be rescued from this area.
- **Mohawk Drive** - built into the 100-year floodplain, during heavy rain events, the end of this road tends to experience flooding. Although there are no critical facilities in this problem spot, during recent flooding, residents needed to be rescued from this area.

Since the 2008 Hazard Mitigation plan was completed, the Town looked into how to solve the flooding issues at River Park and Mohawk Drives. Because the Town is not allowed to dredge the Scantic River, it is not cost effective at this point for the Town to remediate this issue. The Town is looking into this with the Army Corps of Engineers.

- **Colony Drive** - located close to the 500-year floodplain Colony Drive is located near Mill Pond. This neighborhood tends to see some flooding during heavy rains.
- **Glendale Road** - A culvert repeatedly floods where East Brook travels under Glendale Road, near Goodwill Pond. There are no critical facilities located near this trouble spot, but Glendale Road leads north to Ames Road and North Monson Road, and serves as an evacuation route.
- **Main Street (near confluence of East Brook and Scantic River/Laughing Brook)** - An undersized culvert at this location tends to flood during heavy storm events. There are no critical facilities at this location, but it is major intersection for the Town. Not only is it located on Main Street, a key evacuation route, it is near the split with Glendale Road (a northward evacuation route) and Scantic Road (a southward evacuation route). In addition, the flooding tends to impact access to several nearby critical facilities, including the Town House (the primary EOC), Fire Department, and Police Department. Furthermore, this culvert tends to flood during the same conditions as the other problem culvert on Main Street, thereby cutting off these critical facilities from the rest of Town.
- **Main Street (at Memorial Park Road)** - In the 2008 plan, this area was identified and in the past five years the Town did secure funding to mitigate this problem.

Extent

The Hazard Mitigation Committee indicated that all locations of localized flooding can receive high water marks of up to several feet during sufficiently large rainstorms. Water levels in Hampden's rivers, streams, and wetlands rise and fall seasonally and during high rainfall events. High water levels are typical in spring, due to snowmelt and ground thaw. This is the period when flood hazards are normally expected. Low water levels occur in summer due to high evaporation and plant uptake (transpiration). At any time, heavy rainfall may create conditions that raise water levels in rivers and streams above bank full stage, which then overflow adjacent lands.

The worst flooding recorded in Hampden's recent history occurred following Hurricane Diane in August 1955. While Hampden does not have records, the region recorded levels of nearly 20 inches in the greater Springfield area, according to the US Geological survey Report "Floods of August 1955 in the Northeastern States".

Floods can be classified as one of two types: flash floods and general floods.

- **Flash floods** are the product of heavy, localized precipitation in a short time period over a given location. Flash flooding events typically occur within minutes or hours after a period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).
- **General floods** may last for several days or weeks and are caused by precipitation over a longer time period in a particular river basin. Excessive precipitation within a watershed of a stream or river can result in flooding particularly when development in the floodplain has obstructed the natural flow of the water and/or decreased the natural ability of the groundcover to absorb and retain surface water runoff (e.g., the loss of wetlands and the higher amounts of impervious surface area in urban areas).

The average annual precipitation for Hampden and surrounding areas in western Massachusetts is 46 inches.

Previous Occurrences

Hampden has experienced many flooding events over the last decade. Generally, these small floods have had minor consequence, with only temporary impacts to roads and residents' yards.

In October of 2005, a period of extended rainfall (a week with 12 inches of rain followed by a storm event in which 5-7 inches of rain fell in one evening) caused the Scantic River and its tributaries to overflow their banks, causing severe town-wide flooding with significant damage. Flooding was extensive along Main Street, where five households had to be evacuated, and along Rock-a-Dundee

Road, Ames Road, and Howlett Hill Road among several others. Flooding also washed away the VFW Footbridge. There are two culverts over a small branch of the Mill River at Sessions Drive. If this road is flooded there is limited egress via driving over a rough road through conservation land.

Probability of Future Events

Based on previous occurrences, the probability of flooding in Hampden is "low," with a 1 to 10 percent probability in any given year. Flooding frequencies for the various floodplains in Hampden are defined by FEMA as the following:

- 10-year floodplain – 10 percent chance of flooding in any given year
- 25-year floodplain – 2.5 percent chance of flooding in any given year
- 100-year floodplain – 1 percent chance of flooding in any given year
- 500-year floodplain – 0.2 percent chance of flooding in any given year

Climate scientists predict that in the next few decades, climate change will increase the frequency and intensity of all storms that can cause flooding. Currently, floods are the most costly natural hazard in the United States, and climate change will only increase this damage. More information about the effect of Climate Change can be found in the Pioneer Valley Planning Commission's Climate Action Plan, available at www.sustainableknowledgecorridor.org.

The Massachusetts State Climate Change Adaptation Report has additional information about the impact of climate change and can be accessed at www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html.

Impact

The impact of a flooding event is deemed to be "limited," with 10 percent or more land in the affected area damaged or destroyed.

To determine the vulnerability of the town to flooding, the town's median home value of \$268,600 (ACS 2009-2013) is used. Based on this value, the following property damage could occur in various parts of Hampden:

- **River Park Drive** - There are an estimated 9 properties in this area; 100 percent damage to 100 percent of the structures would result in \$2,417,400 of damage.
- **Mohawk Drive** - There are an estimated 3 properties in this area; 100 percent damage to 100 percent of the structures would result in \$805,800 worth of damage.
- **Colony Drive** - There are an estimated 6 properties in this area; 100 percent damage to 100 percent of the structures would result in \$1,611,600 worth of damage.
- **Glendale Road** - There are an estimated 3 properties in this area; 100 percent damage to 100 percent of the structures would result in \$805,800 worth of damage.

- **Main Street (near confluence of East Brook and Scantic River)** - There are an estimated 8 properties in this area; 100 percent damage to 100 percent of the structures would result in \$2,148,800 of damage. There is also potential for the road to be damaged.

Vulnerability

Based on the above analysis, Hampden has a hazard index rating of “2 – high risk” from flooding. In the 2008 plan, Flooding was divided into 100-year flooding, which was ranked "2-high risk" and localized flooding, which was ranked "1-highest risk". Based on the Town's experiences of flooding since the 2008 plan, combined with the Town's progress repairing a problem culvert, the vulnerability ranking has been reduced to "2-high risk" overall.

Severe Snowstorms/Ice Storms

Hazard Description

Severe winter storms can pose a significant risk to property and human life. The rain, freezing rain, ice, snow, cold temperatures and wind associated with these storms can cause the following risks:

- Disrupted power and phone service
- Unsafe roadways and increased traffic accidents
- Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt
- Tree damage and fallen branches that cause utility line damage and roadway blockages
- Damage to telecommunications structures
- Reduced ability of emergency officials to respond promptly to medical emergencies or fires

Location

The entire town of Hampden is susceptible to severe snowstorms, making the location of occurrence “large,” with over 50 percent of land affected. Hampden has also had specific problems in the following areas:

- **Forest Hills Road and Valley View Drive** - Any severe winter weather incident can cause serious snow and ice hazards at several points along Forest Hills Road and Valley View Drive in the northern portion of town. This is due to significant grade and a hairpin turn, causing driving difficulties and impairing visibility.
- **Pondview Drive** - Any severe winter weather incident can cause serious snow and ice hazards at several points along Pondview Drive in the northern portion of town. This is due to significant grade and a dangerous turns, causing driving difficulties and impairing visibility.
- **Mountain Road** - Steep grades along several sections of Mountain Road in the northern part of town can be severely impacted by winter weather, making travel dangerous. In addition, the roads are narrow and there is little room to push accumulated snow.
- **North Road** - One section of steep grade along North Road in the northern part of town can be severely impacted by winter weather, making travel dangerous. In addition, stone retaining walls along the side of the road leave no room to push accumulated snow. Although there are no critical facilities along North Road, it serves as an evacuation route north to Wilbraham.
- **Ames Road** - Severe winter weather can cause snow and ice hazards at the bend in Ames Road just after it splits off of Glendale Road, making travel dangerous. Ames Road serves as an evacuation route to the north.

Extent

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from storms producing heavy snowfall over large areas that include major metropolitan centers.

Northeast Snowfall Impact Scale Categories		
Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Source: <http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

Previous Occurrences

Hampden generally experiences at least one or two severe winter storms each year with varying degrees of severity. Severe winter storms typically occur during January and February; however, they can occur from late September through late May.

Based on data available from the National Oceanic and Atmospheric Administration, there are 47 winter storms since 1958 that have registered on the NESIS scale. Of these, approximately 26 storms resulted in snow falls in the Pioneer Valley of at least 10 inches. These storms are listed in the table on the next page, in order of their NESIS severity.

In 2011, Hampden, like the whole region, experienced unseasonably early snowfall, that, because the

tress still had their leaves, caused long-lasting power outages.

Winter Storms Producing Over 10 inches of Snow in Region, 1958-2014			
Date	NESIS Value	NASIS Category	NESIS Classification
3/12/1993	13.2	5	Extreme
3/2/1960	8.77	4	Crippling
2/15/2003	7.5	4	Crippling
2/2/1961	7.06	4	Crippling
1/21/2005	6.8	4	Crippling
1/19/1978	6.53	4	Crippling
12/25/1969	6.29	4	Crippling
2/10/1983	6.25	4	Crippling
2/14/1958	6.25	4	Crippling
2/5/1978	5.78	3	Major
2/23/2010	5.46	3	Major
2/8/1994	5.39	3	Major
1/9/2011	5.31	3	Major
2/18/1972	4.77	3	Major
12/11/1960	4.53	3	Major
2/7/2013	4.35	3	Major
2/22/1969	4.29	3	Major
1/18/1961	4.04	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.5	2	Significant
4/6/1982	3.35	2	Significant
3/4/2013	3.05	2	Significant
3/15/2007	2.54	2	Significant
3/31/1997	2.29	1	Notable
2/2/1995	1.43	1	Notable
1/25/1987	1.19	1	Notable

Source: NOAA, <http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

Probability of Future Events

Based upon the availability of records for Hampden County, there is a "very high" probability (over 70 percent in any given year) that a severe snow storm or ice storm will occur in Hampden.

Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases. More information about the effect of Climate Change can be found in the Pioneer Valley Planning Commission's Climate Action Plan, available at www.sustainableknowledgecorridor.org.

The Massachusetts State Climate Change Adaptation Report has additional information about the impact of climate change and can be accessed at www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html.

Impact

The impact of a potential severe snow storm or ice storm is "limited," with more than 10 percent of property in the affected area damaged or destroyed.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property of \$519,472,400 is used. An estimated 10 percent of damage would occur to 10 percent of structures, resulting in a total of \$5,194,724 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Hampden faces a hazard index rating of "3 - medium risk" from severe snowstorms and ice storms. In the 2008 plan, severe snowstorms/ice storms was ranked "1-highest risk". Since 2008, the Town has experienced severe snow and ice storms and has a better understanding of how the long term consequences of these natural hazards are being mitigated by the existing measures in place. As a result, the vulnerability assessment has been reduced from 1-3.

Hurricanes / Tropical Storms

Hazard Description

Hurricanes are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour and which generate large amounts of precipitation. Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities.

Location

Because of the hazard's regional nature, all of Hampden is at risk from hurricanes, meaning the location of occurrence is "large," with over 50 percent of land affected. Ridge tops are more susceptible to wind damage. Areas susceptible to flooding are also likely to be affected by heavy rainfall.

The higher elevations near the tops of the mountains throughout town, including Pine Mountain, Mount Vision, Minnechaug Mountain, and Goat Rock, are more susceptible to severe wind incidents, especially during severe thunderstorms, hurricanes, or blizzards. However, no damages have been reported.

Extent

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Hurricane Wind Scale, which rates hurricane wind intensity on a scale of 1 to 5, with 5 being the most intense.

Saffir-Simpson Scale	
Category	Maximum Sustained Wind Speed (MPH)
1	74–95
2	96–110
3	111–129
4	130–156
5	157 +

Source: National Hurricane Center, 2012

Previous Occurrences

Hurricanes that have affected the Pioneer Valley region are shown in the table below. In 2011 Tropical Storm Irene caused a power outage in one section of Town. In 1955 Hurricane (Tropical Storm) Diane hit Hampden causing major flooding and washing away most of the Town's bridges.

Major Hurricanes and Storms Affecting Region		
Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Hurricane of 1938	1938	3
Great Atlantic Hurricane	1944	1
Carol	1954	3
Edna	1954	1
Diane	1955	Tropical Storm
Donna	1960	Unclear, 1 or 2
Groundhog Day Gale	1976	Not Applicable
Gloria	1985	1
Bob	1991	2
Floyd	1999	Tropical Storm
Irene	2011	Tropical Storm
Sandy	2012	Super Storm

Probability of Future Events

Hampden's location in western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a "low" probability of hurricanes in Hampden, or a 1 to 10 percent chance in any given year. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future.

Impact

A description of the damages that could occur due to a hurricane is described by the Saffir-Simpson scale, as shown below.

Hurricane Damage Classifications			
Storm Category	Damage Level	Description of Damages	Wind Speed (MPH)
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. An example of a Category 1 hurricane is Hurricane Dolly (2008).	74-95
	Very dangerous winds will produce some damage		
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings. An example of a Category 2 hurricane is Hurricane Francis in 2004.	96-110
	Extremely dangerous winds will cause extensive damage		
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland. An example of a Category 3 hurricane is Hurricane Ivan (2004).	111-129
	Devastating damage will occur		
4	EXTREME	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland. An example of a Category 4 hurricane is Hurricane Charley (2004).	130-156
	Catastrophic damage will occur		
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	157+
	Catastrophic damage will occur		

The impact of a hurricane or tropical storm in Hampden would be “limited,” with more than 10 percent of property in affected areas damaged or destroyed.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property of \$519,472,400 is used. Wind damage of 5 percent to 10 percent of structures would result in an estimated \$2,597,362 of damage. Flood damage of 10 percent to 20 percent of structures would result in \$10,389,448 of damage. The cost of repairing or replacing roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above analysis, Hampden faces a hazard index rating of "4 - low risk" from hurricanes and tropical storms.

Severe Thunderstorms / Wind / Tornadoes

A thunderstorm is a storm with lightning and thunder produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain, and sometimes hail. Effective January 5, 2010, the NWS modified the hail size criterion to classify a thunderstorm as "severe" when it produces damaging wind gusts in excess of 58 mph (50 knots), hail that is 1 inch in diameter or larger (quarter size), or a tornado (NWS, 2013).

Wind is air in motion relative to the surface of the earth. For non-tropical events over land, the NWS issues a Wind Advisory (sustained winds of 31 to 39 mph for at least 1 hour or any gusts 46 to 57 mph) or a High Wind Warning (sustained winds 40+ mph or any gusts 58+ mph). For tropical systems, the NWS issues a tropical storm warning for any areas (inland or coastal) that are expecting sustained winds from 39 to 73 mph. A hurricane warning is issued for any areas (inland or coastal) that are expecting sustained winds of 74 mph. Effects from high winds can include downed trees and/or power lines and damage to roofs, windows, etc. High winds can cause scattered power outages. High winds are also a hazard for the boating, shipping, and aviation industry sectors.

Tornadoes are swirling columns of air that typically form in the spring and summer during severe thunderstorm events. In a relatively short period of time and with little or no advance warning, a tornado can attain rotational wind speeds in excess of 250 miles per hour and can cause severe devastation along a path that ranges from a few dozen yards to over a mile in width. The path of a tornado may be hard to predict because they can stall or change direction abruptly. Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester. High wind speeds, hail, and debris generated by tornadoes can result in loss of life, downed trees and power lines, and damage to structures and other personal property.

Location

As per the Massachusetts Hazard Mitigation Plan, the entire town is at risk of high winds, severe thunderstorms, and tornadoes. However, the actual area that would be affected by these hazards is "small," or less than 10 percent of total land area.

Extent

An average thunderstorm is 15 miles across and lasts 30 minutes; severe thunderstorms can be much larger and longer. Southern New England typically experiences 10 to 15 days per year with severe thunderstorms. Thunderstorms can cause hail, wind, and flooding.

Tornadoes are measured using the enhanced F-Scale, shown with the following categories and corresponding descriptions of damage:

Enhanced Fujita Scale Levels and Descriptions of Damage			
EF-Scale Number	Intensity Phrase	3-Second Gust (MPH)	Type of Damage Done
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	Moderate	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	Significant	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	Severe	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	Devastating	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

Previous Occurrences

Because thunderstorms and wind affect Hampden on an annual basis, there are not significant records available for these events. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Most occur in the late afternoon and evening hours, the warmest part of the day. The most common months are June, July, and August, but the Great Barrington, MA tornado (1995) occurred in May and the Windsor Locks, CT tornado (1979) occurred in October. The June 2011 tornado that affected neighboring Wilbraham did not cause any significant damage in Hampden.

There are typically 1 to 3 tornadoes somewhere in southern New England per year. Most occur in the late afternoon and evening hours. One past tornado incident is recorded in the Town of Hampden in 1979; the event recorded as F1 (moderate tornado) damaged/destroyed homes on Potash Hill Lane.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester. In 2011, a tornado ranked F3 (Severe Damage) on the Fujita Scale of Tornado Intensity, blew through the towns of West Springfield, Westfield, Springfield, Monson, Wilbraham, Brimfield, Sturbridge, and Southbridge. The tornado and related storm killed 3 people and resulted in hundreds of injuries across the state.

Probability of Future Events

One measure of tornado activity is the tornado index value. It is calculated based on historical tornado events data using USA.com algorithms. It is an indicator of the tornado level in a region. A higher tornado index value means a higher chance of tornado events. Data was used for Hampden County to determine the Tornado Index Value as shown in the table below.

Tornado Index for Hampden County	
Hampden County	138.23
Massachusetts	87.60
United States	136.45

Source: USA.com

<http://www.usa.com/hampden-county-ma-natural-disasters-extremes.htm>

Based upon the available historical record, as well as Hampden’s location in a high-density cluster of state-wide tornado activity, it is reasonable to estimate that there is "low," or between 1 and 10 percent in any given year. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Therefore, the frequency for thunderstorms / winds is "high," with a 40 to 70 percent chance in any given year.

Impact

Overall, the Town of Hampden faces a "limited" impact from severe thunderstorms, winds, or tornadoes, with 10 percent or more of the town affected. The potential for locally catastrophic damage is a factor in any tornado, severe thunderstorm, or wind event. In Hampden, a tornado that hit the residential areas would leave much more damage than a tornado with a travel path that ran along the town’s forested uplands, where little settlement has occurred. Most buildings in the Town of Hampden have not been built to Zone 1, Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, with most of the town’s housing built before this date.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$519,472,400, is used. An estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of \$10,389,448 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Hampden has a hazard index rating of "3 – medium risk" for severe thunderstorms, winds, and tornadoes.

Wildfire / Brushfire

Hazard Description

Wildfires are typically larger fires, involving full-sized trees as well as meadows and scrublands. Brushfires are uncontrolled fires that occur in meadows and scrublands, but do not involve full-sized trees. Both wildfires and brushfires can consume homes, other buildings and/or agricultural resources. Typical causes of brushfires and wildfires are lightning strikes, human carelessness, and arson. FEMA has classifications for 3 different classes of wildfires:

- **Surface fires** are the most common type of wildland fire and burn slowly along the floor of a forest, killing or damaging trees
- **Ground fires** burn on or below the forest floor and are usually started by lightning
- **Crown fires** move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions

Location

Hampden County has approximately 273,000 acres of forested land, which accounts for 67 percent of total land area. Approximately 7,918 acres (63 percent) of Hampden is forested, mostly located in the eastern wooded, mountainous sections of town. High-end houses are being constructed in this part of Hampden, so this increases the risk of damage to these homes. The location of occurrence of a wildfire in Hampden is determine to be "large," with more than 50 percent of total land affected.

Extent

Approximately 7,918 acres (63 percent) of Hampden is forested, and therefore at risk of fire. Wildfires can cause widespread damage to the areas that they affect. They can spread very rapidly, depending on local wind speeds and be very difficult to control. Fires can last for several hours up to several days. There have not been any major wildfires recorded in Hampden. However, based on other major wildfires that have occurred in western Massachusetts, it is estimated that such a fire would likely destroy around 50 to 500 acres of forested area.

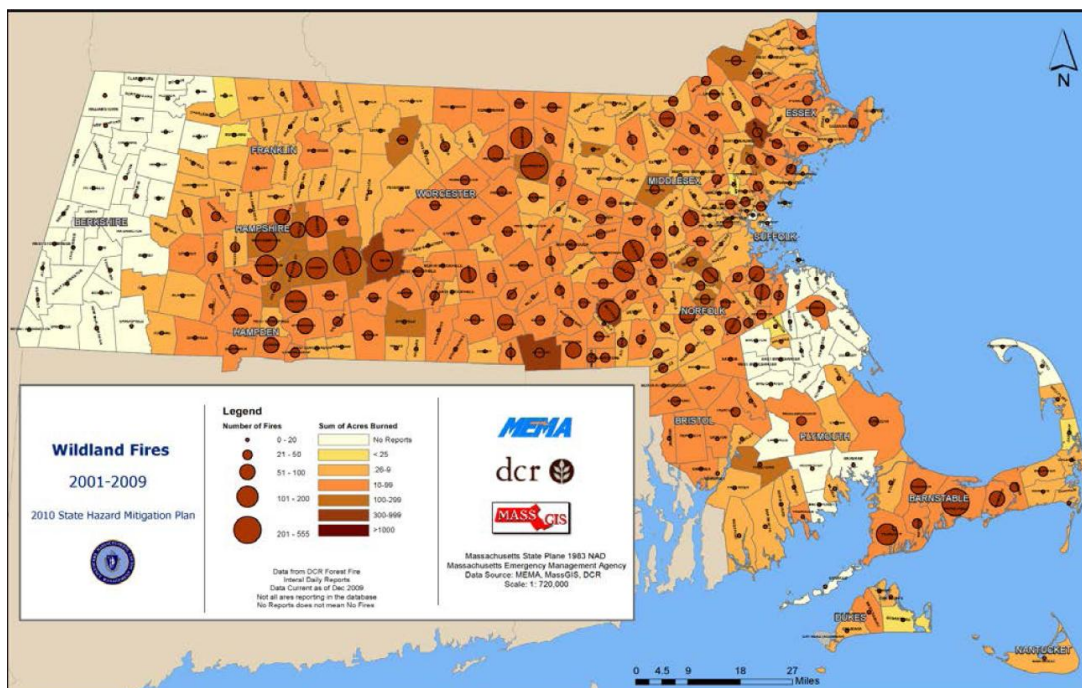
Previous Occurrences

In Hampden, brushfires are somewhat common, though the majority of fires are small and quickly contained. There are, however, no records of wildfires or burned acreage, reported to the Massachusetts' National Fire Incident Reporting System for in Hampden. Brushfires are more common in town than wildfires. According to the Hampden Fire Department, there are approximately 12 unauthorized burns (or brushfires) per year, on average. As a point of comparison, approximately 1,000 burn permits are issued annually.

During the past 100 years, there have not been many wildfires occurring in the Pioneer Valley. However, several have occurred during the past 20 years, as shown in the list below:

- 1995 – Russell, 500 acres burned on Mt. Tekoa
- 2000 – South Hadley, 310 acres burned over 14 days in the Lithia Springs Watershed
- 2001 – Ware, 400 acres burned
- 2010 – Russell, 320 acres burned on Mt. Tekoa
- 2012 – Eastern Hampden County, dry conditions and wind gusts created a brush fire in Brimfield, and burned 50 acres

Wildland Fires in Massachusetts, 2001-2009



Source: Massachusetts Hazard Mitigation Plan

Probability of Future Events

The growth of residential development in town puts more homes and related structures closer to forestlands, increasing susceptibility to impacts from brushfires or wildfires. Steep slopes and ledge outcroppings add to the risk as accessing some of these new home locations in the event of a fire is difficult. Because there is forested and agricultural land scattered throughout Hampden, it is difficult to pinpoint exact locations that could be more susceptible to brushfires than another. There are few structures in these areas that could be affected by a wildfire incident, depending on its exact location, but no critical facilities.

Based on this assessment, the probability of a future event is determined to be “high,” or between 40 and 70 percent.

Climate scenarios project summer temperature increases between 2°C and 5°C and precipitation decreases of up to 15 percent. Such conditions would exacerbate summer drought and further promote high-elevation wildfires, releasing stores of carbon and further contributing to the buildup of greenhouse gases. Forest response to increased atmospheric carbon dioxide—the so-called “fertilization effect”—could also contribute to more tree growth and thus more fuel for fires, but the effects of carbon dioxide on mature forests are still largely unknown.

Impact

Wildfires can result in widespread damage to the natural environment, the built environment and can cause injuries and death. Hampden faces a “minor” impact from wildfires, with minimal damage anticipated in such an event.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$519,472,400, is used. An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$5,194,724 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Hampden faces a hazard index rating of “3 - medium risk” from wildfires and brushfires.

Earthquakes

Hazard Description

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people. Ground shaking from earthquakes can rupture gas mains and disrupt other utility service. They can also damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods, dam failure, and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable soil, and mobile homes not tied to their foundations are most at risk during an earthquake.

Location

Because of the regional nature of the hazard, the entire town of Hampden is susceptible to earthquakes. This makes the location of occurrence "large," or over 50 percent of the total land area affected.

Extent

The magnitude of an earthquake is measured using the Richter Scale, which measures the energy of an earthquake by determining the size of the greatest vibrations recorded on the seismogram. On this scale, one step up in magnitude (from 5.0 to 6.0, for example) increases the energy more than 30 times. The intensity of an earthquake is measured using the Modified Mercalli Scale. This scale quantifies the effects of an earthquake on the Earth's surface, humans, objects of nature, and man-made structures on a scale of I through XII, with I denoting a weak earthquake and XII denoting a earthquake that causes almost complete destruction.

Richter Scale Magnitudes and Effects	
Magnitude	Effects
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: US Federal Emergency Management Agency

Modified Mercalli Intensity Scale for and Effects			
Scale	Intensity	Description Of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: US Federal Emergency Management Agency

Previous Occurrences

The most recent earthquakes to affect the Pioneer Valley are shown in the table below. According to local records and the input of the Hampden Hazard Mitigation committee, no earthquake damage has been reported in Hampden.

Largest Earthquakes Affecting Region, 1924 – 2014		
Location	Date	Magnitude
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Plattsburg, NY	April 20, 2002	5.1
Bar Harbor, NH	October 3, 2006	4.2
Hollis Center, ME	October 16, 2012	4.6

Source: Northeast States Emergency Consortium website, www.nesec.org/hazards/earthquakes.cfm

New England States Record of Historic Earthquakes		
State	Years of Record	Number Of Earthquakes
Connecticut	1668 - 2007	137
Maine	1766 - 2007	544
Massachusetts	1668 - 2007	355
New Hampshire	1638 - 2007	360
Rhode Island	1776 - 2007	38
Vermont	1843 - 2007	73
New York	1840 - 2007	755
<i>Total Number of Earthquakes within the New England states between 1638 and 1989 is 2262.</i>		

Source: Northeast States Emergency Consortium,
www.nesec.org/hazards/earthquakes.cfm

Probability of Future Events

One measure of earthquake activity is the Earthquake Index Value. It is calculated based on historical earthquake events data using USA.com algorithms. It is an indicator of the earthquake activity level in a region. A higher earthquake index value means a higher chance of earthquake events. Data was used for Hampden County to determine the Earthquake Index Value as shown in the table below.

Earthquake Index for Hampden County	
Hampden County	0.24
Massachusetts	0.70
United States	1.81

Based upon existing records, there is a “low” frequency of earthquakes in Hampden with between a 1 to 10 percent chance of an earthquake occurring in any given year.

Impact

Most earthquake related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the extent and duration of the shaking. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock, and liquefaction.

Massachusetts introduced earthquake design requirements into their building code in 1975 and improved building code for seismic reasons in the 1980s. However, these specifications apply only to new buildings or to extensively-modified existing buildings. Buildings, bridges, water supply lines, electrical power lines and facilities built before the 1980s may not have been designed to withstand the forces of an earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code.

The impact incurred from an earthquake would be “catastrophic,” with more than 50 percent of property in the affected area damaged or destroyed. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town of \$519,472,400, is used. An estimated 100 percent of damage would occur to 20 percent of structures, resulting in a total of \$103,894,480 worth of damage. The cost of repairing or replacing roads, bridges, utilities, and the contents of structures is not included in this estimate.

Vulnerability

Based on this analysis, Hampden faces a hazard index rating of “4 - low risk” from earthquakes.

Dam Failure

Hazard Description

Dams and levees and their associated impoundments provide many benefits to a community, such as water supply, recreation, hydroelectric power generation, and flood control. However, they also pose a potential risk to lives and property. Dam or levee failure is not a common occurrence, but dams do represent a potentially disastrous hazard. When a dam or levee fails, the potential energy of the stored water behind the dam is released rapidly. Most dam or levee failures occur when floodwaters above overtop and erode the material components of the dam. Often dam or levee breaches lead to catastrophic consequences as the water rushes in a torrent downstream flooding an area engineers refer to as an “inundation area.” The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Many dams in Massachusetts were built during the 19th Century without the benefit of modern engineering design and construction oversight. Dams of this age can fail because of structural problems due to age and/or lack of proper maintenance, as well as from structural damage caused by an earthquake or flooding. The Massachusetts Department of Conservation and Recreation Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

Location

Hampden has 11 dams located on private and public land.

Dams in Hampden	
Dam	Hazard Level
Driscoll Pond	Low
Rockwell Pond	Low
Wentworth Farm Pond (NJ)	Low
George Ingle Pond (NJ)	Low
Marion Pond (NJ)	Low
Sazama Pond (NJ)	Low
Stalker Pond (NJ)	Low
Worthington Pond (NJ)	N/A
Labonte Pond (NJ)	N/A
Chaffin pond (NJ)	N/A
Gleason Pond (NJ)	Significant

*NJ, non-jurisdictional. Jurisdictional determinations made by DCR based on storage capacity of impoundment and height of dam.

Based on this analysis, a dam failure is estimated to affect less than 10 percent of land in Hampden, meaning that the location of occurrence is "small."

Extent

Often dam breaches lead to catastrophic consequences as the water ultimately rushes in a torrent downstream flooding an area engineers refer to as an "inundation area." The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Dams in Massachusetts are assessed according to their risk to life and property. The state has three hazard classifications for dams:

- **High Hazard:** Dams located where failure or improper operation will likely cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads.
- **Significant Hazard:** Dams located where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities.
- **Low Hazard:** Dams located where failure or improper operation may cause minimal property damage to others. Loss of life is not expected.

Previous Occurrences

Hampden has a history of one dam failure, which occurred during the 1955 hurricane and flood. During the flood, the Scantic River dam broke and was never reconstructed. There are several minor dams or other water-control devices throughout town, mostly owned privately. A large section on the north/west side of the Labonte Pond Dam failed in 1955, causing severe flooding, but no loss of life. Today, the abutments and about 60 percent of the actual dam are still standing, and large stones are still in the area, just downstream.

Probability of Future Events

As Hampden's dams age, and if maintenance is deferred, the likelihood of a dam failure will increase. However, the current probability of a dam failure is "very low," with less than a 1 percent chance in any given year.

As described in the Massachusetts Hazard Mitigation Plan, dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard.

If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream. Throughout the west, communities downstream of dams are already seeing increases in stream flows from earlier releases from dams. Dams are constructed with safety features known as “spillways.” Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as “design failures,” result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

Impact

The Director of the Hampden Highway Department has noted that the Driscoll Dam is a small impoundment with a depth of only about one foot, and no homes in the inundation zone below. Should the dam fail, Somers Road may be temporarily flooded due to the limitations of the culvert, but that the water would all eventually flow into the adjoining wetlands. Two homes are located in the inundation zone of the Gleason Pond Dam.

Assuming 100 percent damage to 100 percent of these two structures, the estimated costs of repairing or replacing would be \$537,200. In addition, the water flow during a dam failure could also significantly impact the culvert under Wilbraham Road, most likely washing out that stretch of the road. This estimate does not factor in the cost of repairing or replacing the road, or any power or telephone lines, or the contents of structures.

Overall, the town faces a “minor” impact from the failure of dams, with minimal property damage expected.

Vulnerability

Based on this analysis, Hampden faces a hazard index rating of “5 - very low risk” from dam failure.

Drought

Hazard Description

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. These impacts can have far-reaching effects throughout the region.

Location

Because of this hazard's regional nature, a drought would impact the entire town, meaning the location of occurrence is "large," or over 50 percent of total land area affected. There is some history of residents' wells drying up, mostly due to increased development nearby, such as in the northwest corner of town.

Extent

The U.S. Drought Monitor records information on historical drought occurrence. Unfortunately, data could only be found at the state level. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

U.S. Drought Monitor		
Classification	Category	Description
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Source: US Drought Monitor, <http://droughtmonitor.unl.edu/classify.htm>

Previous Occurrences

In Hampden, six major droughts have occurred statewide since 1930. They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the US Drought Monitor:

Annual Drought Status in Region	
Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 99% of the state
2003	No drought
2004	D0 conditions in 44% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 57% of the state
2009	D0 conditions in 44% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state

Source: US Drought Monitor

Hampden has not been affected by any previous droughts in the state.

Probability of Future Events

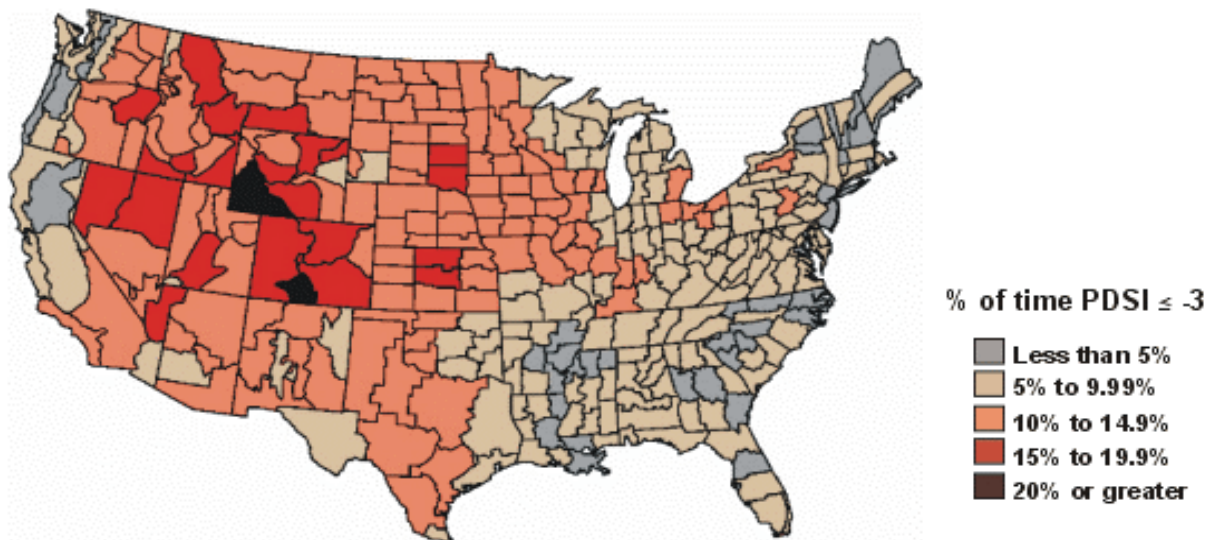
In Hampden, as in the rest of the state, drought has a "low" probability of future occurrence, or between 1 and 10 percent in any given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event. When evaluating the region's risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought. However, global warming and climate change may have an effect on drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts.

Palmer Drought Severity Index

1895–1995

Percent of time in severe and extreme drought



Impact

Due to the water richness of western Massachusetts, Hampden is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard. Because of this, the Hazard Mitigation Committee has determined the impact from this hazard to be "minor," with minimal damage to people and property.

Vulnerability

Based on the above assessment, Hampden has a hazard index rating of "5 - very low risk" from drought.

Extreme Temperatures

As per the Massachusetts Hazard Mitigation Plan, extreme cold and extreme heat are dangerous situations that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat/access to cooling (air conditioning). There is no universal definition for extreme temperatures, with the term relative to local weather conditions. For Massachusetts, extreme temperatures can be defined as those that are far outside the normal ranges. The average temperatures for Massachusetts are:

- Winter (Dec-Feb) Average = 27.51°F
- Summer (Jun-Aug) Average = 68.15°F

Criteria for issuing alerts for Massachusetts are provided on National Weather Service web pages:

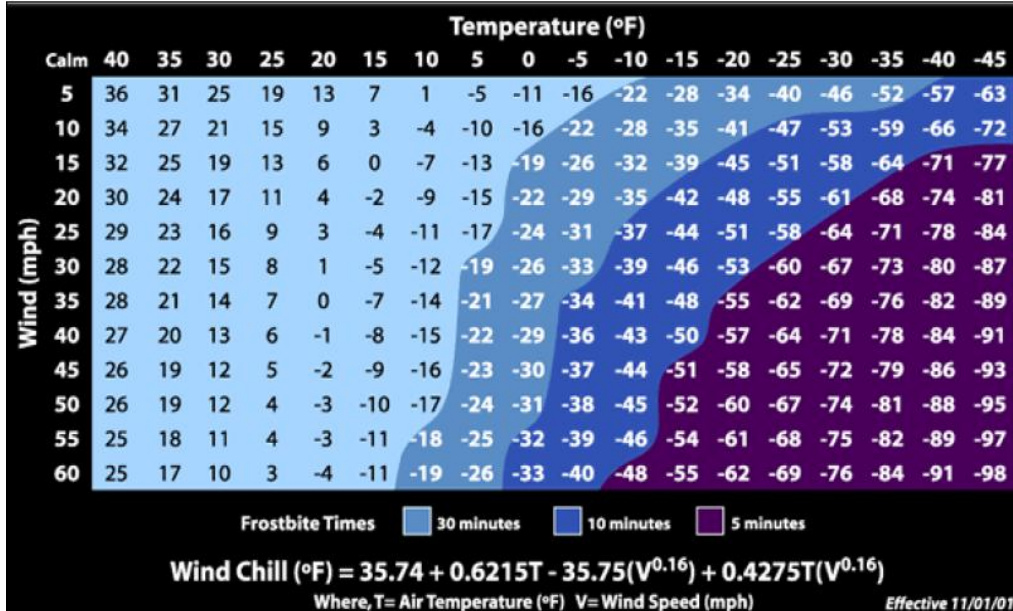
<http://www.erh.noaa.gov/box/warningcriteria.shtml>.

Extent

As per the Massachusetts Hazard Mitigation Plan, the extent (severity or magnitude) of extreme cold temperatures are generally measured through the Wind Chill Temperature Index. Wind Chill Temperature is the temperature that people and animals feel when outside and it is based on the rate of heat loss from exposed skin by the effects of wind and cold. The chart shows three shaded areas of frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops. In Massachusetts, a wind chill warning is issued by the NWS Taunton Forecast Office when the Wind Chill Temperature Index, based on sustained wind, is -25°F or lower for at least three hours.

Extreme temperatures would affect the whole community.

Wind Chills



For extremely hot temperatures, the heat index scale is used, which combines relative humidity with actual air temperature to determine the risk to humans. The NWS issues a Heat Advisory when the Heat Index is forecast to reach 100-104 degrees F for 2 or more hours. The NWS issues an Excessive Heat Warning if the Heat Index is forecast to reach 105+ degrees F for 2 or more hours. The following chart indicates the relationship between heat index and relative humidity:

Heat Index

Relative Humidity (%)		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	
	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136	
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137		
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137			
	55	81	84	86	89	93	97	101	106	112	117	124	130	137				
	60	82	84	88	91	95	100	105	110	116	123	129	137					
	65	82	85	89	93	98	103	108	114	121	128	136						
	70	83	86	90	95	100	105	112	119	126	134							
	75	84	88	92	97	103	109	116	124	132								
	80	84	89	94	100	106	113	121	129									
	85	85	90	96	102	110	117	126	135									
	90	86	91	98	105	113	122	131										
	95	86	93	100	108	117	127											
	100	87	95	103	112	121	132											
Category		Heat Index					Health Hazards											
Extreme Danger		130 °F – Higher					Heat Stroke or Sunstroke is likely with continued exposure.											
Danger		105 °F – 129 °F					Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.											
Extreme Caution		90 °F – 105 °F					Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.											
Caution		80 °F – 90 °F					Fatigue possible with prolonged exposure and/or physical activity.											

Previous Occurrences

Using the NOAA National Centers for Environmental Information data base--one day of extreme cold/wind chill was recorded in the last 365 days, and no incidents of extreme heat have been recorded in Hampden County in the last year.

The following are some of the lowest temperatures recorded in parts of Massachusetts for the period from 1895 to present (Source: NOAA, www.ncdc.noaa.gov):

- Blue Hills, MA- -21°F
- Boston, MA- -12°F
- Worcester, MA- -19°F

The following are some of the highest temperatures recorded for the period from 1895 to present (Source: NOAA, www.ncdc.noaa.gov):

- Blue Hills, MA - 101°F
- Boston, MA - 102°F
- Worcester, MA - 96°F

Probability of Future Events

The probability of future extreme heat and extreme cold is considered to be "low," or between 1 and 10

percent in any given year.

Impact

Extreme cold and extreme heat are dangerous situations that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat or air conditioning or some other way to stay cool.

Because of the relatively wealthy status of residents in Hampden, its geography--being far away from social services and not being served by public transit, combined with the services provided by the Council on Aging, who monitor older residents who may be more susceptible to suffering the impact of extreme temperatures, the impact of extreme heat or cold in Hampden is considered to be "minor," with no property damage and very limited affect on humans.

Vulnerability

Hampden's vulnerability from extreme heat and cold is considered to be, "5 - Lowest Risk."

Other Hazards

In addition to the hazards identified above, the Hazard Mitigation Team reviewed the full list of hazards listed in the Massachusetts Hazard Mitigation Plan. Due to the location and context of the Town, coastal erosion, landslides, and tsunamis, were determined to not be a threat.

4: CRITICAL FACILITIES

Facility Classification

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort
- Maintains an existing level of protection from hazards for community residents and property
- Would create a secondary disaster if a hazard were to impact it

The Critical Facilities List for the Town of Hampden has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Hampden's Hazard Mitigation Committee has broken up this list of facilities into three categories:

- Facilities needed for emergency response in the event of a hazard event.
- Facilities identified as non-essential and not required in an emergency response event, but which are considered essential for the everyday operation of the town.
- Facilities or institutions that include special populations which would need additional attention in the event of a hazard event.

The critical facilities and evacuation routes potentially affected by hazard areas are identified following this list. The Past and Potential Hazards/Critical Facilities Map (Appendix D) also identifies these facilities.

Category 1 – Emergency Response Services

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural hazards.

1. Emergency Operations Center

Primary: Town House – 625 Main Street

Secondary: Thornton Burgess School – 85 Hampden Road

The Senior Center also has a generator installed since the 2008 plan.

2. Fire Station

Hampden Volunteer Fire Department – 19 North Road

3. Police Station

Hampden Town Police Department – 625 Main Street

4. Highway Department

Highway Department – 589 Main Street

5. **Water District**
Public well serving nine residences downstream of landfill
6. **Emergency Fuel Stations**
Highway Department – 589 Main Street
7. **Emergency Electrical Power Facility**
Town House - emergency generator to serve EOC and Police Departments
3 portable generators
8. **Emergency Shelters**
Hampden Senior Center – 104 Allen Street
Town House – 625 Main Street
Green Meadow School – 38 North Road

Since the 2008 plan, all emergency shelters have been equipped with generators.

9. **Water Sources**
Numerous locations in Hampden
10. **Transfer Station**
Cross Road (see Hazard Map)
11. **Helicopter Landing Sites**
Thornton Burgess Middle School parking lot
Green Meadow Elementary School parking lot
(Permitted anywhere that is feasible)
12. **Communications**
Four cell/radio towers throughout town (see Hazard Map)
13. **Primary Evacuation Routes**
Main Street
South Monson Road
Glendale Road/North Monson Road
Hampden Road
Somers Road
North Road
Chapin road
Allen Street
East Longmeadow Road
14. **Bridges/Culverts Located on Evacuation Routes**
Mill Road – where Scantic River crosses

Somers Road – where Scantic River crosses
Main Street – three locations, crossings of West Brook, Big Brook, and East Brook
Chapin Road – where Scantic River crosses
Scantic Road – three locations, crossings of unnamed tributary to Scantic River,
Temple Brook, and Rockadundee Brook
South Monson Road – where Temple Brook crosses (twice)
South Road – where unnamed tributary to Scantic River crosses
Glendale Road – where East Brook crosses (twice)
East Longmeadow Road – where Watchaug Brook crosses
Rockadundee Road – where Rockadundee Brook crosses

Category 2 – Non Emergency Response Facilities

The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Hampden.

1. Problem Culverts

East Longmeadow Road – where Watchaug Brook crosses
Main Street – three locations, crossings of Big Brook, and East Brook
Glendale Road – where East Brook crosses (two locations)

Category 3 – Facilities/Populations to Protect

The third category contains people and facilities that need to be protected in event of a disaster.

1. Special Needs Population

Mary Lyon Nursing Home – 32 Main Street
South Wood Development – Stony Hill Road
Tall Pines Development – Stony Hill Road

2. Elderly Housing/Assisted Living

Centennial Commons Senior Housing – 26 Springmeadow Lane
47 Oak Knoll Drive
17 Baldwin Drive

3. Public Buildings/Areas

Hampden Senior Center – 104 Allen Street
Laughing Brook Wildlife Sanctuary

4. Schools

Green Meadows Elementary School – 38 North Road
Thornton Burgess Middle School – 85 Hampden Road
Green Valley Pre-School – 10 Allen Street

Several private daycares throughout town (see Hazard Map)

5. Churches

Bethlehem Baptist Church – 12 Main Street
Federated Community Church – 590 Main Street
St. Mary’s Catholic Church – 28 Somers Road

6. Historic Buildings/Sites

Two cemeteries (see Hazard Map)
Academy Hall, 616 Main Street

7. Apartment Complexes

White Birch Apartments – 359 Main Street
86 Somers Road – 4 unit building

8. Employment Centers

Allen Street - East Longmeadow Road area

Critical Facilities & Evacuation Routes potentially affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding (100-year Flood)	Floodplain along Scantic River	Library	Main Street
	Floodplain along Rockadundee Brook		Rockadundee Road
	River Park Drive		
	Mohawk Drive		
Flooding	Glendale Road		Glendale Road
	Main Street – at Scantic Road Glendale Road split	Town House (EOC); Fire Dept; Police Dept; Highway Dept	Main Street; Scantic Road; Glendale Road
	Main Street – at Memorial Park Drive	Town House (EOC); Fire Dept; Police Dept; Highway Dept	Main Street
	Colony Drive		
Severe Snow/Ice Storm	Forest Hills Road and Valley View Road		
	Pondview Drive		
	Mountain Road		
	North Road		North Road
	Ames Road		Ames Road
Hurricanes/Severe Wind	Mountain tops		
Wildfires/Brushfires	Agricultural/Forest/Recreation Land		
Dam Failure	Pondview Drive		
Drought	Private Wells		
Hazardous Materials	Main Street		Main Street

5: MITIGATION CAPABILITIES/STRATEGIES

One of the steps of this Hazard Mitigation Plan update process is to evaluate all of the Town's existing policies and practices related to natural hazards and identify potential gaps in protection. Hampden's local Hazard Mitigation Committee worked with PVPC to complete the FEMA Capability Assessment worksheet, included in Appendix.

Hampden has most of the no cost or low cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in floodplains, stormwater management, tree maintenance, etc. Hampden also has appropriate staff dedicated to hazard mitigation-related work for a community its size, including members of the SelectBoard who served on the local Hazard Mitigation committee, an Emergency Management Director, a professionally run Department of Public Works, a part-time Building Inspector, and a Tree Warden, and Hampden has plans in place, including an Open Space and Recreation Plan, and a Comprehensive Emergency Management Plan.

The Town also has very committed and dedicated volunteers who serve on Boards and Committees and in Volunteer positions. The Town collaborates closely with surrounding communities and is party to Mutual Aid agreements through the MEMA. Hampden is also an active member community of the Pioneer Valley Planning Commission (PVPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at the PVPC.

Hampden's most obvious hazard mitigation need is for federal funds to implement prioritized actions. While Hampden is a well-managed fiscally sound Town, it is not a wealthy community and with state constraints on municipalities raising their own funds, Hampden has very limited financial resources to invest in costly hazard mitigation measures. Hampden is, however, committed to locally matching all HMGP grants received.

After reviewing existing policies and the hazard identification and assessment, the Town Hazard Mitigation Committee developed a set of hazard mitigation strategies it would like to implement.

The Town of Hampden has developed the following goal to serve as a framework for mitigation of the hazards identified in this plan.

Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to the following hazards: flooding, severe snowstorms/ice storms, severe thunderstorms, hurricanes, tornadoes, wildfires/brushfires, earthquakes, dam failures, drought, and extreme temperatures.

Overview of Mitigation Strategies by Hazard

An overview of the general concepts underlying mitigation strategies for each of the hazards identified in this plan is as follows.

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways. The Town of Hampden currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the Town's zoning bylaw and subdivision regulations, such as ensuring adequate driveway drainage, restricting development in the floodplain, requiring drainage easements where applicable for subdivisions, and following the Wetlands Protection Act. The Town also participates in the National Flood Insurance Program. The Town's Flexible Open Space Residential Development regulations allow for concentrated development that preserves open space and pervious surface for stormwater drainage.

Severe Snowstorms / Ice Storms

The Town's current mitigation strategy is to restrict the location and height of telecommunications facilities. To the extent that some of the damages from a winter storm can be caused by flooding, flood protection mitigation measures also assist with severe snowstorms and ice storms. The State Building Code provides minimum snow load requirements for roofs, that also assist in mitigation of severe snow storms and ice storms. Additionally, the Town works with Eversource (formerly WMECO) to identify and prune trees near power lines, which reduces the potential of power outages caused by falling branches. New subdivisions are also required to have buried power lines.

Hurricanes

The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Flood protection measures can thus also be considered hurricane mitigation measures. The high winds that often accompany hurricanes can also damage buildings and infrastructure, similar to tornadoes and other strong wind events. Meeting the requirements of the State Building code reduces damages from hurricanes. The Town's Telecommunications Zoning Bylaw also prevents damage from high winds. Additionally, regular pruning of trees and burying of utilities in new subdivisions also reduce the chances for strong winds to down power lines.

Severe Thunderstorms / Winds / Tornadoes

Most damage from tornadoes and severe thunderstorms come from high winds that can fell trees and electrical wires, as well as generate hurtling debris. Adherence to the Massachusetts Building Code is a primary current mitigation strategy. Current land development regulations, such as restrictions on the height of telecommunications towers, also help prevent wind damages. Regular pruning of trees and burying of utilities in new subdivisions also reduce the chances for strong winds to down power lines.

Wildfires / Brushfires

Residents must notify the Fire Department when they plan to have a controlled burn on their property. In addition, the Town conducts local outreach to students at schools about fire safety. Finally, subdivisions greater than five are encouraged to provide a water source for fire prevention.

Earthquakes

Most buildings and structures in the state were constructed without specific earthquake resistant design features. However, the State Building Code helps maintain the structural integrity of structures and helps to mitigate earthquakes.

Dam Failure

The mitigation measures currently in place focus on regular inspections and permitting process required by the Massachusetts DCR. State law requires a permit for the construction of any dam. DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).

Drought

The Town regularly inspects its water system to identify and repair leaks. Following the Massachusetts Water Management Act also regulates the amount of water that can be used during a Water Emergency Declaration. Many of the measures that reduce flooding by preserving open space allow for stormwater to infiltrate into the soil and maintain appropriate groundwater levels.

Extreme Temperatures

Extreme temperatures were not identified as a hazard in Hampden in the 2008 Hazard Mitigation plan. The Town is aware of increasing extreme temperatures and has included this hazard in their plan, even though there have been no occurrences in the Town. The Council on Aging is the entity in Hampden charged with monitoring this hazard because the Town has determined that if anyone is likely to be affected, it is probably older people.

Existing Capabilities/Strategies

The Town of Hampden currently has a variety of mitigation capabilities and strategies in place. These capabilities/strategies are listed on the following pages and have been evaluated in the “Effectiveness” column.

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness and Potential Changes
Culvert Replacements	Operations	Priority list of necessary culvert replacements and other construction projects to effectively manage flooding.	Flooding, Hurricanes, Severe Storms	Very effective for managing flood control needs. Replace top priorities on culvert replacement list to reduce flooding, pending availability of funding.
Zoning Bylaws: Floodplain and Wetlands District	Policy	Areas delineated as part of the 100-year floodplain and wetlands are protected by strict use regulations.	Flooding, Hurricanes, Severe Storms Drought	Very effective for preventing incompatible development within the flood prone areas.
Zoning Bylaws: Water Supply Protection District	Policy	Areas delineated as recharge areas for groundwater aquifers are protected by strict use regulations.	Flooding, Hurricanes, Severe Storms Drought	Very effective for preventing groundwater contamination and for controlling stormwater runoff. Revise definitions for clarification – utilize state model from DEP.
Zoning Bylaws: Golf and Recreation District	Policy	Definitive plan must show drainage and runoff	Flooding, Hurricanes, Severe Storms	Effective.
Zoning Bylaws: Non-Profit Educational Recreation District	Policy	Minimum 75% open space; drainage requirements; site and definitive plan must show runoff and drainage	Flooding, Hurricanes, Severe Storms	Effective.

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness and Potential Changes
Zoning Bylaws: Ridgeline and Hillside Overlay District	Policy	This district restricts the height and use of development so as to minimize the removal of native vegetation and excavation of land in order to minimize any danger of erosion, flooding, or pollution of the ground or surface water supply.	Severe wind Flooding, Drought Hurricanes, Severe Storms	Effective.
Zoning Bylaws: Permits/Site Plan Approval	Policy	Proposed uses must meet requirements for drainage and preventing erosion and pollution to waterbodies.	Flooding, Hurricanes, Severe Storms	Effective for preventing incompatible development.
Zoning Bylaws: Flexible Residential Open Space Development	Policy	The FROSD, which is allowed by special permit, provides for greater flexibility and creativity in the design of residential subdivisions, to permanently preserve open space / pervious surface and natural resources.	Severe Wind Flooding, Hurricanes, Severe Storms Drought	Effective.
Hampden Open Space and Recreation Plan	Planning Document	Inventories natural features and promotes natural resource preservation in the town, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks. Makes recommendations for protecting Hampden's water quality and supply.	Flooding, Hurricanes, Severe Storms Drought	Effective in identifying sensitive resource areas, including floodplains. Encourages forestland and farmland protection, which will help conserve the town's flood storage capacity. Implement relevant action items in OSRP.

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness and Potential Changes
Participation in the National Flood Insurance Program	Operations	Allows property owners to purchase flood insurance from the government against future losses. Longmeadow participates in the program. Continued compliance with NFIP program by maintaining Floodplain Overlay District and limiting development in 100-year floodplain.	Flooding Hurricanes, Severe Storms,	Somewhat effective, provided that the town remains enrolled in the National Flood Insurance Program. Initiate process to become a part of FEMA's Community Rating System. Distribute information to citizens living in floodplain about NFIP.
Subdivision Regulations: Underground Utilities	Policy	Utilities in new developments must be placed underground.	Snow Storm / Ice Storm / Hurricanes / Tropical Storms Tornadoes / Severe Thunderstorms / Winds	Effective for preventing power loss. Contract with utility companies to put underground new utility lines in general and existing utility lines in locations where repetitive outages occur.
Subdivision Regulations: Design Standards	Policy	Standards include street grade regulations (6% - 8% maximum); and intersection grade regulations.	Snow Storm / Ice Storm	Effective.
Backup Electric Power	Operations	Shelters have backup power, three mobile generators	All	Very effective in case of power loss. Test effectiveness of generators.
Tree Management	Operations	List of dangerous trees created annually for Eversource.	Snow Storm / Ice Storm / Hurricanes / Tropical Storms Tornadoes / Severe Thunderstorms / Winds	Very effective, preventative collaboration.
Wireless Communications Bylaw	Policy	Height and setback limits on wireless communication towers/facilities	Snow Storm / Ice Storm / Hurricanes / Tropical Storms Tornadoes / Severe Thunderstorms / Winds	Somewhat effective for preventing damage to nearby property.
Development of Sites: Trailers	Policy	Trailers (or mobile homes/RVs) are not permitted within town limits as permanent living quarters.	Hurricanes / Tropical Storms Tornadoes / Severe Thunderstorms / Winds	Somewhat effective for preventing damage to susceptible structures (mobile homes).

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness and Potential Changes
Subdivision Regulations: Rural Water Supply	Policy	Subdivisions greater than 5 are encouraged to provide a water source for fire prevention.	Wildfire / Brushfire / Drought	Effective. Make requirement mandatory.
Burn Permits	Operations	Residents must obtain burn permits, and personnel provide information on safe burn practices.	Wildfire / Brushfire	Somewhat effective. Increase enforcement of burning regulations, perhaps invoke penalties for offenders.
Subdivision Regulations: Environmental Impact Assessment	Policy	Environmental impact of all new developments must be considered as part of subdivision applications, including the impact to groundwater.	Flooding	
Public Education/ Outreach	Operations	The Fire Department has an ongoing educational program in the schools.	Wildfire / Brushfire	Effective.
Stormwater Management Bylaw	Policy	The bylaw addresses erosion and non-stormwater discharges into the town's storm drain system.	Drought Flooding, Hurricanes, Severe Storms	Effective.
State Building Code	Policy	The Town of Hampden has adopted the State Building Code.	All	Effective for new buildings only. Determine whether older structures categorized as critical facilities to determine if they are earthquake resistant.
New Dam Construction Permits	Operations	State law requires a permit for the construction of any dam.	Dam Failure	Effective. Ensures dams are adequately designed.

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness and Potential Changes
Dam Inspections	Operations	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Dam Failure	Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply. Monitoring and enforcement falls within the state's purview. Identify sources of funding for dam safety inspections. Incorporate dam safety into development review process.

Deleted Mitigation Strategies

The Town of Hampden has decided not to pursue several mitigation strategies identified in the previous version of its Hazard Mitigation Plan. These deleted strategies, as well as the reason for their deletion, are indicated in the table below.

Deleted and/or Completed Mitigation Strategies					
Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Reason for Deletion
Stormwater Management Bylaw	Policy	Propose adoption of Stormwater Management Bylaw, pending availability of funding.	Flooding	Planning Board – Stormwater Committee, BOS	COMPLETED
Culvert/Drainage Repair/ Replacement	Operations	Replace top priorities on culvert replacement list to reduce flooding, pending availability of funding.	Flooding	Highway Dept, Grants Committee	ONE CULVERT WAS REPAIRED, and this strategy is being moved to the new strategy list as the Town still has some problem culverts
Local Emergency Management Committee	Operations	Work to form Local Emergency Management Committee (LEMC)	All	EMD, BOS	COMPLETED
NFIP Information	Education and Outreach	Distribute information to citizens living in the floodplain about the NFIP.	Flooding	EMD, Building Inspector	COMPLETED
Burn Permit Education	Education and Outreach	Increase education and enforcement of burn permits, including preseason review of regulations in public outreach campaign and/or invoking penalties for offenders	Wildfire / Brushfire	Fire Dept, BOS, Police Dept	COMPLETED
Resident Snow Plowing	Operations	Increase enforcement of restrictions prohibiting residents from plowing snow into the road	Snow Storm / Ice Storm	BOS, Police Dept	COMPLETED

Deleted and/or Completed Mitigation Strategies

Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Reason for Deletion
Reverse 911	Operations	Examine current notification system including feasibility of new siren warning system, internet radio, or Reverse 911.	All	EMD, BOS	COMPLETED
Shelter Supply Inventory	Operations	Inventory supplies at shelters; coordinate with local vendors to supply shelters in case of natural disaster.	All	EMD, LEMC (when formed)	COMPLETED
Shelter Generators	Operations	Test effectiveness of generators at shelters	All	EMD, BOH	COMPLETED
Snow Drift Prevention	Capital Purchase	Purchase large snow-blower for severe snow drifting.	Snow Storm / Ice Storm	EMD, Highway Dept, BOS	DETERMINED ITS MORE COST EFFECTIVE TO RENT ONE AS NEEDED
Water Supply Protection District Bylaw Revision	Policy	Revise the Water Supply Protection District Bylaw, clarifying definitions.	Flooding	Planning Board, BOH, Fire Department	COMPLETED
Erosion Control Devices	Policy	Clarify requirements and responsibility of O&M for erosion control devices, detention/retention ponds, swales, etc. in the Subdivision Regulations	Flooding	BOS, Planning Board, Stormwater Committee, Building Inspector	COMPLETED
Rural Water Supply Requirements	Policy	Revise Subdivision Regulations regarding Rural Water Supply to make fire prevention water sources required.	Drought	BOS, Planning Board, Fire Dept	COMPLETED
Dam Safety Review	Policy	Incorporate dam safety into development review process.	Dam Failure	Planning Board; EMD	DETERMINED TO BE NOT COST EFFECTIVE

Deleted and/or Completed Mitigation Strategies

Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Reason for Deletion
Underground Utilities	Operations	Contract with utility companies to put underground new utility lines in general and existing utility lines in locations where repetitive outages occur.	Snow Storm / Ice Storm / Hurricanes / Tropical Storms / Tornadoes / Severe Thunderstorms / Winds	Planning Board, Town Consulting Engineer	NOW REQUIRED FOR ALL NEW DEVELOPMENT AND NOT ECONOMICALLY FEASIBLE OTHERWISE

Prioritized Implementation Plan

Throughout this planning process, the Town of Hampden Hazard Mitigation Committee has worked to analyze actions and/or projects that the Town considered to reduce the impacts of hazards identified in the risk assessment, and identified the actions and/or projects that the jurisdiction intends to implement. Several of the action items previously identified in the previous version of this Hazard Mitigation Plan are currently continuing, either because they require more time to secure funding or their construction process is ongoing. In addition, the Hazard Mitigation Committee identified several new strategies that are also being pursued. These new strategies are based on experience with currently implemented strategies, as well as the hazard identification and risk assessment in this plan. The strategies identified in this plan are believed by the local Hazard Mitigation Committee to be the ones needed in Hampden to address the vulnerabilities identified in this plan.

The prioritization process used in this plan update is different from the prioritization process used previously and produced a different hierarchy of projects.

Prioritization Methodology

The Hazard Mitigation Committee reviewed and prioritized a list of previously identified and new mitigation strategies using the following criteria:

Application to multiple hazards – Strategies are given a higher priority if they assist in the mitigation of several natural hazards.

Time required for completion – Projects that are faster to implement, either due to the nature of the permitting process or other regulatory procedures, or because of the time it takes to secure funding, are given higher priority.

Estimated benefit – Strategies which would provide the highest degree of reduction in loss of property and life are given a higher priority. This estimate is based on the Hazard Identification and Analysis Chapter, particularly with regard to how much of each hazard’s impact would be mitigated.

Cost effectiveness – in order to maximize the effect of mitigation efforts using limited funds, priority is given to low-cost strategies. For example, regular tree maintenance is a relatively low-cost operational strategy that can significantly reduce the length of time of power outages during a winter storm. Strategies that have identified potential funding streams, such as the Hazard Mitigation Grant Program, are also given higher priority.

Eligibility Under Hazard Mitigation Grant Program – The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Funding is made available through FEMA by the Massachusetts Emergency Management Agency. Municipalities apply for grants to fund specific mitigation projects under MEMA requirements.

The following categories are used to define the priority of each mitigation strategy:

Low – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical

Medium – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people

High – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete

Very High – extremely beneficial projects that will greatly contribute to mitigation of multiple hazards and the protection of people and property. These projects are also given a numeric ranking within the category.

Several hazard mitigation strategies identified in the previous Hazard Mitigation Plan have not yet been completed, but were changed in priority during the update of this plan by the Hazard Mitigation Committee. The Committee changed priorities by evaluating the entire list of mitigation strategies in a comprehensive manner according to the factors listed above. For strategies that have changed in priority, the previous priority is provided in parenthesis in the “Priority” column.

Cost Estimates

Each of the following implementation strategies is provided with a cost estimate. Projects that already have secured funding are noted as such. Where precise financial estimates are not currently available, categories were used with the following assigned dollar ranges:

- **Low** – cost less than \$50,000
- **Medium** – cost between \$50,000 – \$100,000
- **High** – cost over \$100,000

Cost estimates take into account the following resources:

- Town staff time for grant application and administration (at a rate of \$25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (rate of \$25 per hour)

Project Timeline

Each strategy is provided with an estimated length of time it will take for implementation. Where funding has been secured for the project, a specific future date is provided for when completion will occur. However, some projects do not currently have funding and thus it is difficult to know exactly when they will be completed. For these projects, an estimate is provided for the amount of time it will take to complete the project once funding becomes available.

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
New-the Town will apply for HMGP/PDM funds if unable to secure Ch 90 state highway funds	Wilbraham Rd drainage	Operations	Upgrade/replace as needed gravity-fed drainage on hilly, heavily traveled road, possible catch-basin failure, excavation, installation of trench retention system for pipe that is in some places buried 30 ft below surface	Flooding and Hurricanes/ Tropical Storms	DPW	high	High, est. \$2-3 million	Possibly HMGP/PDM and State	18 months from when funds become available
New-2 residents volunteered on the Haz Mit committee and they will work on this strategy in 2016	Public Education	Education	Prepare a pamphlet to educate residents about the dangers of flooding and the fact that FEMA/USGS is in the process of defining and clarifying the Flood Plain that will be distributed to all households	Flooding	SelectBoard	low	low	Town Staff/Volunteers	6 months after initiation
The Town is seeking funding to implement this strategy	Culvert/Drainage Repair/ Replacement	Operations	Replace/repair top priorities on culvert replacement list (p. 49) to reduce flooding, pending availability of funding.	Flooding and Hurricanes/ Tropical Storms	Highway Dept, Grants Committee	high	High, est. \$500,000-3 million	Municipal funds	18 months from when funds become available
COMPLETED	Stormwater Management Bylaw	Policy	Propose adoption of Stormwater Management Bylaw, pending availability of funding.	Flooding	Planning Board — Stormwater Committee, BOS		\$3,000	Town Staff/Volunteers Local Technical Assistance Grant (PVPC)	

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
COMPLETED	Local Emergency Management Committee	Operations	Work to form Local Emergency Management Committee (LEMC)	All	EMD, BOS	✓	N/A	Town Staff/Volunteer	
The Planning Board will work on this in 2016	Dam Safety Review	Policy	Incorporate dam safety into development review process.	Dam Failure	Planning Board, EMD	medium	low	Town Staff/Volunteers	July-Dec 2016
The same residents who volunteered on the committee will work on this in 2016	NFIP Information	Education and Outreach	Distribute information to citizens living in the floodplain about the NFIP.	Flooding	EMD, Building Inspector	medium	low	Town Staff/Volunteers	Sep-Nov 2016
COMPLETED	Burn Permit Education	Education and Outreach	Increase education and enforcement of burn permits, including pre-season review of regulations in public outreach campaign and/or invoking penalties for offenders	Wildfire / Brushfire	Fire Dept, BOS, Police Dept	✓	N/A	Town Staff	
COMPLETED	Resident Snow Plowing	Operations	Increase enforcement of restrictions prohibiting residents from plowing snow into the road	Snow Storm / Ice Storm	BOS, Police Dept	✓	N/A	Town Staff	

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
This is not Mitigation, but it is important to residents and the Town undertakes it semi-annually	Disseminate Emergency Information	Education and Outreach	Collect, update, disseminate emergency information to the public ('home survival kit'; home preparation for natural disasters, evacuation procedures, etc.)	All	EMD, LEPC (when formed)	low	low	Town Staff/Volunteers	3 months start with Oct preparedness month 2016
COMPLETED	Reverse 911	Operations	Examine current notification system including feasibility of new siren warning system, internet radio, or Reverse 911.	All	EMD, BOS	✓	TBD	Town Staff/Volunteers grants	
COMPLETED	Shelter Supply Inventory	Operations	Inventory supplies at shelters; coordinate with local vendors to supply shelters in case of natural disaster.	All	EMD, LEMC (when formed)	✓	N/A	Town Staff/Volunteers	
COMPLETED	Shelter Generators	Operations	Test effectiveness of generators at shelters	All	EMD, BOH	✓	N/A	Town Staff/Volunteers grants (for replacement)	
Determined to be cost effective to rent as needed	Snow Drift Prevention	Capital Purchase	Purchase large snow blower for severe snow drifting.	Snow Storm / Ice Storm	EMD, Highway Dept, BOS	✓	TBD	Town Staff	

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
The Town did not accomplish this in last 5 years and will undertake in 2017	Community Rating System	Operations	Research process of becoming a part of FEMA's Community Rating System and make a decision as to whether or not to participate	Flooding, Hurricanes, severe storms	BOS, EMD	high	low	Town Staff	Start Jan 2017-Dec 2017
The Town did not accomplish this in last 5 years and will undertake in 2017	Earthquake Evaluation	Operations	Determine whether critical facilities are earthquake resistant.	Earthquake	Building Inspector, EMD	medium	low	Town Staff	Start Oct 2018-June 2019

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
The Town made some progress on this from previous plan but as OSRPs are updated every 5 years this is an ongoing need and the Town will review status in 2017 to assure action.	Open Space and Recreation Plan Implementation	Policy, implementation-in some cases land acquisition or change of use	In regards to the Hampden Open Space and Recreation Plan, investigate why priority goals which would help with hazard mitigation are not being implemented and work to overcome identified barriers to implement the goals and strategies, particularly those dealing with protection of floodplain, forests, and farmland.	All Hazards	Con Com, BOS, Planning Board, Open Space Committee	medium	low	Town Staff/Volunteers	Jan 2017-Oct 2017
COMPLETED	Water Supply Protection District Bylaw Revision	Policy	Revise the Water Supply Protection District Bylaw, clarifying definitions.	Flooding	Planning Board, BOH, Fire Department	✓	\$2,500	PVPC Local Technical Assistance	
COMPLETED	Erosion Control Devices	Policy	Clarify requirements and responsibility of O&M for erosion control devices, detention/retention ponds, swales, etc. in the Subdivision Regulations	Flooding	BOS, Planning Board, Stormwater Committee, Building Inspector	✓	\$2,500	Town Staff/Volunteers PVPC Local Technical Assistance	

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
COMPLETED	Rural Water Supply Requirements	Policy	Revise Subdivision Regulations regarding Rural Water Supply to make fire prevention water sources required.	Drought	BOS, Planning Board, Fire Dept	✓	N/A	Town Staff/Volunteers	
COMPLETED	Dam Safety Review	Policy	Incorporate dam safety into development review process.	Dam Failure	Planning Board; EMD	✓	N/A	Town Staff/Volunteers	
The Town did not accomplish this in last 5 years and will undertake in 2018	Water Conservation Guidelines	Policy	Create Water Conservation Guidelines.	Drought	Con Com, BOS	low	Low: est. \$2,500	Town Staff/Volunteers PVPC Local Technical Assistance	Jan 2018- Dec 2018
COMPLETED	Dam Safety Inspection Funding	Operations	Identify sources of funding for dam safety inspections.	Dam Failure	EMD	✓	N/A	Town Staff/Volunteers	

Previously Identified and New Strategies Prioritized by Hampden

Status	Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Priority	Cost	Funding Source	Timeframe
COMPLETED, as possible. The Town requires all new subdivisions to bury lines and it is not feasible to bury existing aboveground lines	Underground Utilities	Operations	Contract with utility companies to put underground new utility lines in general and existing utility lines in locations where repetitive outages occur.	Snow Storm / Ice Storm / Hurricanes / Tropical Storms Tornadoes / Severe Thunderstorms / Winds	Planning Board, Town Consulting Engineer	✓	N/A	Town Staff/Volunteers	

6: PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

Plan Adoption

Upon completion of the draft Hazard Mitigation Plan, a public meeting was held by the Town staff and the Pioneer Valley Planning Commission on July 27, 2015 to present and request comments from town officials and residents. The Hazard Mitigation Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency for their review. Upon receiving conditional approval of the plan by FEMA, the plan was presented to the Town's Select Board and adopted.

Plan Implementation

The implementation of this plan began upon its formal adoption by the Town Select Board and approval by MEMA and FEMA. Those Town departments and boards responsible for ensuring the development of policies, bylaw revisions, and programs as described in this plan have been included in the plan update process and will be notified of their responsibilities immediately following approval. The Town's Hazard Mitigation Committee will oversee the implementation of the plan, and work with the identified "Responsible Agencies" on plan implementation starting in 2016 and as noted in the prioritized action plan.

Incorporation with Other Planning Documents

Existing plans, studies, reports and municipal documents were incorporated throughout the planning process. This included a review and incorporation of significant information from the following key documents:

- ***Hampden Comprehensive Emergency Management Plan*** - used to identify critical infrastructure, current emergency operations, and special needs populations
- ***Hampden Community Development Plan*** - used to identify existing hazard mitigation strategies, already proposed mitigation strategies, natural resources, and critical infrastructure
- ***Hampden Zoning Ordinance and Subdivision Regulations*** - used to identify existing mitigation strategies
- ***Massachusetts' State Hazard Mitigation Plan*** - used to ensure consistency with state identification of mitigation strategies, critical infrastructure, and hazards

The Hazard Mitigation Plan will also be incorporated into updates of the Town's Comprehensive Emergency Management Plan.

After this plan has been approved by both FEMA and the local government, links to the plan will be emailed to all Town staff, boards, and committees, with a reminder to review the plan periodically and work to incorporate its contents, especially the action plan, into other planning processes and documents. In addition, during annual monitoring meetings for the Hazard Mitigation Plan implementation process, the Hazard Mitigation Committee will review whether any of these plans are in the process of being updated. If so, the Hazard Mitigation Committee will remind people working on these plans, policies etc of the Hazard Mitigation plan, and urge them to incorporate the Hazard Mitigation plan into their efforts.

The Hazard Mitigation Committee will also review current Town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan.

While it is the understanding of the Hampden Hazard Mitigation committee that the previous Hazard Mitigation plan has been integrated into other planning mechanisms in the Town, the Hazard Mitigation committee did not track this work. The committee is committed to doing so going forward.

Plan Monitoring and Evaluation

***Monitoring** is tracking the implementation of the plan over time. **Evaluating** is assessing the effectiveness of the plan at achieving its purpose and goals. **Updating** means reviewing and revising the plan at least once every five years.*

The Town's Emergency Management Director will call meetings of the Local Emergency Planning Committee (LEPC) to review plan progress as needed, based on occurrence of hazard events. The public will be notified of these meetings in advance through a posting of the agenda at Town Hall. Responsible parties identified for specific mitigation actions will be asked to submit their reports on mitigation action status in advance of the meeting. Meetings will entail the following actions:

- Review of previous hazard events to discuss and evaluate major issues, effectiveness of current mitigation, and possible mitigation for future events.
- Assess how the mitigation strategies of the plan can be integrated with other Town plans and operational procedures, including the Zoning Bylaw and Emergency Management Plan.
- Review and evaluate progress toward implementation of the current mitigation plan based on reports from responsible parties.
- Update and amend current plan to improve mitigation practices.

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. All changes to the plan will be tracked by saving the plan with new dates when updated or amended. The Committee will review and update the Hazard Mitigation Plan every five years.

The following questions will serve as the criteria that is used to evaluate the plan:

Plan Mission and Goal

- Is the Plan's stated goal and mission still accurate and up to date, reflecting any changes to local hazard mitigation activities?
- Are there any changes or improvements that can be made to the goal and mission?

Hazard Identification and Risk Assessment

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.
- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.
- Is there any new data available from local, state, or Federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the plan.

Existing Mitigation Strategies

- Are the current strategies effectively mitigating the effect of any recent hazard events?
- Has there been any damage to property since the plan was last reviewed?
- How could the existing mitigation strategies be improved upon to reduce the impact from recent occurrences of hazards? If there are improvements, these should be incorporated into the plan.

Proposed Mitigation Strategies

- What progress has been accomplished for each of the previously identified proposed mitigation strategies?
- How have any recently completed mitigation strategies affected the Town's vulnerability and impact from hazards that have occurred since the strategy was completed?
- Should the criteria for prioritizing the proposed mitigation strategies be altered in any way?
- Should the priority given to individual mitigation strategies be changed, based on any recent changes to financial and staffing resources, or recent hazard events?

Review of the Plan and Integration with Other Planning Documents

- Is the current process for reviewing the Hazard Mitigation Plan effective? Could it be improved?
- Are there any Town plans in the process of being updated that should have the content of this Hazard Mitigation Plan incorporated into them?

- How can the current Hazard Mitigation Plan be better integrated with other Town planning tools and operational procedures, including the zoning bylaw, the Comprehensive Emergency Management Plan, and the Capital Improvement Plan?

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all meetings in accordance with Massachusetts open meeting laws and the public invited to attend. The public will be notified of any changes to the Plan via the meeting notices board at Town Hall, and copies of the revised Plan will be made available to the public at Town Hall.

7: APPENDICES

Appendix A: Technical Resources

1) Agencies

Massachusetts Emergency Management Agency (MEMA).....	508/820-2000
Hazard Mitigation Section	617/626-1356
Federal Emergency Management Agency (FEMA)	617/223-4175
Selected MA Regional Planning Commissions:	
Berkshire Regional Planning Commission (BRPC).....	413/442-1521
Franklin Regional Council of Governments (FRCOG).....	413/774-3167
Metropolitan Area Planning Council (MAPC).....	617/451-2770
Pioneer Valley Planning Commission (PVPC).....	413/781-6045
MA Board of Building Regulations & Standards (BBRS).....	617/227-1754
DCR Water Supply Protection.....	617/626-1379
DCR Waterways.....	617/626-1371
DCR Office of Dam Safety.....	508/792-7716
DFW Riverways.....	617/626-1540
MA Dept. of Housing & Community Development.....	617/573-1100
Woods Hole Oceanographic Institute.....	508/457-2180
UMass-Amherst Cooperative Extension.....	413/545-4800
National Fire Protection Association (NFPA).....	617/770-3000
New England Disaster Recovery Information X-Change (NEDRIX – an association of private companies & industries involved in disaster recovery planning).....	781/485-0279
MA Board of Library Commissioners.....	617/725-1860
MA Highway Dept, District 1.....	413/582-0599
MA Division of Marine Fisheries.....	617/626-1520
MA Division of Capital & Asset Management (DCAM).....	617/727-4050
University of Massachusetts/Amherst.....	413/545-0111
Natural Resources Conservation Services (NRCS).....	413/253-4350
MA Historical Commission.....	617/727-8470
U.S. Army Corps of Engineers.....	978/318-8502
Northeast States Emergency Consortium, Inc. (NESEC).....	781/224-9876
National Oceanic and Atmospheric Administration: National Weather Service.....	508/824-5116
US Department of the Interior: US Fish and Wildlife Service	413/253-8200
US Geological Survey.....	508/490-5000

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP)	MA Emergency Management Agency
406 Public Assistance and Hazard Mitigation	MA Emergency Management Agency
Community Development Block Grant (CDBG).....	DHCD, also refer to RPC
Dam Safety Program.....	MA Division of Conservation and Recreation
Disaster Preparedness Improvement Grant (DPIG)	MA Emergency Management Agency
Emergency Generators Program by NESEC‡	MA Emergency Management Agency
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation
Service Flood Mitigation Assistance Program (FMAP).....	MA Emergency Management Agency
Flood Plain Management Services (FPMS).....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP).....	MA Emergency Management Agency
Mutual Aid for Public Works.....	Western Massachusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) †	MA Emergency Management Agency
Power of Prevention Grant by NESEC‡	MA Emergency Management Agency
Roadway Repair & Maintenance Program(s).....	Massachusetts Highway Department
Section 14 Emergency Stream Bank Erosion & Shoreline Protection	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing	US Army Corps of Engineers
Shoreline Protection Program.....	MA Department of Conservation and Recreation
Various Forest and Lands Program(s).....	MA Department of Environmental Protection
Wetlands Programs	MA Department of Environmental Protection

‡NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NESEC for more information.

† Note regarding National Flood Insurance Program (NFIP) and Community Rating System (CRS): The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community’s floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. MEMA can provide additional information regarding participation in the NFIP-CRS Program.

3) Internet Resources

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/dis aster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/geog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program,	http://www.fema.gov/fema/csb.html	Searchable site for access of Community

Sponsor	Internet Address	Summary of Contents
Community Status Book		Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links
The Tornado Project Online	http://www.tornadoject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	http://www.iaa.iix.com/ndcmap.html	A multi-disaster risk map.
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

Appendix B: Documentation of Planning Process

The Hampden Hazard Mitigation Committee met four times to work on the update of the Town's Hazard Mitigation plan.

Meetings were held on

**Hampden Hazard Mitigation Committee
Meeting Agenda
Hampden Town Hall
February 12, 2015, 1:00 p.m.**

1. Introductions
2. Overview of Hazard Mitigation Planning Process
 - a. Background on Hazard Mitigation Planning
 - b. Planning process and requirements
 - i. 3 committee meetings
 - ii. 2 public outreach meetings
 - iii. MEMA / FEMA review
 - iv. Select Board adoption
 - c. Schedule for committee and public outreach meetings
3. Review of Chapter 1: Planning Process
4. Review of Chapter 2: Local Profile
5. Review of Chapter 3: Hazard Identification and Risk Assessment

**Hampden Hazard Mitigation Committee
Meeting Agenda #2
Hampden Town Hall
May 14, 2014, 7:00 p.m.**

1. Review draft plan update chapter by chapter and provide input on local knowledge of hazards and impacts and critical infrastructure
2. Review 2008 plan strategies and determine status: a) implemented, b) delete and explain why, c) continue on and move up in priority
3. Start work indentifying and necessary new mitigation strategies to pursue
4. Time permitting---Review hazard identification and critical infrastructure map

**Hampden Hazard Mitigation Committee
Meeting 3 Agenda
Hampden Town Hall
July 23, 2015**

1. Review plan edits from last meeting
2. Finalize mitigation strategies
3. Review Plan adoption process
4. Procedures for regular maintenance of plan

**Hampden Hazard Mitigation Committee
Meeting 4 Agenda
Hampden Town Hall
July 27, 2015**

1. Review and Finalize proposed Final plan and Map

Media releases announcing and inviting residents, representatives of surrounding communities and local and area businesses and other interested parties to participate in and/or comment on the draft Hampden Hazard Mitigation Plan Update 2015



MEDIA RELEASE

CONTACT: Catherine Ratte, PVPC Principal Planner, (413) 781-6045 or cratte@pvpc.org
Pam Courtney, Administrative Assistant, Town of Hampden (413) 566-2151
x100 or selectmen@hampden.org

FOR IMMEDIATE RELEASE
May 12, 2015

Town of Hampden to Hold Public Engagement Event for Hazard Mitigation Plan

Hampden residents, businesses, and surrounding community representatives are invited to provide comments on the update of the Town of Hampden Hazard Mitigation Plan on Monday, May 18 at 7:00 pm at Hampden Town Hall, 625 Main Street. The plan is being updated by the Town with assistance from the Pioneer Valley Planning Commission and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). All members of the public are welcome to attend the event.

The meeting will include an overview of the hazard mitigation planning process and a discussion of existing mitigation initiatives addressing natural hazards in Hampden. Municipal officials and PVPC staff will be available to answer questions and listen to comments on the draft plan.

This planning effort is being undertaken to help the Town of Hampden assess the risks faced from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

For more information, please contact PVPC's Catherine Ratté at cratte@pvpc.org or (413) 781-6045.



MEDIA RELEASE

CONTACT: Catherine Ratte, PVPC Principal Planner, (413) 781-6045 or cratte@pvpc.org
Pam Courtney, Administrative Assistant, Town of Hampden (413) 566-2151
x100 or selectmen@hampden.org

FOR IMMEDIATE RELEASE
July 23, 2015

Town of Hampden to Hold Final Public Engagement Event for Hazard Mitigation Plan

The Select Board in Hampden, with assistance from Town volunteers, the Pioneer Valley Planning Commission and the Massachusetts Emergency Management Agency, has recently completed updating the Town's Hazard Mitigation Plan. Hampden residents, businesses, and surrounding community representatives are invited to a meeting on Monday July 27th to hear an overview of the Town's new Hazard Mitigation plan and to provide any comments.

Monday, July 27 at 6:00 pm at Hampden Town Hall, 625 Main Street.

This planning effort has helped the Town of Hampden assess the risks faced from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

For more information, please contact PVPC's Catherine Ratté at cratte@pvpc.org or (413) 781-6045.

Hampden Hazard Mitigation Plan

Public Outreach Event
May 18, 2015



Agenda

- Overview of Hazard Mitigation
- Content of Hampden Hazard Mitigation Plan
 - Hazard Identification and Risk Assessment
 - Critical infrastructure
 - Existing strategies for mitigating hazards
- Question and comment period

What is Hazard Mitigation?

According to FEMA:

"any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc."

Benefits of Hazard Mitigation

- Makes community eligible to apply for Hazard Mitigation funds from FEMA
- Mitigation is a way of managing risk and can save the Town money over the long term
- Having a plan provides an approach for using limited resources more effectively

Overview of a Hazard Mitigation Plan

Purpose of plan:
Mitigate (manage/lessen) the consequences of natural disasters

Key plan components:

1. Hazard identification and assessment
2. Identification of critical infrastructure
3. Existing and proposed mitigation strategies
4. Proposed schedule for implementation of strategies

Hampden Hazard Mitigation Workgroup

The existing plan was developed by these people:

- John D. Flynn, Board of Selectmen
- Kathleen Foster, Planning Board
- Debbie House, Planning Board
- Dana Fodley, Highway Department
- Melissa Lail-Trecker, Grants Committee
- Kevin Hinkamp

The Pioneer Valley Planning Commission assisted the Town with the development of the plan, through funding from FEMA via MEMA.

Hazard Assessment

Type of Hazard	Location of Occurrence	Potentiality of Future Events	Impact	Vulnerability
Flooding	Large	Low	Limited	2-High Risk
Coastal Encroachment / Ice Storms	Large	Very High	Limited	2-High High Risk
Hurricanes	Large	Low	Limited	1-Low Risk
Coastal Encroachment / Storm / Tornado	Small	Temporary Low Coasts Threatened and High High	Limited	2-Medium Risk
Wildfires / Bushfires	Large	High	Other	2-Medium Risk
Seismicity	Large	Low	Disruptive	1-Low Risk
Sea Level Rise	Small	Very Low	Other	2-High Low Risk
Drought	Large	Low	Other	2-High Low Risk

Critical Infrastructure Inventory

An inventory of critical infrastructure in Hampden is being updated, and mapped to assure safe location of critical infrastructure, including:

- Emergency services
- Town offices
- Water, sewer, and road infrastructure
- Communications towers
- Emergency shelters

Other critical infrastructure could include: elderly housing, schools and places of worship.

Existing and New Mitigation Strategies

- The Town of Hampden has a set of existing mitigation strategies included in its operations, zoning bylaw, subdivision regulations, and other planning documents
- The Hazard Mitigation Workgroup will evaluate each mitigation strategy to determine its effectiveness
- The Workgroup will also develop and prioritize a list of new mitigation strategies

Next Steps in Planning Process

- Local Hazard Mitigation committee will meet to provide input on the DRAFT updated Plan
- Town will hold a second public meeting to share the draft updated plan
- Draft plan will be submitted to MEMA and FEMA
- MEMA and FEMA provide comments, which are incorporated into plan
- Plan reviewed and voted upon by Hampden Select Board

Question and Comments




Contact information:

Catherine Ratta'
Principal Planner/Section Manager, Pioneer Valley Planning Commission
E-mail: cratta@pvp.org
Phone: 413-781-6045

Welcome to Hampden, Massachusetts
Incorporated 1879

Hampden Hazard Mitigation Plan

Public Outreach Event #2
July 27, 2015

Agenda

- Overview of hazard mitigation
- Content of Hampden Hazard Mitigation Plan
 - Hazard identification and risk assessment
 - Critical infrastructure
 - Existing strategies for mitigating hazards
 - Proposed strategies for mitigating hazards
- Question and comment period

What is Hazard Mitigation?

According to FEMA:

"any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc."

Benefits of Hazard Mitigation

- Makes community eligible to apply for Hazard Mitigation funds from FEMA
- Mitigation is less expensive than disaster clean up
- Having a plan provides an approach for using limited resources more effectively

Overview of a Hazard Mitigation Plan

Purpose of plan:
Lessen the long-term consequences of natural disasters

Key plan components:

1. Hazard identification and assessment
2. Identification of critical infrastructure
3. Existing and proposed mitigation strategies
4. Proposed schedule for implementation of strategies

Hazard Assessment

Type of Hazard	Scale of Hazard / Potential for Loss			
	Location of Occurrence	Frequency of Future Events	Impact	Vulnerability
Flooding	Large	Low	Limited	2-High Risk
Severe Droughts / Ice Storms	Large	Very High	Limited	2-High High Risk
Hurricanes	Large	Low	Limited	4-Low Risk
Severe Thunderstorms / Wildfires / Tornadoes	Small	Thunders: Low Severe Thunderstorms: and Wildfire: High	Limited	3-Medium Risk
Wildfires / Avalanches	Large	High	Minor	3-Medium Risk
Seismicity	Large	Low	Geographic	4-Low Risk
Sea Level Rise	Small	Very Low	Minor	5-High Low Risk
Debris	Large	Low	Minor	5-High Low Risk

In addition to the media releases publicizing the Town's planning process and inviting input, PVPC assured that surrounding communities were aware of Hampden's work updating their plan by informing the members of the Commission that oversees PVPC's work through articles in the quarterly newspaper published by the PVPC and also by presenting at meetings of the Executive Committee. Three articles have been published on the Hampden (and other member municipalities) Hazard Mitigation work, starting in 2012. They are copied below. The PVPC "Regional Reporter" is emailed to all 43 cities and towns in the Pioneer Valley and also to Businesses, Chambers of Commerce, Educational Institutions and Developers.

Pioneer Valley Planning Commission Regional Reporter December 2012

PVPC working with member communities to mitigate the long term consequences of natural hazards

PVPC is working with 10 member municipalities to update and/or develop new Hazard Mitigation plans. Granville, Longmeadow, Montgomery, Russell, and Wales are all developing their first Hazard Mitigation plans; while Agawam, Easthampton, Hampden, Southwick, and Ware are working on updates.

PVPC was also engaged by the University of Massachusetts Amherst campus to write their campus Hazard Mitigation plan, and PVPC has just submitted a grant application to MEMA to update plans for Hadley, Hatfield, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southampton, Westhampton, and Wilbraham.

Having a FEMA approved Hazard Mitigation plan makes each municipality eligible to apply for Hazard Mitigation grant funds to address identified top community priorities to mitigate the long-term consequences of natural disasters.

For more information, please contact Catherine Ratté at cratte@pvpc.org or 413/781-6045.

Pioneer Valley Planning Commission Regional Reporter January 2015

Let PVPC Guide Your Community Through the Hazard Mitigation Planning Process!

Over the past 10 years, PVPC has helped 40 communities in the Pioneer Valley develop hazard mitigation plans, making them eligible for grant opportunities from the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA).

Through the hazard mitigation planning process, communities assess their vulnerability to natural hazards, such as flooding, snowstorms, hurricanes, wildfire, and tornadoes. They also prioritize a set of mitigation strategies that will help eliminate the long-term risk to human life and property from these hazards. Common mitigation strategies that are eligible for grant funding from FEMA and MEMA include minor localized flood reduction projects, structural retrofitting of existing buildings, culvert improvements, installation of emergency backup generators, and infrastructure retrofits.

PVPC provides guidance in all aspects of the development of hazard mitigation plans, including identification and mapping of natural hazards, collaboration with municipal officials to prioritize mitigation strategies, and public outreach. PVPC can also assist communities in applying for grants to fund mitigation projects, through its Local Technical Assistance (*LTA*) program. Contact Josiah Neiderbach at jneiderbach@pvpc.org to find out more.

Pioneer Valley Planning Commission Regional Reporter April 2013

The Pioneer Valley Planning Commission is currently working with 23 member municipalities to create new hazard mitigation plans and update expiring plans. These plans, approved by the Federal Emergency Management Agency (FEMA), make these municipalities eligible to apply for hazard mitigation grant funds to address identified top community priorities to mitigate the long-term consequences of natural disasters.

PVPC is currently in the process of creating or updating plans for 10 communities. This includes developing new hazard mitigation plans for Granville, Longmeadow, Montgomery, Russell, and Wales, as well as updating the current plans for Agawam, Easthampton, Hampden, Southwick, and Ware.

PVPC also recently applied for funds from FEMA to create or update plans for an additional 13 communities. This includes creating new plans for Blandford and Tolland, as well as updating existing plans for Chesterfield, Hadley, Hatfield, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southampton, Westhampton, and Wilbraham.

Copies of approved hazard mitigation plans are available on PVPC's website at <http://www.pvpc.org/activities/landuse-mitplans-2011.shtml>. For more information please contact PVPC's Josiah Neiderbach at (413) 781-6045 or jneiderbach@pvpc.org.

Media Organizations Sent Press Releases

Media Organization	Address	Town	State	Zip Code
African American Point of View	688 Boston Road	Springfield	MA	01119
Agawam Advertiser News	23 Southwick Street	Feeding Hills	MA	01030
Amherst Bulletin	115 Conz Street	Northampton	MA	01060
Belchertown Sentinel	1 Main Street	Belchertown	MA	01007
Berkshire Eagle	75 South Church Street	Pittsfield	MA	01202
Brattleboro Reformer	62 Black Mountain Rd.	Brattleboro	VT	05301
CBS 3 Springfield	One Monarch Place	Springfield	MA	01144
Chicopee Register	380 Union Street	West Springfield	MA	01089
CommonWealth Magazine	18 Tremont Street	Boston	MA	02108
Country Journal	5 Main Street	Huntington	MA	01050
Daily Hampshire Gazette	115 Conz Street	Northampton	MA	01060
El Sol Latino	P.O. Box 572	Amherst	MA	01004
Going Green	PO Box 1367	Greenfield	MA	01302
Hilltown Families	P.O. Box 98	West Chesterfield	MA	01084
Holyoke Sun	138 College Street	South Hadley	MA	01075
Journal Register	24 Water Street	Palmer	MA	01069
La Voz Hispana	133 Maple Street #201	Springfield	MA	01105
Ludlow Register	24 Water Street	Palmer	MA	01069
Massachusetts Municipal Association	One Winthrop Street	Boston	MA	02110
Quaboag Current	80 Main Street	Ware	MA	01082
Recorder	14 Hope Street	Greenfield	MA	01302
Reminder	280 N. Main Street	East Longmeadow	MA	01028
Southwick Suffield News	23 Southwick Street	Feeding Hills	MA	01030
State House News Service	State House	Boston	MA	02133
Tantasqua Town Common	80 Main Street	Ware	MA	01082
The Longmeadow News	62 School Street	Westfield	MA	01085
The Republican	1860 Main Street	Springfield	MA	01102
The Westfield News	62 School Street	Westfield	MA	01085
Town Reminder	138 College Street	South Hadley	MA	01075
Urban Compass	83 Girard Avenue	Hartford	CT	06105
Valley Advocate	115 Conz Street	Northampton	MA	01061
Vocero Hispano	335 Chandler Street	Worcester	MA	01602

WAMC Northeast Public Radio	1215 Wilbraham Road	Springfield	MA	01119
Ware River News	80 Main Street	Ware	MA	01082
West Springfield Record	P.O. Box 357	West Springfield	MA	01098
WFCR-Public Radio	131 County Circle	Amherst	MA	01003
WGBY-Public TV	44 Hampden Street	Springfield	MA	01103
WGGB ABC40/FOX 6 News	1300 Liberty Street	Springfield	MA	01104
WHMP-FM	15 Hampton Avenue	Northampton	MA	01060
Wilbraham-Hampden Times	2341 Boston Road	Wilbraham	MA	01095
Worcester Telegram & Gazette	20 Franklin Street	Worcester	MA	01615
WRNX/WHYN/WPKR Radio	1331 Main Street	Springfield	MA	01103
WWLP-TV 22	PO Box 2210	Springfield	MA	01102

Appendix C: List of Acronyms

Ag Com	Agricultural Commission
BOS	Board of Selectmen
CEM	
Plan	Comprehensive Emergency Management Plan
CIS	Community Information System
Con	
Com	Conservation Commission
CRS	Community Rating System
DCR	Massachusetts Department of Conservation and Recreation
DEP	Massachusetts' Department of Environmental Protection
DPW	Department of Public Works
EMA	Emergency Management Agency
EMD	Emergency Management Director
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance Program
HAZMAT	Hazardous Materials
HMGP	Hazard Mitigation Grant Program
LEPC	Local Emergency Planning Committee
MEMA	Massachusetts Emergency Management Agency
NFIP	National Flood Insurance Program
NWS	National Weather Service
PVPC	Pioneer Valley Planning Commission
RACES	Radio Amateur Civil Emerg Service
SFHA	Special Flood Hazard Area
TRI	Toxics Release Inventory
WMECO	Western Massachusetts Electric Company

Appendix D: Critical Facilities Map

CERTIFICATE OF ADOPTION

Town of Hampden, MASSACHUSETTS

BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE TOWN OF HAMPDEN HAZARD MITIGATION PLAN UPDATE 2015

WHEREAS, the Town of Hampden established a Committee to update the Town's Hazard Mitigation Plan; and

WHEREAS, the Town of Hampden participated in the update of the Town of Hampden Hazard Mitigation Plan Update 2015;

and WHEREAS, the Town of Hampden Hazard Mitigation Plan Update 2015 contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Hampden, and

WHEREAS, a duly-noticed public meeting was held by the Board of Selectmen on _____ for the public and municipality to review prior to consideration of this resolution; and

WHEREAS, the Town of Hampden authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Hampden Board of Selectmen formally approves and adopts the Town of Hampden Hazard Mitigation Plan Update 2015, in accordance with M.G.L. c. 40.

ADOPTED AND SIGNED this _____,

ATTEST