Tighe&Bond
Engineers | Environmental Specialists

COMMUNITY RESILENCE BUILDING WORKSHOPS- SUMMARY OF FINDINGS

TOWN OF PEPPERELL
MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) PROGRAM

Source: *https://www.town.pepperell.ma.us/*

SUBMITTED TO

Town of Pepperell

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Section 1
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1.1 Overview

FIGURE 1: 2010 Roadway flooding along Route 119 in Pepperell

The Town of Pepperell, like other communities in the Commonwealth of Massachusetts, is already feeling the impacts of climate change. In particular, the community has experienced severe weather related to inland flooding and extreme winter events. There have been 20 natural hazard incidents that triggered federal or state disaster declarations since 1991 that have affected Pepperell. The Town has had to manage extreme storm events such as the back to back Winter Storms Riley and Skylar in March 2018, where over 20 inches of snow was recorded by the end of the second storm. Pepperell experienced a drought that lasted from June 2016 through May 2017 and impacted the public water supply, businesses, and the public. The October 2011 "Halloween Storm" caused power outages for seven days in Town. Tropical Storm Irene in August 2011 caused devastating flooding and wind damage. The March 2010 storm caused the Nashua River to experience its worst flood in 23 years, resulting in substantial impacts in Pepperell including closure of Routes 119 and 111. In the future, the Town anticipates more severe and commonly occurring weather events due to climate change, such as increased flooding from large rain events, more substantial winter storms, and a greater likelihood of drought, including increased extreme heat days and heat waves. These extreme weather events will test Pepperell's ability to prepare for and respond to emergencies.

In 2017, the Commonwealth of Massachusetts inaugurated the Municipal Vulnerability Preparedness (MVP) program to assist municipalities in planning for and implementing strategies to adapt to predicted changes in our warming climate. The Executive Office of Energy and Environmental Affairs (EEA) oversees and implements the MVP program. Funds are awarded to municipalities under two categories of work: planning grants and action grants.

To proactively prepare for climate resiliency and begin to consider adaptation strategies, Pepperell applied for an MVP Planning Grant that also includes funding to prepare a Town-specific update of the 2015 Regional Hazard Mitigation Plan (HMP) prior to expiration of the Regional HMP.

1.1.1 How does the MVP Planning Process Augment the HMP?

The Federal Disaster Mitigation Act, adopted in 2000, requires that after November 1, 2004, all municipalities that wish to continue to be eligible to receive Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant funding for hazard mitigation activities adopt a local Hazard Mitigation Plan (HMP) and update the plan every five years.

Note that this planning requirement does not affect federally authorized disaster assistance funding which is exempt from the HMP requirement.

Currently, Pepperell is included in the "Hazard Mitigation Plan for the Northern Middlesex Region", which was approved by FEMA in August 2015. This plan covers Billerica, Chelmsford, Dracut, Dunstable, Lowell, Pepperell, Tewksbury, Tyngsborough, and Westford and was prepared under the overall direction of the Northern Middlesex Council of Governments (NMCOG). This plan will expire in August 2020.

The MVP effort supplements the HMP process by providing a statewide and major basin-specific climate change data to use in the natural hazard risk assessment and a consistent methodology for public engagement through the Community Resilience Building (CRB) process. Figure 2 demonstrates the overlap between the MVP and HMP development.

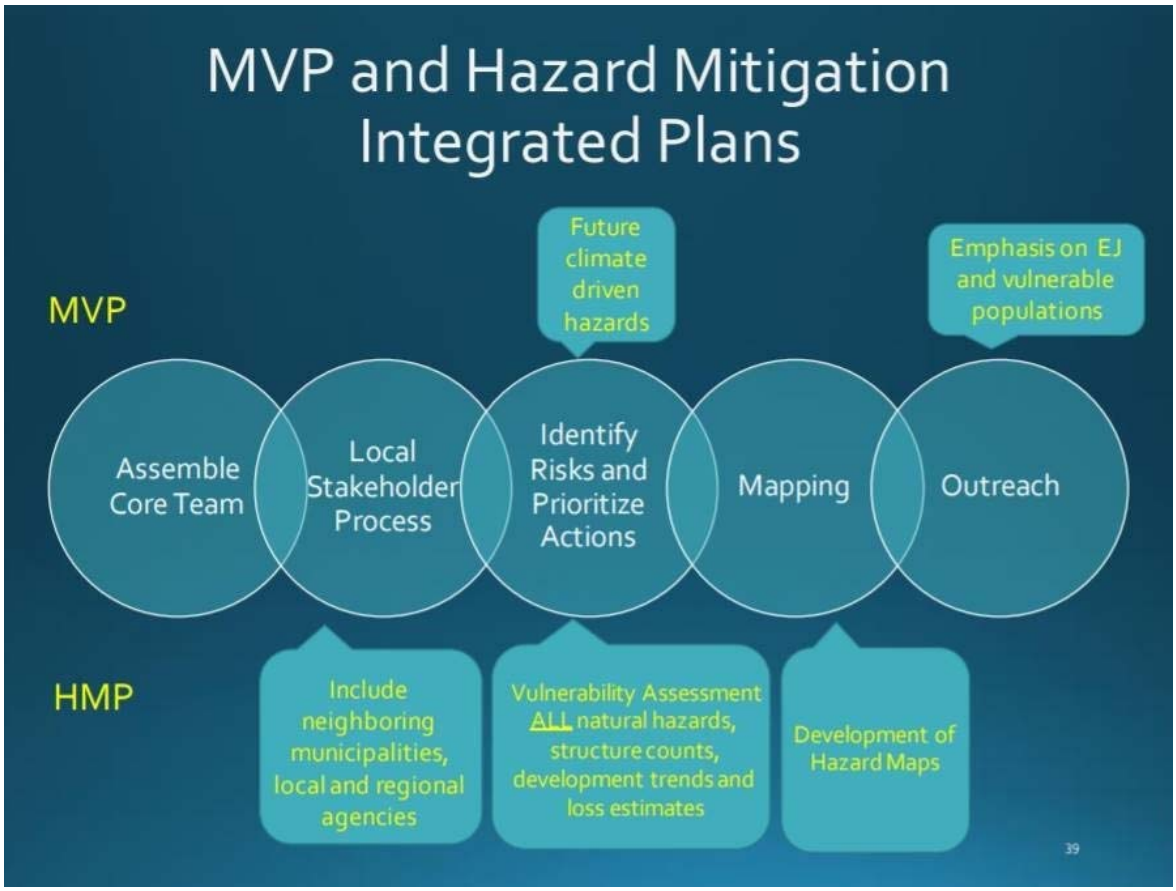


FIGURE 2: Overlap between MVP and HMP Development

1.1.2 Overview of the Community Resilience Building (CRB) Process

The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experiences to foster a collaborative dialogue about the strengths and vulnerabilities within a community, identify potential resiliency actions, and advance the education, planning, and ultimately implementation of priority actions. Figure 3 provides an overview of this process from the CRB Workshop Guide, which is available online at: https://www.communityresiliencebuilding.com/

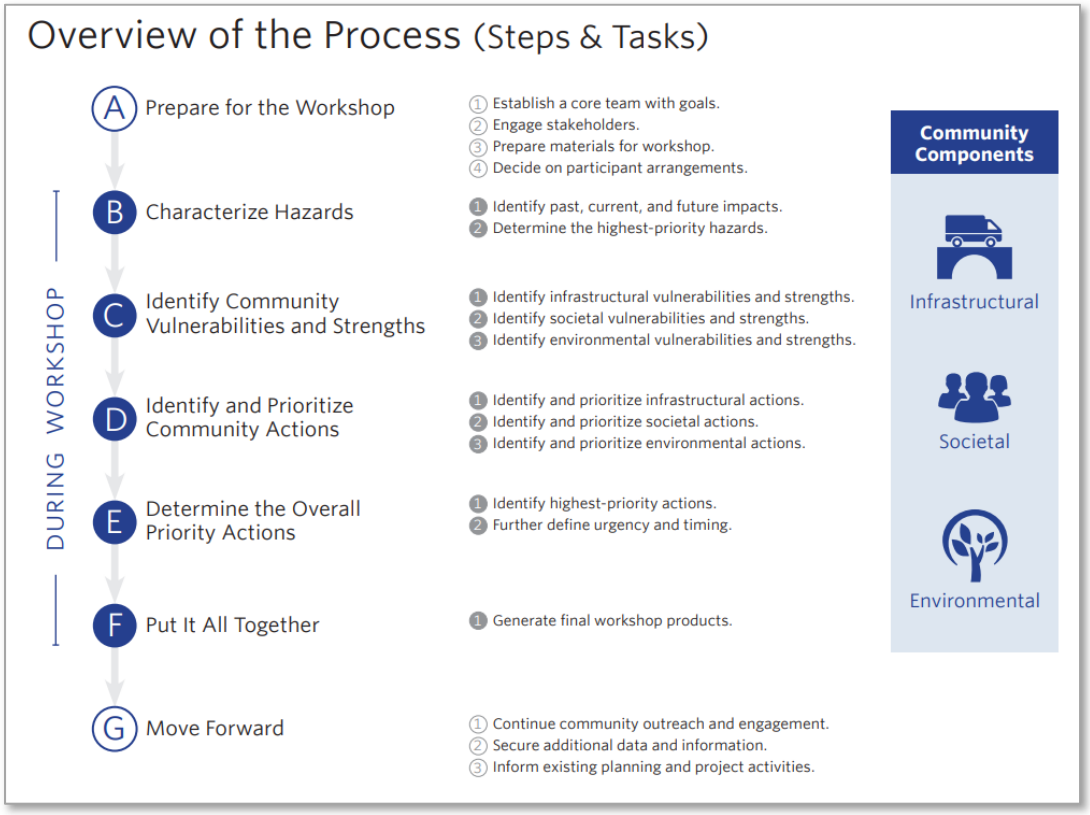


FIGURE 3: Overview of the CRB Process

During the workshops, participants interact at both small and large group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions. Each workshop's central objectives are to:

- Define the top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities of the Community;
- Develop prioritized actions for the Community; and
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

1.2 Pepperell's CRB Planning Activities

Lisa Davis, Planning Board Advisor, served as the Local Project Manager for undertaking the integrated MVP and HMP planning process. The Town partnered with Tighe & Bond, a state-certified MVP Provider, to complete the town-specific HMP Update and undertake the CRB process, including holding the CRB workshops.

To complete Step A of the CRB Guide, the Town of Pepperell drew from multiple departments, boards, and commissions to form the Core Team for the MVP. In addition, Pepperell formed an Advisory Group to create a knowledge base among citizens for a longer-term commitment on working locally to combat climate change impacts and develop a more sustainable community.

Together, these groups identified and engaged the community stakeholders to participate in the CRB workshops and the listening session. Community stakeholders included municipal staff not already a member of the Core Team, elected and appointed officials in Pepperell, municipal staff and representatives from abutting communities, NMCOG staff, environmental non-profits, representatives from power utilities, owners and managers of local businesses (including pharmacies, large employers, contractors, farms, tree removal services), and the citizens involved in local planning such as the ongoing Master Plan.

The following provides additional detail on the overcall CRB planning process undertaken by the Town of Pepperell to obtain MVP Community Designation and support the ongoing town specific HMP update.

1.2.1 Core Team Meetings

The MVP kickoff meeting, held on July 15, 2019, was coordinated to involve the Core Team at an early stage in the planning process. At this meeting, Tighe & Bond presented an overview of EEA's MVP Program and Goals, reviewed the scope, schedule, and budget, discussed public involvement and outreach, and reviewed the CRB process.

The Core Team met on September 26, 2019, to review and prioritize natural hazards, discuss the draft asset inventory and assets most at risk, and plan for the workshops including logistics and outreach.

The Core Team met again on February 13, 2020, to review and prioritize the mitigation strategies, review draft deliverables to date, and finalize the schedule for the public meeting and listening session, and define further Advisory Group actions.

Materials documenting the Core Team meetings are provided in Appendix A.

1.2.2 Advisory Group Meetings

The Advisory Group met on October 7, 2019, to review the prioritization of natural hazards that apply to Pepperell and to discuss the top four hazards, review and confirm community assets, and define a strategy to help engage local businesses to attend MVP Workshops.

The Advisory Group also met on January 27, 2020, to review progress to date and set deadline for input by Group on draft documents, and review previous mitigation strategies and discuss new mitigation strategies.

Materials documenting the meetings are provided in Appendix A.

1.2.3 Community Resilience Building Workshops

Community stakeholders were invited to participate in one of two CRB workshops on October 28 or November 2, 2019, at the Pepperell Community Center. The list of community stakeholders invited to the workshops is included in Appendix A.

The October 28th workshop was attended by 25 participants. The November 2nd workshop was attended by 16 participants.

Each workshop began with a chance for attendees to sign in and denote where they live or work in Pepperell.

Town Administrator Andrew MacLean provided an introduction to the Town's MVP/HMP planning process, welcomed attendees to the workshop, and thanked the Core Team and Advisory Group.

Tighe & Bond provide a formal presentation of the MVP program, the CRB workshop process, outlined climate change projections for the Town and Commonwealth, and reviewed Pepperell's top natural hazards (Step B of the CRB Guide). Attendees were invited to discuss the top hazards and modify as needed.

PHOTO 1: Town Administrator Andrew MacLean welcoming attendees to the first CRB Workshop and thanking the Core Team and Advisory Group

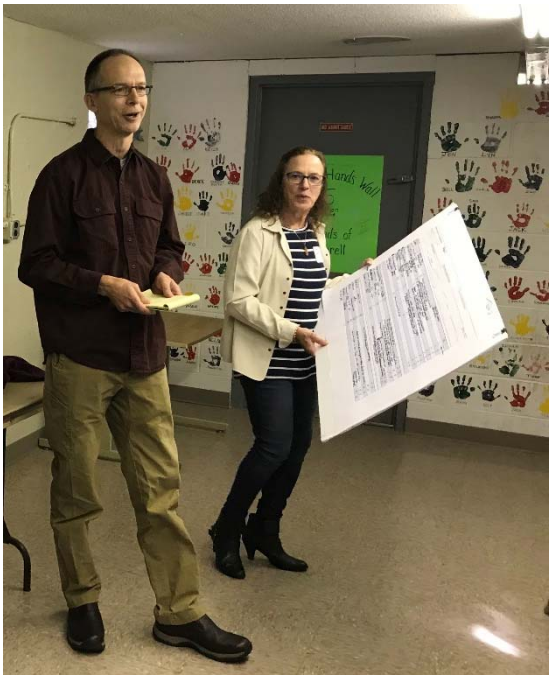
Participants were asked to complete a series of three facilitated small group discussions to fill out the CRB Risk Matrix by:

1. Identifying important community assets most vulnerable to natural hazards in four categories (for consistency with HMP requirements): infrastructure, societal, economic, and environmental, and define if these are a vulnerability, a strength, or both (Step C of the CRB Guide);
2. Determining mitigation actions to address vulnerabilities and protect strengths (Step D of the CRB Guide); and
3. Prioritizing and scheduling the mitigation actions (Step E of the CRB Guide).

PHOTO 2: (On right) Group from Workshop #1 in process determining mitigation actions and completing a portion of the CRB Risk Matrix

PHOTO 3: (On left) Group from Workshop #2 working to refine priorities and timeline for mitigation actions and complete CRB Risk Matrix

PHOTO 4: (below) Group from Workshop #2 presenting top community assets and associated mitigation actions



Following this small group discussion process, each group reported to the full group on the top risks and strengths and mitigation actions based on the group's prioritization and scheduling. Collectively, the group voted to further define the priorities (Step E/F of the CRB Guide).

Workshop meeting materials including completed sign-in sheets, presentations, maps, notes, and completed matrices are provided in Appendix B. The compiled CRB matrix is provided in Appendix D.

PHOTO 5: (On left) Results of collective voting from workshop #1

1.2.4 Listening Session

A listening session to present the final report and review the high priority actions identified through the CRB workshops was held remotely on GoToMeeting due to the COVID-19 pandemic on May 21,2020. Town Staff and NMCOG led the session with support from Tighe & Bond. An invitation was sent to everyone who attended the workshops, the Core Team, the Advisory Group, the Master Plan Committee and Neighboring towns, and was posted on the Town's website and the very active Facebook group. Ten attendees participated in the Listening Session.

Town staff facilitated discussion including resident input on the following:

- The town's intent to submit an application for an MVP action grant; and
- The future advancement and implementation of mitigation actions.

Meeting materials, including advertisement, for the listening session are provided in Appendix E. Following the Listening Session, an article by the Nashoba Valley Voice was published in the Lowell Sun on May 31, 2020. A copy of this is included in Appendix E as well.

Section 2
Top Hazards and Vulnerable Areas

This section discusses Steps B and C of the CRB Process to characterize hazards and identify community vulnerabilities and strengths (a.k.a. community assets).

2.1 Natural Hazard Risks

2.1.1 State Identified Hazards

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)[1] provides an in-depth overview of natural hazards in Massachusetts. The State Plan identifies 14 natural hazards that have impacted or historically occurred in communities within the Commonwealth of Massachusetts. These hazards are as follows:

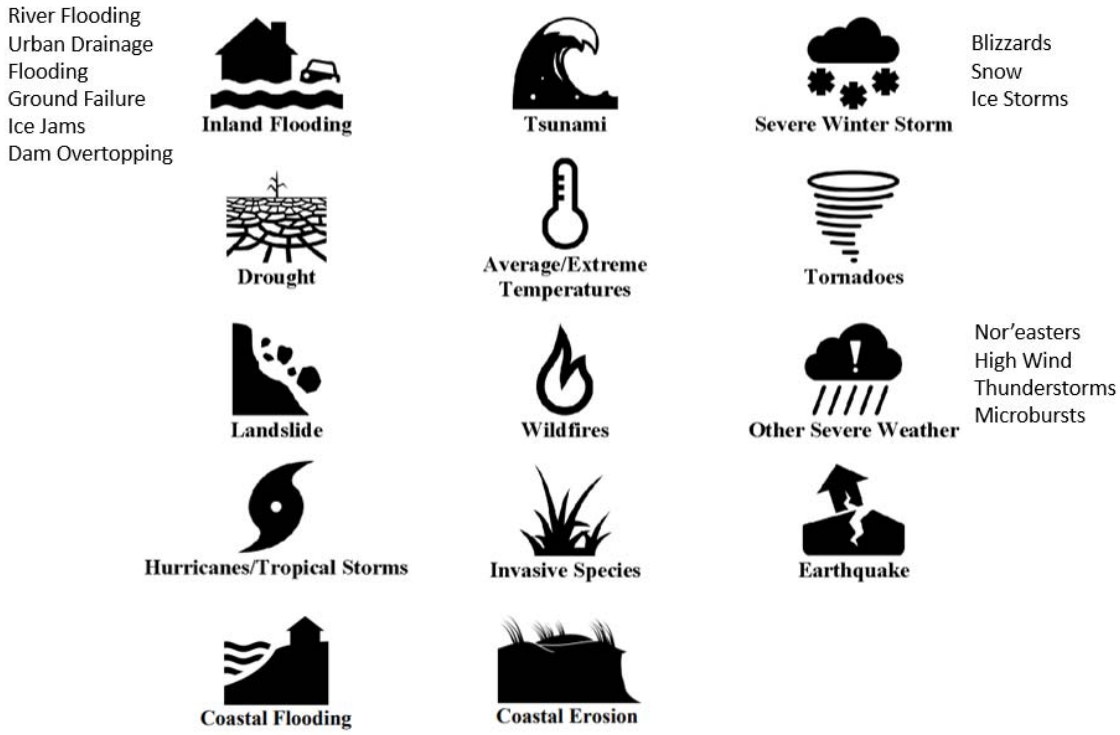


FIGURE 4: Hazards Identified in the SHMCAP

[1] https://www.mass.gov/files/documents/2018/10/26/SHMCAP-September2018-Full-Plan-web.pdf

2.1.2 Hazards that Apply to Pepperell

The SHMCAP includes coastal flooding, coastal erosion, and tsunamis; however, because Pepperell is not a coastal community, these hazards are not applicable and therefore are not further discussed or evaluated in this report.

The Core Team and Advisory Team reviewed the remaining natural hazards identified in the SHMCAP and identified natural hazards that have impacted Pepperell in the past or could impact Pepperell in the future. The hazards selection for Pepperell was made using local expertise from the Planning Team, information from the 2015 Regional Hazard Mitigation Plan, the SHMCAP and other sources. All of the natural hazards presented in the SHMCAP, except those applicable to coastal communities, were included in the ranking process.

The Advisory Team reviewed each natural hazard and analyzed the history of occurrence in Town, hazard probability, hazard frequency, geographic extent, and severity of impact. Each of these categories were ranked based off of the Hazard Profile Definitions, displayed in Table 1 and taken from the 2018 SHMCAP.

TABLE 1: Hazard Profile Definitions (2018 SHMCAP)

Points	Rank	Description
Hazard Probability (Possible occurrence in the future)		
1	Unlikely	Less than a 1% probability over the next 100 years
2	Possible	1-10% probability in the next year or at least one chance in the next 100 years
3	Likely	10-100% probability in the next year or at least one chance in the next 10 years
4	Highly Likely	Near 100% probability in the next year
Hazard Frequency		
0	Very Low	Events that occur less frequently than once in 1,000 years (less than 0.1% per year)
1	Low	Events that occur from once in 100 years to once in 1,000 years (0.1% - 1% per year).
2	Medium	Events that occur from once in 10 years to once in 100 years (1% - 10% per year).
3	High	Events that occur more frequently than once in 10 years (greater than 10% per year).
Geographical Extent (Area Impacted by a Given Natural Hazard)		
1	Small	Less than 10% of the City affected
2	Medium	10-50% of the City affected
3	Large	More than 50% of the City affected
Severity of Impact from Hazard		
1	Minor	Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e. one or two communities); essential

Points	Rank	Description
		services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
2	Serious	Scattered major property damage (more than 10% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services briefly interrupted up to 1 day; some minor injuries.
3	Extensive	Consistent major property damage (more than 25%); major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and possible fatalities.
4	Catastrophic	Property and public infrastructure destroyed (more than 50%); essential services stopped for 30 days or more, multiple injuries and fatalities.

Table 2 includes list of the hazards selected by Pepperell for inclusion in this Summary of Findings Report and the HMP update. The HMP Update includes profiles for each natural hazard and documents additional detail about the history of occurrence and potential future occurrence.

TABLE 2: Relevant Natural Hazards for the Town of Pepperell

Type of Natural Hazard	History of Occurrence in Pepperell	Hazard Probability	Hazard Frequency	Geographic Extent	Severity of Impact	Hazard Risk Ranking
Inland Flooding	Yes	3	3	2	3	11
Severe Winter-Storm/Nor'easter	Yes	3	3	3	2	11
Drought	Yes	3	3	2	2	10
Extreme Temperature	Yes	3	3	3	1	10
Tropical Storms/ Hurricanes	Yes	3	2	3	2	10
Severe Weather-Strong Wind and High Precipitation	Yes	3	3	3	1	10
Invasive Species	Yes	4	3	2	1	10
Microburst	Yes	3	3	1	1	8
Earthquake	Yes	1	0	3	3	7
Wildfires	Yes	3	1	1	1	6
Tornadoes	No	1	0	1	3	5
Landslide	No	1	0	1	1	3

2.1.3 Top Hazards for Pepperell

Based on the evaluation of natural hazard risk ranking, coupled with the history of occurrence, the geographic extent of impact, economic impact, and consideration for climate change, the Advisory Group determined the highest ranked natural hazards for Pepperell consist of:

- Severe winter storms
- Other severe weather and tropical storms / hurricanes
- Inland Flooding
- Average/Extreme temperatures and drought

The 2015 Regional HMP natural hazard risk index rated Pepperell at high risk for flooding, earthquake, nor'easters, hurricanes, ice storms, snowstorms and blizzards; at moderate risk for wildfire, drought, and ice jams; and at low risk for dam failure, landslides, urban fire and tornadoes.

2.2 Areas of Concern

During the CRB Workshops, participants outlined areas of concern under three categories of community assets, consistent with the CRB Workshop Guide: infrastructural, societal, and environmental. In addition, for consistency with the HMP update, participants included areas of concern in Pepperell's economic assets. The completed CRB Risk Matrix in Appendix D provides additional information.

2.2.1 Infrastructural (Built Environment)

Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.

The workshop participants identified the following categories of or specific infrastructural assets with vulnerabilities or strengths within the community (presented alphabetically):

- Bridges (Main Street, Route 119, Route 113, Groton Street, Hollis Street, Mill Street)
- Culverts (town-wide)
- Department of Public Works facilities
- Fire and Police facilities
- Main Street Dam (private)
- Major traffic arteries
- Power grid
- Private medical center on Main Street
- Public safety communications including SCADA
- Public wells and water facilities
- Schools/town shelters
- Wastewater treatment plant and pump stations

2.2.2 Societal (People / Vulnerable Populations)

Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.

The workshop participants identified the following categories or specific societal assets with vulnerabilities or strengths within the community (presented alphabetically):

- Child Care on Hollis Street
- Churches
- Emergency shelters
- Food Pantry
- Historical Places
- Nursing Homes/elderly housing
- Pepperell Airport
- PACH outreach
- Senior Center
- RV/Trailers
- SNMC
- Schools
- Town Library
- Veterinary hospitals

2.2.3 Environmental (Natural Environment)

Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.

The workshop participants identified the following categories or specific environmental assets with vulnerabilities or strengths within the community (presented alphabetically):

- Conservation lands and open space (e.g., Town Forest, Ch. 61 lands, open space)
- Farms
- Habitat (including vernal pools)
- Major Wetlands and Waterbodies (e.g., Nashua and Nississit Rivers, Gulf Brook)
- Properties in floodplain
- Trails (Nashua River Trail)
- Well contribution areas

2.2.4 Economy

Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.

The workshop participants identified the following categories or specific economic assets with vulnerabilities or strengths within the community (presented alphabetically):

- Banks
- Donelan's Supermarket (Main Street)
- Farms
- Funeral Homes (Main Street, Pleasant Street)
- Gas Heating Oil Company
- Gas Stations
- Hardware Store (Main Street)
- Industrial Park (Lomar Park)
- Kimball Fruit Farm (Hollis Street)

- Main Street Businesses
- Medical Center (Main Street)
- Oil Delivery (Groton Street, Hollis Street)
- Pharmacies
- Railroad Square (East Main Street)
- Recreational Areas
- Skydiving Park (Nashua Road)
- Tree removal services
- Veterinary Hospital (River Road)

Section 3
Current Concerns and Challenges Presented by Hazards and Climate Change

3.1 History of Natural Hazards that have Impacted Pepperell

Chapter 3 of the HMP Update includes hazard profiles for each of the natural hazards that have impacted the Town or can impact the Town in the future, including a definition and description of the hazard, previous occurrence and extent (including historical data), local areas of impact, and probability for future occurrence. Evaluation of the extent or severity of the hazard includes the measuring scale for a specific hazard. Locally identified areas of impact include maps showing the areas identified by the hazard whenever possible. The probability of future occurrences is based on best available science and historic events using the hazard probability.

The following provides an overview of the general concerns about natural hazards as expressed by workshop participants:

- Severe storms seem to be more frequent and have a great impact on the Town. The March 2018 back to back winter storms left over 20 inches of snow and many people were out of power for multiple days. Attendees recalled many blizzards including the "Snowtober" event in October 2011, and winter storms in February 2013 and January 2015.
- Flooding is a serious concern in Pepperell. There was a record storm in March 2010, where the Nashua River experienced its worst flood in 23 years, resulting in substantial impacts in Pepperell including closure of Routes 119 and 111. Hurricane Irene in August 2011 caused devastating flooding and wind damage.
- The community is feeling the impacts from extreme temperatures, including drought. Atmospheric hazards impact farmers, the public water supply, and private wells.
- Tropical storms and hurricanes impact Pepperell, resulting in flooding and power outages.
- Invasive species are everywhere and harm the Town's waterbodies.
- Microbursts have occurred a number of times and had significant impacts to localized areas.

These hazards are anticipated to be amplified by climate change as discussed in Commonwealth's resilient MA Climate Change Clearinghouse website (http://www.resilientma.org/)

Changes in Precipitation: Changes in the amount, frequency, and timing of precipitation—including both rainfall and snowfall—are occurring across the globe as temperatures rise and other climate patterns shift in response.

Rising Temperatures: Average global temperatures have risen steadily in the last 50 years, and scientists warn that the trend will continue unless greenhouse gas emissions are significantly reduced. The 9 warmest years on record all occurred in the last 20 years (2017, 2016, 2015, 2014, 2013, 2010, 2009, 2005, and 1998), according to the U.S. National Oceanographic and Atmospheric Administration (NOAA).

Extreme Weather: Climate change is expected to increase extreme weather events across the globe, as well as right here in Massachusetts. There is strong evidence that storms—from heavy downpours and blizzards to tropical cyclones and hurricanes—are becoming more intense and damaging, and can lead to devastating impacts for residents across the state.

The following table reproduced from the SHMCAP shows how climate change interacts with natural hazards.

TABLE 3: Climate Change Interactions

Primary Climate Change Interaction	Natural Hazard	Other Climate Change Interactions	Representative Climate Change Impacts
Changes in Precipitation	Inland Flooding	Extreme Weather	Flash flooding, urban flooding, drainage system impacts (natural and human-made), lack of groundwater recharge, impacts to drinking water supply, public health impacts from mold and worsened indoor air quality, vector-borne diseases from stagnant water, episodic drought, changes in snow-rain ratios, changes in extent and duration of snow cover, degradation of stream channels and wetland
	Drought	Rising Temperatures, Extreme Weather	
	Landslide	Rising Temperatures, Extreme Weather	
Rising Temperatures	Average/Extreme Temperatures	N/A	Shifting in seasons (longer summer, early spring, including earlier timing of spring peak flow), increase in length of growing season, increase of invasive species, ecosystem stress, energy brownouts from higher energy demands, more intense heat waves, public health impacts from high heat exposure and poor outdoor air quality, drying of streams and wetlands, eutrophication of lakes and ponds
	Wildfires	Changes in Precipitation	
	Invasive Species	Changes in Precipitation, Extreme Weather	
Extreme Weather	Hurricanes/Tropical Storms	Rising Temperatures, Changes in Precipitation	Increase in frequency and intensity of extreme weather events, resulting in greater damage to natural resources, property, and infrastructure, as well as increased potential for loss of life
	Severe Winter Storm / Nor'easter	Rising Temperatures, Changes in Precipitation	
	Tornadoes	Rising Temperatures, Changes in Precipitation	
	Other Severe Weather (Including Strong Wind and Extreme Precipitation)	Rising Temperatures, Changes in Precipitation	
Non-Climate-Influenced Hazards	Earthquake	Not Applicable	There is no established correlation between climate change and this hazard

3.2 Massachusetts Climate Change Projections

Researchers from the Northeast Climate Science Center at the University of Massachusetts Amherst prepared projections for changes in temperature, precipitation, and sea level rise for the entire state, as well as for each major watershed, in recognition that there are differences regionally. EEA is encouraging municipalities, industry, non-government organizations, state government and others to utilize this information as a standard, peer-reviewed set of climate change projections and is recommending these projections be included in MVP planning efforts. The Town of Pepperell is entirely included within the Nashua River watershed. The information presented in this section is specific to this watershed and was excerpted from Massachusetts Climate Change Projections, dated March 2018[2].

3.2.1 Increasing Temperatures

Warmer temperatures and extended heat waves could have very significant impacts on public health in our state, as well as the health of plants, animals and ecosystems like forests and wetlands. Rising temperatures will also affect important economic sectors like agriculture and tourism, and infrastructure like the electrical grid. Even what seems like a very small rise in average temperatures can cause major changes in other factors, such as the relative proportion of precipitation that falls as rain or snow.

In Massachusetts, temperatures are projected to increase significantly over the next century. Winter average temperatures are likely to increase more than those in summer, with major impacts on everything from winter recreation to increased pests and challenges to harvesting for the forestry industry. Beyond this general warming trend, Massachusetts will experience an increasing number of days with extreme heat in the future. Generally, extreme heat is considered to be over 90 degrees F, because at temperatures above that threshold, heat-related illnesses and mortality show a marked increase. Residents in Massachusetts – especially those who are very young, ill, or elderly, and those who live in older buildings without air conditioning – will face greater risks of serious heat-related illnesses when extreme heat becomes more common. Extreme heat and dry conditions or drought could also be detrimental to crop production, harvest and livestock.

While warmer winters may reduce burdens on energy systems, more heat in the summer may put larger demands on aging systems, creating the potential for power outages. The number of cooling degree days is expected to increase significantly by the end of the century adding to this strain. In addition, heat can directly stress transmission lines, substations, train tracks, roads and bridges, and other critical infrastructure.

Increased Average Temperature

The Nashua River watershed is expected to experience increased average temperatures throughout the 21st century. Maximum and minimum temperatures are also expected to increase throughout the end of the century. These increased temperature trends are expected for both annual and seasonal projections. Seasonally, maximum summer and fall temperatures are expected to see the highest projected increase throughout the 21st century. Table 4 on the following page demonstrates temperature change throughout the next century.

[2] https://www.mass.gov/files/ma-statewide-and-majorbasins-climate-projections-final.pdf

TABLE 4
Increased Average Temperature

Nashua Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	46.8	+2.2 to +4.4	+3.0 to +6.4	+3.5 to +9.0	+3.9 to +11.0
	Winter	25.2	+2.2 to +5.1	+2.8 to +7.6	+3.7 to +9.2	+3.9 to +10.6
	Spring	44.9	+1.6 to +3.5	+2.5 to +5.5	+2.7 to +7.7	+3.3 to +9.5
	Summer	67.6	+2.2 to +4.6	+3.1 to +7.0	+3.5 to +10.1	+4.0 to +12.6
	Fall	49.0	+2.2 to +5.1	+3.7 to +6.6	+3.6 to +9.5	+4.1 to +11.8
Maximum Temperature	Annual	57.8	+2.1 to +4.3	+2.7 to +6.5	+3.2 to +9.1	+3.6 to +11.0
	Winter	35.1	+1.8 to +4.6	+2.4 to +7.1	+3.0 to +8.4	+3.4 to +9.6
	Spring	56.2	+1.5 to +3.4	+2.4 to +5.5	+2.7 to +7.9	+3.3 to +9.6
	Summer	79.2	+2.0 to +4.7	+3.0 to +7.2	+3.4 to +10.5	+3.9 to +12.9
	Fall	60.2	+2.3 to +4.9	+3.6 to +7.0	+3.5 to +9.8	+4.0 to +12.3
Minimum Temperature	Annual	35.8	+2.3 to +4.8	+3.3 to +6.5	+3.8 to +8.9	+4.2 to +11.0
	Winter	15.3	+2.5 to +5.6	+3.3 to +8.1	+4.2 to +10.0	+4.4 to +11.4
	Spring	33.7	+1.8 to +3.8	+2.7 to +5.9	+2.8 to +7.5	+3.3 to +9.3
	Summer	56.0	+2.5 to +4.6	+3.2 to +7.2	+3.7 to +9.8	+4.1 to +12.3
	Fall	37.8	+2.0 to +5.2	+3.6 to +6.6	+3.7 to +9.3	+4.1 to +11.6

Days with Maximum Temperatures

Due to projected increases in average and maximum temperatures throughout the end of the century, the Nashua basin is also expected to experience an increase in days with daily maximum temperatures over 90°F, 95°F, and 100°F. Table 5 demonstrates the number of days per season with extreme maximum temperatures.

TABLE 5
Days with Maximum Temperatures

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Maximum Temperature Over 90°F	Annual	4	+6 to +17	+9 to +30	+10 to +50	+13 to +70
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	<1[72]	-0 to +1	+<1[72] to +1	+<1[72] to +3	+<1[72] to +4
	Summer	4	+5 to +15	+8 to +26	+10 to +42	+11 to +56
	Fall	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +7	+1 to +10
Days with Maximum Temperature Over 95°F	Annual	<1[72]	+1 to +6	+2 to +13	+3 to +27	+4 to +42
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +1	+0 to +1
	Summer	<1[72]	+1 to +6	+2 to +12	+2 to +24	+3 to +37
	Fall	<1[72]	+<1[72] to +<1[72]	+<1[72] to +1	+<1[72] to +2	+<1[72] to +3
Days with Maximum Temperature Over 100°F	Annual	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +9	+<1[72] to +17
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]
	Summer	<1[72]	+<1[72] to +1	+<1[72] to +3	+<1[72] to +8	+<1[72] to +16
	Fall	0	+0 to +<1[72]	+0 to +<1[72]	+0 to +<1[72]	+0 to +1

Days with Minimum Temperatures

Due to projected increases in average and minimum temperatures throughout the end of the century, the Nashua basin is expected to experience a decrease in days with daily minimum temperatures below 32°F and 0°F. Table 6 demonstrates the number of days per season with extreme minimum temperatures.

TABLE 6
Days with Minimum Temperatures

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Minimum Temperature Below 0°F	Annual	9	-3 to -6	-4 to -7	-4 to -7	-4 to -8
	Winter	9	-3 to -6	-4 to -6	-4 to -7	-4 to -7
	Spring	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Summer	0	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
Days with Minimum Temperature Below 32°F	Annual	156	-11 to -28	-19 to -38	-22 to -54	-23 to -64
	Winter	85	-1 to -5	-2 to -8	-3 to -16	-4 to -20
	Spring	40	-4 to -12	-6 to -16	-8 to -20	-9 to -22
	Summer	<1[73]	-0 to -0	-0 to -0	-0 to -0	-0 to -0
	Fall	31	-5 to -12	-9 to -15	-9 to -19	-9 to -22

Heating Degree-Days and Cooling Degree-Days

Due to projected increases in average, maximum, and minimum temperatures throughout the end of the century, the Nashua basin is expected to experience a decrease in heating degree days and increases in both cooling degree-days and growing degree-days. Table 7 below demonstrates this.

TABLE 7
Heating Degree-Days

Nashua Basin		Observed Baseline 1971-2000 (Degree-Days)	Projected Change in 2030s (Degree-Days)	Mid-Century Projected Change in 2050s (Degree-Days)	Projected Change in 2070s (Degree-Days)	End of Century Projected Change in 2090s (Degree-Days)
Heating Degree-Days (Base 65°F)	Annual	7092	-574 to -1223	-806 to -1701	-937 to -224	-1054 to -2623
	Winter	3602	-187 to -476	-248 to -697	-323 to -838	-366 to -974
	Spring	1861	-138 to -302	-215 to -473	-230 to -622	-290 to -736
	Summer	141	-49 to -84	-64 to -106	-73 to -120	-75 to -124
	Fall	1488	-169 to -400	-295 to -489	-276 to -683	-296 to -784
Cooling Degree-Days (Base 65°F)	Annual	432	+201 to +421	+271 to +712	+325 to +1091	+373 to +1458
	Winter	0	-2 to -2	+1 to +3	-1 to +1	-1 to +0
	Spring	17	+9 to +24	+15 to +48	+19 to +85	+15 to +118
	Summer	377	+163 to +335	+208 to +545	+241 to +817	+276 to +1038
	Fall	33	+23 to +78	+37 to +131	+44 to +216	+62 to +297
Growing Degree-Days (Base 50°F)	Annual	2270	+393 to +800	+533 to +1236	+647 to +1889	+730 to +2367
	Winter	4	-1 to +8	-0 to +10	+1 to +14	+2 to +19
	Spring	254	+59 to +127	+84 to +227	+101 to +346	+107 to +453
	Summer	1617	+206 to +417	+287 to +645	+323 to +931	+364 to +1158
	Fall	384	+109 to +283	+168 to +395	+159 to +593	+207 to +750

3.2.2 Changing Precipitation

Rainfall is expected to increase in spring and winter months in particular, with increasing consecutive dry days in summer and fall. More total rainfall can have an impact on the frequency of minor but disruptive flooding events, especially in areas where stormwater infrastructure (such as drainage systems, bridges, and culverts) has not been adequately sized to accommodate higher levels. Increased total rainfall will also affect agriculture, forestry and natural ecosystems.

More intense downpours often lead to inland flooding as soils become saturated and stop absorbing more water, river flows rise, and the capacity of urban storm water systems is exceeded. Flooding may occur as a result of heavy rainfall and snowmelt, but precipitation is the strongest driver of flooding in Massachusetts. Winter flooding is also common in Massachusetts, particularly when the ground is frozen.

The climate projections suggest that the frequency of high-intensity rainfall events will trend upward. Overall, it is anticipated that the severity of flood-inducing weather events and storms will increase, with events that produce sufficient precipitation to present a risk of flooding likely increasing. A single intense downpour can cause flooding and widespread damage to property and critical infrastructure. The coast will experience the greatest increase in high-intensity rainfall days, but some level of increase will occur in every area of Massachusetts.

Intense rainfall from developed areas can cause pollutants on roads and parking lots to get washed into nearby rivers and lakes, reducing habitat quality. As rainfall and snowfall patterns change, certain habitats and species that have specific physiological requirements may be affected.

Climate projections for Massachusetts indicate that in future decades, winter precipitation could increase, but by the end of the century most of this precipitation is likely to fall as rain instead of snow due to warmer winters. There are many human and environmental impacts that could result from this change including reduced snow cover for winter recreation and tourism, less spring snow melt to replenish aquifers, higher levels of winter runoff, and lower spring river flows for aquatic ecosystems.

A small projected decrease in average summer precipitation in Massachusetts could combine with higher temperatures to increase the frequency of episodic droughts, like the one experienced across the Commonwealth in the summer of 2016. Droughts will create challenges for local water supply by reducing surface water storage and the recharge of groundwater supplies, including private wells. More frequent droughts could also exacerbate the impacts of flood events by damaging vegetation that could otherwise help mitigate flooding impacts. Droughts may also weaken tree root systems, making them more susceptible to toppling during high wind events.

Days with High Precipitation

The projections for expected number of days receiving precipitation over one inch are variable for the Nashua basin, fluctuating between loss and gain of days. Table 8 details these projected fluctuations through the end of the century.

TABLE 8
Days with Precipitation over 1", 2", and 4"

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Days with Precipitation Over 1"	Annual	7	+<1[74] to +2	+1 to +3	+1 to +3	+1 to +4
	Winter	2	+0 to +1	+<1[74] to +1	+<1[74] to +2	+<1[74] to +2
	Spring	2	+0 to +1	+0 to +1	+0 to +1	+<1[74] to +1
	Summer	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
	Fall	2	+0 to +1	+0 to +1	+0 to +1	+0 to +1
Days with Precipitation Over 2"	Annual	1	+0 to +<1[74]	+<1[74] to +<1[74]	+<1[74] to +1	+<1[74] to +1
	Winter	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Spring	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+<1[74] to +<1[74]	+<1[74] to +<1[74]
	Summer	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Fall	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
Days with Precipitation Over 4"	Annual	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Winter	0	+0 to +0	+0 to +0	+0 to +0	+0 to +0
	Spring	0	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Summer	<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]
	Fall	0	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]	+0 to +<1[74]

Total Precipitation

Similar to projections for number of days receiving precipitation over a specified threshold, seasonal projections for total precipitation are also variable for the Nashua basin. Table 9 below shows seasonal projected total precipitation changes through the end of the century.

TABLE 9
Total Precipitation

Nashua Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.9	+0.4 to +4.9	+1.2 to +6.3	+2.3 to +7.9	+1.3 to +8.4
	Winter	11.0	-0.3 to +1.9	+0.2 to +2.5	+0.4 to +3.3	+0.6 to +4.3
	Spring	11.8	-0.0 to +2.2	+0.1 to +2.0	+0.5 to +3.0	+0.1 to +2.9
	Summer	11.3	-0.3 to +1.5	-0.3 to +2.2	-0.6 to +2.2	-1.1 to +2.2
	Fall	11.8	-1.1 to +1.1	-1.2 to +1.8	-1.6 to +1.7	-1.4 to +1.5

Consecutive Dry Days

Annual and seasonal projections for consecutive dry days, or for a given period, the largest number of consecutive days with precipitation less than 1 mm (~0.04 inches), are variable throughout the 21st century. Table 10 below projects consecutive dry days in the 2030s, 2050s and 2090s.

TABLE 10
Consecutive Dry Days

Nashua Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)	Mid-Century Projected Change in 2050s (Days)	Projected Change in 2070s (Days)	End of Century Projected Change in 2090s (Days)
Consecutive Dry Days	Annual	16	-0 to +2	-1 to +2	-1 to +2	-1 to +3
	Winter	11	-1 to +1	-1 to +1	-1 to +1	-1 to +2
	Spring	11	-1 to +1	-1 to +1	-1 to +1	-2 to +1
	Summer	12	-1 to +2	-1 to +2	-1 to +3	-1 to +3
	Fall	12	-0 to +2	-0 to +3	-0 to +3	-0 to +3

3.3 Specific Categories of Concerns and Challenges

Workshop attendees identified 68 community assets that were either vulnerable to the impacts of climate change or that are strengths for the Town of Pepperell. Of that list, the following concerns and challenges were discussed:

- Maintaining communication for public safety services in the event of an emergency, including floods and power outages.
- Resiliency of the power grid, including power outages and ability to provide backup power via generators or a microgrid system for the Town.
- Ability to access medical services and facilities, including access to private pharmacies to procure prescription drugs.
- Mandatory water conservation or use restrictions to drinking water including on the regional level
- Available space and usage of emergency shelters.
- Flooding impacts on road networks and emergency response.
- Education of private entities and residents, including vulnerable populations like the elderly, about Town emergency response services, shelters, private well resiliency, and assessing generator need and/or condition if applicable.
- Obtaining gas during power outages and other severe storm events.
- Privately-owned dams and a need for formal Emergency Action Plans.
- Emergency response for livestock and farms.
- Access to food, including on a regional scale.

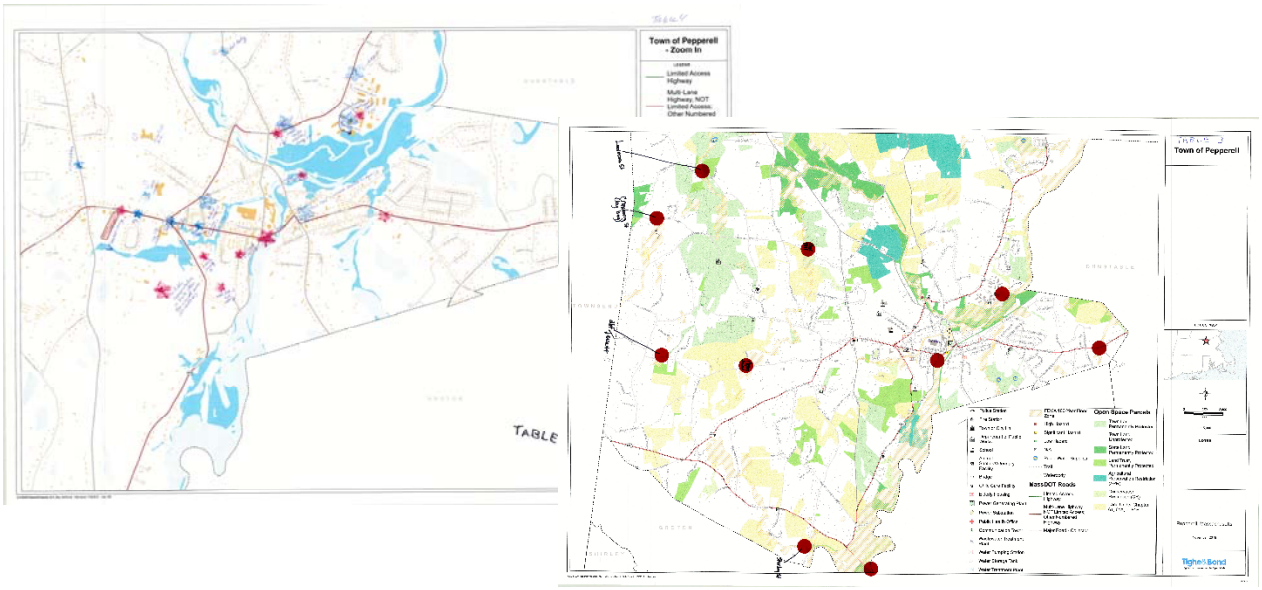


FIGURE 5: Examples of Marked up Maps showing areas of Concerns or Challenges

3.4 Current Strengths and Assets

Pepperell officials and emergency response staff are actively engaged in preparing the community to respond to and adapt to current and future natural hazards. Collaboration, communication, and responsiveness of these staff is viewed as a strength in Pepperell. In addition, Pepperell has an active and engaged resident base that helps facilitate outreach and education and that provided input on ongoing planning processes. Pepperell's public works staff are viewed as a strength in terms of their operation and management of the water and wastewater systems and assistance with emergency response.

The Town also completes thoughtful planning exercises, such as currently updating its Master Plan, and has begun the process of preparing a Town-specific HMP update. Capabilities are further discussed in Appendix D in the completed FEMA Capabilities Assessment Worksheet and narrative prepared by NMCOG on capabilities.

3.5 Top Recommendations and Strategies to Improve Resiliency

According the FEMA's Local Multi-Hazard Mitigation Planning Guidance, hazard mitigation measures can generally be sorted into six categories:

1. **Prevention**: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built, and direct public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
2. **Property Protection**: Modification or removal of existing buildings or infrastructure to protect them from a hazard. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.

3. **Public Education and Awareness**: Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and ways to mitigation them. Such actions include outreach projects, real estate disclosure requirements, hazard information centers, and school-age and adult education programs.
4. **Natural Resource Protection and Green Infrastructure**: Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include low impact development, sediment and erosion control, stream corridor restoration, watershed management, urban forest and vegetation management, and wetland restoration and preservation.
5. **Structural Projects**: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.
6. **Emergency Services Protection**: Actions that will protect emergency services before, during, and immediately after an occurrence. Examples of these actions include protection of warning system capability, protection of critical facilities, and protection of emergency response infrastructure

All Mitigation Projects identified in the CRB workshops are considered resiliency actions for the Town. The list prepared below is subject to change based on evolving conditions in the Town.

TABLE 11: Mitigation Actions

Category of Action	Description of Action	Implementation Responsibility and Status	Hazard Addressed	Timeframe/ Priority
Emergency Services Protection	Evaluate the design and construction for a new Public Safety Complex	Building Committee	All Hazards	Short-term
Emergency Services Protection	Evaluate and identify backups for the existing communications system and define alternative communications and improve redundancy	Communications Director/Police and Fire	All Hazards	Short-term
Natural Resource Protection	Acquire and protect land including forests, agriculture, floodplains, and other local priorities	Town Planning Board/Conservation Commission.	Flooding, Hurricanes, Climate Change	Ongoing
Natural Resource Protection/ Prevention	Update Town floodplain, zoning, and stormwater bylaws	Town Planning Board/Conservation Commission	Flooding, Climate Change	Short-term
Natural Resource Protection	Conduct a town wide watershed/stormwater assessment (modeling, culvert assessments)	Conservation Commission/ Town Engineer	Flooding, Severe Storms, Climate Change	Ongoing

TABLE 11: Mitigation Actions

Category of Action	Description of Action	Implementation Responsibility and Status	Hazard Addressed	Timeframe/ Priority
Structural Projects	Address repetitive flood issues on Route 119	DPW & MassDOT, Conservation	Flooding, Severe Storms	Ongoing
Property Protection/ Natural Resource Protection/ Emergency Services Protection	Conduct a feasibility study and cost/benefit analysis for developing microgrids	Board of Selectmen	Severe Storms, Climate Change	Long-term
Prevention	Develop a large/dead tree management plan and conduct tree trimming	DPW, National Grid	Severe Storms, Hurricane, Tornado	Ongoing
Structural Projects	Conduct capacity planning study for culverts to analyze design, permit, and construction	DPW/Town Engineer, Conservation	Flooding, Climate Change	Short-term
Emergency Services Protection	Study inventory and conduct an evaluation on private emergency generator readiness and condition	Building Department	All Hazards	Long-term
Natural Resource Protection	Conduct a watershed evaluation study for stormwater retrofits	Conservation Commission/DPW	Flooding, Climate Change	Short-term
Emergency Services Protection	Conduct an agreement with a private vendor regarding gas/oil supplies for the highway department in the event of an emergency	DPW/Emergency Manager	All Hazards	Short-term
Emergency Services Protection	Develop an evacuation plan for nursing homes, elderly housing, and other facilities that house vulnerable populations	Emergency Manager, Council on Aging	All Hazards	Short-term
Emergency Services Protection	Develop a Reactive Regional Emergency Planning Committee (REPC)	Emergency Services	All Hazards	Ongoing

TABLE 11: Mitigation Actions

Category of Action	Description of Action	Implementation Responsibility and Status	Hazard Addressed	Timeframe/ Priority
Natural Resource Protection	Conduct a floodplain impact evaluation for the Wastewater Treatment Facility and collection system	DPW/Conservation	Flooding	Short-term
Public Education/ Structural Project	Add a shower at Senior Center to allow the facility to serve as the primary shelter	Emergency Manager/ CoA	All Hazards	Short-term
Natural Resource Protection	Develop a wildlife (beavers, mosquitos, etc.) management plan for major wetlands and waterbodies	Board of Health	Climate Change	Short-term

Section 4
Workshop Details

4.1 Workshop Participants

A list of those invited to participate in the workshops is included in Appendix B. The following provides a list of participants and their affiliations. Members of the workshop project team that had a role are also documented.

4.1.1 Workshop #1 Attendance

Workshop Host: Andrew MacLean, Town Administrator, and Lisa Davis, Planning Board Advisor

Workshop Facilitators: Gabrielle Belfit, CFM, Sharon Rooney, AICP and Janet Moonan, PE (Tighe & Bond)

Table Facilitators: Gabrielle Belfit, and Sharon Rooney (Tighe & Bond), Beverly Woods (NMCOG), and Lisa Davis (Town of Pepperell)

Table 12: Workshop #1: October 28, 2019

Name	Affiliation	Name	Affiliation
Paula Terrasi	TOP Cons & DPW	Margie LaFleur	BOH Chair
Brynn Montesanti	TOP PB & BOH	Cheryl Lutcza	Assistant to Zoning BD of Appeals
Scott Farrar	National Grid	Beverly Woods	NMCOG
Walter Richard	IA Auto	Joyce Morrow	PB/MPC
Deb Fountain	Master Plan Comm	David Querze	Emergency Management
Debbie Nutter	Treasurer	Deb Spratt	Library
Ken Kalinowski	DPW	Kalene Gendron	Board of Health
Kris Hartwell	DPW	Andrew MacLean	Town Administration
Joan Ladik	Town Clerk	Denise Pigeon	Nashoba Tech
John Ladik	Fin Com	Michelle Rowden	EEA
Tony Beattie	Robinwood Farm	Tom Nephew	BPW Realty

4.1.2 Workshop #2 Attendance

Workshop Host: Andrew MacLean, Town Administrator, and Lisa Davis, Planning Board Advisor

Workshop Facilitators: Gabrielle Belfit, CFM, Sharon Rooney, AICP and Janet Moonan, PE (Tighe & Bond)

Table Facilitators: Gabrielle Belfit, and Sharon Rooney (Tighe & Bond), Carlin Andrus (NMCOG), and Paula Terrasi and Lisa Davis (Town of Pepperell)

Table 13: Workshop #2: November 2, 2019			
Name	**Affiliation**	**Name**	**Affiliation**
Renee D'Argento	Master Planning Adv Com Climate Working Grp	Ken Hartlage	Nashoba Conservation Trust
Tony Beattie	Robinwood Farm	Charles P Walker	Planning Board
Jim Scarsdale	NASHUARD	Rick McHugh	Planning Board
Wm Van Lennys		Casey Campetti	Planning Board
Carlin Andrus	NMCOG	Rob Rand	Cons. Comm
Beth Faxon	Resident	John Masiello	MASY
Gabrielle Belfit	Tighe & Bond	David Walsh	Walsh Bros.
Lauri Masiello	MASY	Andrew MacLean	Town of Pepperell

4.2 Workshop Project Team

The following individuals provided invaluable assistance with coordination and implementation of the workshops and listening session.

TABLE 14: Core Team and Advisory Committee Members

	Name	Title / Department / Affiliation
MVP / HMP Core Team	Lisa Davis	Town Planner
	David Querze	Emergency Management Director
	Beverly Woods	NMCOG
	Brynn Montesanti	Planning
	Paula Terrasi	Conservation Agent
	Ken Kalinowski	DPW Director
	Andrew MacLean	Town Administrator
	Kalene Gendron	Health Agent
MVP / HMP Advisory Committee	Walter Richards	Resident
	Denise Pigeon	Nashoba Tech
	Lisa Davis	Town Planner
	Beverly Woods	NMCOG
	Tony Beattie	Robinwood Farm and resident
	Casey Competti	Planning Board
	Paula Terrasi	Conservation DPW
	Kalene Gendron	Board of Health
	Jim Scarsdale	Resident
	David Querze	Emergency Management Director
	Kat Belliveau	Resident
	Andrew MacLean	Town Administrator

4.3 Acknowledgements

Funding for the CRB workshop was provided through a Massachusetts Executive Office of Energy and Environmental Affairs (EEA) Municipal Vulnerability and Preparedness Planning Grant during Fiscal Year 20.

Many thanks to Lisa Davis, Pepperell Planning Department and Andrew MacLean, Town Administrator for serving as leads for the MVP Planning Process. Thank you to Brynn Montesanti for coordinating all meetings including the workshops. A special thanks to all

MVP Core Team members and everyone who participated in the CRB workshops as presenters, facilitators, scribes and stakeholders. Thanks to the Pepperell Town Staff for providing a great meeting space in the Community Center for both MVP workshops and the listening session. Thank you to the Advisory Committee members who encourage the Town to apply for this grant.

4.4 Report Citation

Tighe & Bond (2020). *Community Resilience Building Workshop Summary of Findings*, Town of Pepperell, Massachusetts.

Tighe&Bond
Engineers | Environmental Specialists

APPENDIX A

Pepperell MVP / HMP Core Team Kickoff Meeting Agenda

TO: Attendees (See sign-in sheet)

LOCATION: Pepperell Town Hall – Conference Room A

DATE: July 15, 2019

TIME: 1:00 to 2:30 PM

Overview Executive Office of Energy and Environmental Affairs (EEA) Municipal Vulnerability Preparedness (MVP) Program and Goals

- Overview of the Community Resilience Building (CRB) Workshop Guide & Scope of Work from EEA (*handout*)
- Deliverable deadlines
    a. Workshops - April 30, 2020
    b. Draft report and listening session - May 30, 2020
    c. All deliverables to EEA and MEMA - June 30, 2020
- Roles and Responsibilities (*handout*)

Steering Committee, Stakeholders & Public Outreach

- Town to identify steering committee members
- Town to identify and engage stakeholders (e.g. business owners, elder service providers, neighboring communities, regional environmental advocates, educators, etc.) to get a broader community perspective on Pepperell's societal and environmental vulnerabilities and strengths and their perspective on priority actions to mitigate climate change
- Review worksheet (*handout*) and suggest assignments to reach goal for 25+ participants at each workshop
- Public outreach process

Workshop Planning

- Review example 4-hour and 8-hour workshop
- Workshop materials will include:
    - Presentation
    - Selected base maps of Town with critical assets
    - Climate change data relevant to the Town and summary of potential impacts
    - CBC Risk matrix
- Locations and dates for Workshops
- Workshop facilitators - T&B will provide 2 facilitators and one additional staff to coordinate the workshop and facilitate the small groups. For each small groups one volunteer will be chosen to act as scribe and report back to the large group, a few additional volunteers from the Town are needed to help facilitate groups, as well as assist with sign-in, setting up the room and refreshments.

Town of Pepperell, MA
Sign-in Sheet

Date: July 15, 2019 **Time:** 1:00 PM

Location: Town Hall, Conference Room A

RE: MVP Planning Grant

Attendees:

Name (please print)	Title/Department	Email
Emily Scerbo	Tighe & Bond	EJScerbo@tighebond.com
LISA DAVIS	PLANNING	LDAVIS@pepperell.MA.US
David Queeuré	Emergency Management Director	dqueeuré@town.pepperell.ma.us
Beverly Woods	NMCOG	bwoods@nmcog.org
Brynn Montesanti	Planning	bmontesanti@town.pepperell.ma.us
Paula Terrasi	Conservation/DPW	pterrasi@town.pepperell.ma.us
Ken Kalinowski	DPW Director	Kkalinowski@town.pepperell.ma.us
Andrew MacLean	Town Administrator	amacLean@Town.pepperell.MA.US
Janet Moran	Tighe & Bond	jsmoran@tighebond.com

ATTACHMENT B - SCOPE OF SERVICES: INTEGRATING MVP AND HAZARD MITIGATION PLANNING

INSTRUCTIONS: In order to ensure that the Department and the Contractor have a clear understanding of their respective responsibilities and performance expectations, the Following attachment shall contain a specific detailed description of all obligations, responsibilities and additional terms and conditions between the Contractor and the Department which do not modify the Contract boilerplate language. *Attach as many additional pages as necessary.* {See INSTRUCTIONS sheet for more information and suggested provisions to include in ATTACHMENT B.}

The Executive Office of Energy and Environmental Affairs (EEA) and the ("the municipality") hereby contract for the municipality to complete the Municipal Vulnerability Preparedness (MVP) planning process to achieve MVP climate community designation. Using funds awarded through this grant program, the municipality will hire a state certified MVP provider to complete the planning process required to achieve MVP designation and deliver outputs of the process to EEA. **The municipality will receive additional funds to simultaneously prepare a Hazard Mitigation Plan (HMP) in accordance with FEMA guidelines as part of this scope of work Requirements to fulfill a HMP are largely aligned with those of MVP. Highlighted are HMP components that are in addition to the standard MVP planning scope of work. To fulfill the requirements of both the MVP and HMP processes, the municipality will complete its portion of a regional integrated MVP/HMP report for submittal to both EEA and MEMA.** Upon execution of the grant contract, the municipality will be provided with an advance payment of **$37500**. This payment is intended to support completion of the planning grant scope and expanded scope outlined in further details below. **Expanded scope requests are detailed on page 6. Failure to submit all project deliverables by the contract end date will prohibit the municipality from being eligible for future EEA grants.**

This project will run from the effective date of this contract through **June 30, 2020**. Municipalities will select a vendor from a list of state-certified MVP providers, provided by EEA, to complete the planning and stakeholder engagement exercise with the municipality. For more information on the Hazard Mitigation Planning requirements, see:

https://www.mass.gov/service-details/local-hazard-mitigation-planning
https://www.fema.gov/media-library/assets/documents/23194

Process Summary:
The contract will support the municipality in completing a comprehensive, baseline climate change and natural hazard vulnerability assessment, development of prioritized actions for dealing with priority hazards using the Community Resilience Building (CRB, www.communityresiliencebuilding.com) workshop guide, and beginning broader community outreach to satisfy both the MVP and HMP requirements. Through the program EEA will provide the municipality access to newly developed downscaled climate change projections, available on the www.resilientMA.org website, which must be incorporated into the planning process.

Led by a local project lead, a core team from the municipality, and the MVP provider, communities will gather available background information on hazards, vulnerabilities and strengths, conduct interviews with staff and volunteers, and plan two 4-hour workshops or one 8-hour workshop. Communities working through regional workshops may chose to hold workshops in a slightly different format, but should review their plans with EEA prior to commencing these workshops. During the workshop(s), approximately 20-60 municipal staff, residents, partners, and volunteers will work to:

- Understand connections between ongoing community issues, climate change and natural hazards, and local planning and actions in the municipality;
- Understand how climate change will exacerbate or lead to new community issues, hazards and other challenges the municipality faces;
- Identify and map vulnerabilities and strengths to develop infrastructure, societal, and natural resource risk profiles for the municipality;
- Explore nature-based solutions to build resiliency in the municipality;
- Develop and prioritize actions and clearly delineated next steps for the municipality, local organizations, businesses, private citizens, neighborhoods, and community groups; and,
- Identify opportunities to advance actions that further reduce the impact of climate change and natural hazards and increase resilience across and within municipalities.

Process Details:
The municipality will engage a state certified MVP provider from a list provided by EEA to faciliate and help the municipality to define extreme weather and natural and climate-related hazards, identify existing and future vulnerabilities and strengths, develop and prioritize actions for the municipality and broader stakeholder networks, and identify opportunities for the municipality to advance actions to reduce risks and build resilience. **The municipality working with the MVP provider will organize and conduct two 4-hour workshops or one 8-hour workshop. Following the workshop(s), the municipality will conduct at least 1 public listening session that will be open to the entire municipality. This public listening session must be completed by May 30, 2020 to ensure the municipality receives designation and is eligible for FY21 MVP Action Grants.**

The municipality will conduct the following tasks, working with the contracted MVP provider:

1. **Prepare for the workshop(s):**
   - Establish a core team that includes government officials, community leaders and business owners. This team will serve as a liaison to the MVP provider and assist in the planning process by providing access to relevant local data, facilitating community input on plan recommendations and priorities, reviewing draft products, and assisting with outreach to community stakeholders. This group may also include residents and the general public.
   - Engage stakeholders from the municipality, including but not limited to municipal officials, business, neighboring communities, private non-profits, and community residents, and develop partnerships with key non-profits, state and local government agencies, neighboring communities, local businesses and academic institutions who can help to improve outcomes at the workshops
   - Prepare materials for the workshop, including state climate change projections, and data specific to the municipality which may help to understand where past hazards have occurred
   - Decide on participants and arrangements/logistics

2. **Characterize hazards:**
   - The MVP provider will describe the past, current and future hazards in terms of impact location within the jurisdicton, using resilientMA Climate Change Clearinghouse, the State Hazard Mitigation and Climate Adaption Plan, and other best available data, reports, and technical documents.. Each hazard will need to document the likely extent (a scale or measure of magintude) and probability of future occurance
   - The MVP Provider will create a map of areas affected by multiple natural hazards for the Town/City. This map will be used at the workshops and incorporated into the final deliverables. Providers may choose to create a series of maps showing each hazard or impact separately. A set of hazard maps will be included within the Hazard Mitigation plan, and GIS files will be made available to the Town/City for integration with their other community plans.

3. **Identify community vulnerabilities and strengths, and how these intersect with known hazards in the community.**
   - Identify infrastructure and critical facilities vulnerabilities and strengths: The provider may consider using FEMA's HAZUS-MH or a GIS map analysis to delineate those critical facilities that are located within mapped hazard areas. Critical facilities could include but are not limited to:
     - Roads, bridges, and dams
     - City or town owned buildings or offices
     - Water and wastewater treatment plants
     - Sewage pumping stations
     - Schools and emergency shelters
     - Hospitals and critical care facilities
   - Identify societal vulnerabilities and strengths, including but not limited to:
     - Youth or elderly populations
     - Low to no income populations
     - Communities of color
     - Communities with limited English proficiency
     - People with disabilities

- Cases of medical illness

- Identify land use and environmental vulnerabilities and strengths, including:
  - Land use maps that depict the location of developed land uses, delineated by categories based on use (e.g. residential, commercial, industrial, institutional, other public use, etc.) and intersections with known hazards.
  - Anticipated future land use areas and intersections with known hazards.
  - Natural resources areas
  - Repetitive flood loss structures and structures which have incurred substantial damage, if they exist, as defined by FEMA (the community will need to request this data from DCR's Flood Hazard Management Program on letterhead)

- Identify vulnerabilities in other sectors as chosen by the community

4. Assess and summarize vulnerabilities:

- The MVP provider will take the identified community vulnerabilities and complete a vulnerability assessment that includes:
  - The types and numbers of buildings (including NFIP losses), infrastructure, and critical facilities located in the hazard areas
  - Documentation of the communities' current capabilities to mitigate and adapt to the identified vulnerabilities; providers are recommended to use the FEMA Capability Assessment Worksheet (attached).
  - Evaluation of the capabilities and if any need improvements, development of recommended actions
    A review and documentation of the communities' continued compliance with the NFIP.

5. Determine the highest priority hazards within the municipality.

6. Identify and prioritize community actions:

- Begin by sumarizing overall goals the community identified at the Workshop in goal staments that reduce or elimate long term vulnerabilty to identified hazards and climate change. Please note that MVP Action Grants, available through EEA prioritize nature-based solutions. Municipalities are encouraged to explore these types of strategies which include Low-impact design, green infrastructure, land conservation and other techniques.

7. Determine the overall priority actions:

- Identify actions and how they will be administerd (including responsible party, time frame for completion, possible funding source, etc.
- Use a prioritization process that will define urgency, cost and benifet and timing of the action
- Identify process for monitoring, updating, and evaluating the plan/final report, including the process for continued public engangement

8. Move forward

- Continue community outreach and engagement which includes at least 1 public listening session before May 30, 2020 where a draft report findings will be shared and feedback incorporated.
- Secure additional data and information for key gaps and questions identified through the process
- Use the process and report to inform existing planning efforts and project activities and incorporate priority actions into other local planning processes, such as a Comprehensive Plan, or orther local by-laws and ordinances.

9. Put it all together:

- If this is an update to a previously appoved HMP, document any changes in priorities, development, and local progress of mitigation actions taken place in the community, if applicable.
- Be sure to clearly document these planning steps, participants, and when the public was involved in the MVP process.
- Generate final workshop products and combined MVP/ HMP report (described in detail below)

9. Review and Approval

- Submit the plan to MEMA via mitigation@mass.gov.
- Submit the plan to the MVP Portal on the resilientMA.com Climate Change Clearinghouse.

Upon successful completion of Steps 1-8 of the CRB process and clearly defined efforts to begin Step 8 including conducting at least 1 public session, municipalities will be designated as a "Municipal Vulnerability Preparedness Program Climate Community," or "MVP Climate Community" which may lead to increased standing in future funding opportunities and follow-on opportunities. MEMA AND FEMA are responsible for reviewing and approving Hazard Mitigation plans.

All workshop outputs and background materials must be compiled into an easily accessible Community Resilience Building final report/ Hazard Mitigation Plan, based on a template provided by the state below. Municipalities may build on the template provided below, but must include the items in the template at a minimum to satisfy the requirements of the grant. Derivatives from the report can be used by the municipality following this initial phase of the process to inform existing planning processes, capital budgeting, and grant applications.

As an immediate next step, each community must complete at least one public listening session meant to share draft findings and incorporate feedback. The community should have a clearly articulated list of priority next steps and actions and how to implement these.

General guidelines for (~60 min) MVP public listening sessions include:

- Schedule and post listening session using best practives or requirements for posting public meetings in the municipality
- Ensure listening session is open to the public in a central, easily accessible location in the municipality (city/town hall, public library, community center, etc.)
- Ensure that the core team is present and ideally elected officials
- Provide a speaker(s) to present an overview of the Summary of Findings Report
    - Speaker(s) should be from the core team members and/or elected official(s)
    - Service provider for the respective municipality should not be the principle speaker(s)
    - Speaker(s) to review purpose, intent, objectives, and outcomes of workshop process
- Provide a question and answer period for members of the concerned public
    - Core team member(s) and/or service provider(s) respectfully listen and record responses from public
    - Provide clarification about Findings
- Provide opportunity for members of the concerned public to contribute in writing further inpurt at the listening session
- Provide web link to Summary of Findings report at the listening session

Acceptable alternative formats include:

- A public listening session can take place at a selectmen meeting only if they are open and promoted for public attendance, with similar allotment of time (~60 min) for the MVP listening session portion.

Maintaining Designation:
To maintain the designation as an MVP community year over year the municipality must provide the Commonwealth with a yearly progress report outlining the steps they have taken towards implementing their priority actions signed by a local official. Steps may include applying for grant funding, working to implement local changes to policies or bylaws, updating existing local plans using the outcomes of the workshop, completing more detailed vulnerability assessments, etc. A progress report template will be provided to the municipality to help them complete this requirement. A full update to this process would be required every 5 years to maintain FEMA HMP Approval.

Municipal Staff Commitment:
The municipality must provide sufficient staff time (estimated at 120-200 hours) to assure completion of this planning exercise and community engagement. Staff time provided by the municipality will include the following activities:

- Complete a contract with the Commonwealth and maintain all necessary reports and paperwork;

- Procure a state certified MVP provider;
- Establish a core team (or steering committee) within the municipality or region to steer the project;
- Help identify and complete outreach to critical stakeholders, partners and town officials who will be involved in the workshops;
- Help coordinate, schedule, send invitations and attend planning meetings and workshop(s);
- Conduct significant outreach in the community to ensure good attendance at the works hop(s) and public listening session(s);
- Help coordinate staff interviews with key experts, such as emergency response and the department of public works, to collect information prior to the workshop(s);
- Help the MVP provider find relevant data and other information useful to conducting the planning exercise;
- Provide access to relevant planning documents, budget information, and other information as needed;
- In concert with the MVP provider, complete and send 3 progress reports to EEA with information on prog ress and contract spending to date. The final CRB report will be counted as the final progress report, but must be accompanied by a final invoice showing all spending to date;
- With consultant support as budget allows, complete at least 1 public listening session to engage the broader public in a discussion of the workshop results and completed plan; and,
- Commit to working to continue municipal outreach and engagement, use the completed plan to inform existing planning and project activities, and secure additional data and information needed to improve the plan.

Reporting & Final Deliverables:
In concert with the MVP provider, the municipality is required to provide EEA with quarterly reporting, including information on spending, and the completed CRB/ HMP report which will result from the process. Quarterly reports are simple summaries (1-3 pages) of work that has been accomplished to date towards MVP certification, including status of scheduling and completion of workshop(s) and listening sessions. Municipalities shall provide a Summary of Findings Report (final CRB report), a list of workshop participants, contact information for the project lead and core team, a completed Risk Matrix in excel format, documentation of at least one public listening session, and a final invoice as deliverables for completion of the Community Resilience Building (CRB) process. The following is an annotated template for the CRB Workshop(s) Summary of Findings report. **Communities may submit a Hazard Mitigation Plan as their Summary of Findings Report, as long as it adheres to the layout, sections (bold and underlined), and associated details provided herein.** Consistency will increase reporting consistency which will in turn will accelerate the exchange and transfer of knowledge within and amongst municipalities, regions, and ultimately, across the Commonwealth. To assist further examples of completed CRB Summary of Findings reports can be reviewed and downloaded for reference on the Community Resilience Building website (www.communityresiliencebuilding.com). **Failure to submit all project deliverables by the contract end data will prohibit the municipality from being eligible for future EEA grants.**

The satisfactory documentation of at least once completed public listening session, and submittal of the MVP report, and associated materials described above, are the trigger for the MVP designation that entitles each municipality to partcipate in the MVP Action Grant to fund priorities identified through the planning process as well as to receive advanced standing in EEA grant programs. These deliverables and a completed FEMA Local Hazard Mitigaiton Plan Review Tool need to be submitted to MEMA for HMP plan review.

Materials:
All materials, software, maps, reports, and other products produced through the grant program shall be considered in the public domain and thus available at the cost of production. All materials created through this opportunity and as a result of this award should credit the Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) program.

Sample MVP/HMP Report Template:

SUMMARY OF FINDINGS TEMPLATE GUIDANCE

Cover Page:
{List Municipalities Covered by Summary of Findings}
{insert descriptive community photos and or logos (as appropriate)}
{insert - Community Resilience Building Workshop Summary of Findings – below photo/logos}
{insert Month & Year report completed}

Overview:
{insert following at top of page}
{List Municipalities Engaged in CRB Workshop(s)}

Community Resilience Building Workshop
Summary of Findings

Text (refer to Step A in CRB Guide): Summarize the need for Workshop from community perspective and the path taken to arrive at Workshop(s). Discuss partnerships critical to enabling Workshop(s) and define "community" engaged in process (i.e., single or multiple municipalities – which ones? Other significant organizations as core partners). Reference the use of the CRB process (www.communityresiliencebuilding.com) and include all presentation and meeting materials

{insert the following text within this "Overview" section}

The Workshop's central objectives were to:
- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengthen and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

Top Hazards and Vulnerable Areas:

Text (refer to Step B & C in CRB Guide and triggering questions page 26): Include summary of the discussions on top hazards that have had and will have impacts on the community (past, current, future). Define Top Hazards.

Top Hazards
{insert bulleted list of top hazards identified by community}

Areas of Concern
{insert categories followed by specific locations and other assets – confirm place names}
{examples of categories: Neighborhoods, Ecosystems, Transportation, Infrastructure, Critical Facilities, etc.}

Current Concerns and Challenges Presented by Hazards and Climate Change:

Text (refer to Step C in CRB Guide and triggering questions page 26): Provide brief history on all of the natural hazards that have impacted the community in and what those impacts were/are (i.e., long period of elevated heat, flooded intersections, impact of multiple hazards, etc.). Include reflection on the general concerns expressed by the Workshop participants on hazards today and in the future (5, 10, 25 yrs. or more).

Provide information on the types of climate change impacts the community expects to see in the future.

Include land use maps that depict the location of developed land uses, delineated by categories based on use (e.g. residential, commercial, industrial, institutional, other public use, etc.) and how it intersects with known hazards. Identify anticipated future land use areas and how they intersect with known hazards.

Specific Categories of Concerns and Challenges
Text: Insert paragraph or more for each major categories of concern for the community – as expressed by the participants. These often include emergency management capacity, vulnerability of road networks, inadequate community-wide communications and collaboration, critical infrastructure limitations (wastewater systems, energy), degraded floodplains and wetlands, and drinking water supply. These specific categories of concerns and challenges become the principle focal points highlighted in the following sections of the Summary of Findings.

Current Strengths and Assets:
Text (refer to Step C of CRB Guide and triggering questions page 26): Provide brief overview paragraph or two on the current strengths of the community as expressed by the participants.
{insert bullet statements (1-2 sentences) of current strengths. For example: "The responsive and committed leadership exhibited by elected officials and senior staff was viewed as a current strength. Ongoing collaboration and support amongst leadership and staff will help to advance comprehensive, cost-effective approaches to resilience as identified in this Summary of Findings".}
Completed FEMA Capability Assessment Worksheet

Top Recommendations and Strategies to Improve Resilience:
Text (refer to Step D of CRB Guide): Provide brief overview paragraph or two on the top recommendations for the community as expressed by the participants. Include a list of prioritized hazard mitigation projects that best meet the communities' needs for multiple hazard damage reduction
{insert bulleted of priority actions from Risk Matrix organized in sequential order first by "Highest Priority" then "Moderate Priority" and finally, "Lower Priority". Prioritized actions can be inserted directly from final Risk Matrix for the community.}

CRB Workshop Participants: Department/Commission/Representative:
{insert list of invited and participating entities. Place asterisks next to "attendees".}
{include an overall summary of the planning process}
{include documentation of the public listening session}

Citation:
{insert citation for Summary of Findings Report – this provides way to reference report for future plans and funding opportunities. Example:
{Insert name of municipality or persons responsible} (2017) Community Resilience Building Workshop Summary of Findings. {insert core team partnerships}. {insert municipality}, Massachusetts.

CRB Workshop Project Team: Organization, Name, Role:
{Example: Town of XXXX, Susan Smith, Core Team Member. Other roles can include: Lead Facilitator, Project Coordinator, Project Sponsor, Facilitator}

Acknowledgements:
{insert recognition of leadership and core team members by name and affiliation. Recognize entity that provided facility and meals/refreshments. In addition, provide recognition of funding sources utilized to advance the Workshop as well as the CRB process itself.}

Appendix:
{insert in subsequent pages of the Appendix the following items as available: Base Map(s) used for participatory mapping exercise (Step C and D of CRB Guide), Participatory Mapping Map(s) (outputs from Step C and D), supporting risk maps

(FEMA flood maps, etc.) used during workshop, supporting hazard information from the state plan, ResilentMa.org, etc. which was used in the risk assessment process, and powerpoint presentations or handouts used by participants.}

Expanded Scope

The Municipality has been funded **$15,500** to pursue the below expanded scope to build on the MVP planning process and further advance their community resiliency building efforts. Expanded scope deliverables must also be complete and submitted to EEA along with the MVP Report by June 30, 2020. **Failure to submit all project deliverables by the contract end date will prohibit the municipality from being eligible for future EEA grants.**

Please note that we are removing $7,000 from your expanded scope ask, as your award already includes $7,000 for integrating your plan with HMP.

1. ENHANCED COMMUNITY ASSET INVENTORY:

Community assets in Town important to the character and function of the community will be included in the enhanced inventory under Task 1. This Task builds on the previous community asset inventory from the 2015 HMP adding additional societal, infrastructural and natural resource assets identified by the MVP core team and in the community resilience building workshop. The inventory will be enhanced to include site specific details such as parcel elevation, building value, contact information, and known emergency management assets and issues

- Task 1 Deliverables (expected due date October 2019):
  - Enhanced matrix of community assets (societal, infrastructure, natural resources, and others as required) detailing specific attributes required for the vulnerability analysis.
  - Map and GIS database of community asset locations, attributes and natural hazard areas

2. NATURAL HAZARD RISKS WITH CLIMATE CHANGE:

Task 2 includes an update to the 2015 risk assessment of natural hazards to include climate change. The update will include all natural hazards identified in the 2018 Massachusetts State Hazard Mitigation Plan and use the Massachusetts Climate Change projections developed by the Northeast Climate Science Center at the University of Massachusetts. The prioritization of natural hazard risks will be reviewed by the MVP core team.

- Task 2 Deliverables (expected due date November 2019):
  - A matrix of natural hazards impacting Pepperell that include history of occurrence, future probability, frequency, geographic area of impact and extent to serve as the basis for a prioritization of hazards.
  - Hazard Profiles for each natural hazard.
  - Hazard Maps showing the geographic extent of impacted areas.
  - Revised data analysis and inundation mapping for future flooding risk due to climate change based on future extreme precipitation values.
  -

3. MULTI-HAZARD VULNERABILITY ASSESSMENT:

Task 3 includes an evaluation of both Town-wide and asset specific vulnerability to natural hazard risk. The evaluation will focus on wind and flood hazards including climate change using GIS-based tools to calculate risk probability and potential damages. The analysis will be compiled in a table with a rating for determining the relative risk to each community asset. The rating will be discussed at the MVP workshop.

- Task 3 Deliverables (expected due date December 2019):
  - A matrix of results from the vulnerability assessment.

4. ADAPTATION STRATEGIES:

Task 4 will include the development of adaptation strategies for the top 3 community assets most at risk. The adaptation strategies will focus on short, mid and long-range goals to help Pepperell become a more resilient community by proactively addressing impacts due to climate change at the three specific locations. The strategy summaries will support discussions at the MVP workshops and seeking future grant funding.

- Task 4 Deliverables (excepted due date January 2020):
  - The adaptation strategy will be presented as a bulletin format for each selected community assets including maps, graphic and discussion of the strengths, vulnerabilities and adaptation strategies with time lines for implementation, funding strategies and opinions of probable cost for each proposed strategy.

Pepperell MVP Planning Grant - Budget for Expanded Scope

	PIC	Project Manager	Certified Floodplain Manager	Staff Eng	GIS	Planning Advisor	Total Man-hours	Reimbursable	Labor Effort	Total Phase/Task Cost
1.ENHANCED COMMUNITY ASSET INVENTORY										
Complete Inventory in GIS and Prepare Draft Maps	0.5	0.5	2	4	8		15	$ -	$ 1,485	$ 1,485
Update based on Town Input		0.5	1	1	2		4.5	$ -	$ 465	$ 465
Subtotal	**0.5**	**1**	**3**	**5**	**10**	**0**	**19.5**	$ -	$ 1,950	$ 1,950
2.NATURAL HAZARD RISKS WITH CLIMATE CHANGE:										
Prepare draft matrix, hazard profiles, and mapping	0.5	0.5	4	8	8		21	$ -	$ 2,135	$ 2,135
Expand innudation mapping		0.5	4	6	12		22.5	$ -	$ 2,145	$ 2,145
Subtotal	**0.5**	**1**	**8**	**14**	**20**	**0**	**43.5**	$ -	$ 4,280	$ 4,280
3.MULTI-HAZARD VULNERABILITY ASSESSMENT:										
Vulnerability assessment and preparation of Matrix	0.5	2	3	10	8		23.5	$ -	$ 2,415	$ 2,415
Meeting to review with Town staff		2	2	1			5	$ 58	$ 665	$ 723
Preparation of Final Matrix	0.5	2	2	2			6.5	$ -	$ 880	$ 880
Subtotal	**1**	**6**	**7**	**13**	**8**	**0**	**35**	$ 58	$ 3,960	$ 4,018
4.ADAPTATION STRATEGIES:										
Develop adaptation strategies	0.5	2	8	4	6		20.5	$ -	$ 2,360	$ 2,360
Site visits and Meeting			8	8			16	$ 58	$ 1,840	$ 1,898
Costs	1	4		8			13	$ -	$ 1,600	$ 1,600
Subtotal	**1.5**	**6**	**16**	**20**	**6**	**0**	**49.5**	$ 58	$ 5,800	$ 5,858
Additional Planning Board Advisor Assistance										
Additional hours (average 4 per week) for Planning Board Consultant (above normal 10 hours a week)						120	120	$ -	$ 6,360	$ 6,360
Grand Total	4	14	34	52	44	120	267.5	$ 116	$ 22,350	$ 22,466

Town of Pepperell MVP / HMP Roles and Responsibilities

Task	Task Leader	Task Support	Assumptions
Task 1: Kickoff Meeting	Town	Tighe & Bond	Assumes Town staff will identify and invite Core Team (with input by Tighe & Bond via conference call). Core team may include: Town Admin, Emergency Management, Engineering/Highway, Health, Conservation, Building/Facilities, etc. To be efficient with staff time, representatives from Fire and Police may be included as part of stakeholder process, not on core team.
Task 2: Characterize Natural Hazard Risks Including those from Climate Change	Tighe & Bond	NMCOG /Town	Assumes Tighe & Bond will lead this task using data from previous HMP and update based on more recent available data consistent with state information. Includes consideration for climate change. Assumes Core Team will provide input on local hazards (e.g., areas of flooding, dams, winter storms, etc.) and will identify priority hazards.
Task 3: Enhanced Community Asset Inventory	NMCOG	Town	Assumes NMCOG will create mapping and prepare list of critical facilities, infrastructure, societal, environmental, and economic assets. Town to obtain repetitive loss data, if any, and review draft, and provide input on known emergency management assets and issues. Tighe & Bond to provide guidance on process.
Task 4: Multi-Hazard Vulnerability Assessment	Tighe & Bond	Town	Tighe & Bond to lead this effort. NMCOG to provide Community Asset Inventory GIS to Tighe & Bond. Our work includes: - Hazus-MH for Hurricanes and Earthquakes - Exposure assessment of parcel and building flood risk - The types and number of community assets located in priority hazard areas

Task	Task Leader	Task Support	Assumptions
Task 5: Capabilities Assessment	Town	Tighe & Bond	Assumes Town staff will complete this exercise with guidance from Tighe & Bond. Use form from FEMA handbook. The Capabilities assessment will include the following elements: • Review of all existing multiple hazard protection measures within the City, including protective measures under NFIP. • Review of exiting administrative capacity. • Review of existing funding mechanisms. • Review of education and outreach methods. • Description of each mitigation measure and method of enforcement and/or point of contact responsible for implementation of each measure. • Update of historic performance of each measure and description of improvements or changes needed.
Task 6: Development of Mitigation Strategies and Targeted Adaptation Analysis	Tighe & Bond	NMCOG/Town	Assumes Core Team will review/update goals and previous action items from 2016 Regional hazard mitigation plan. Development of new mitigation actions arise from Core Team input and workshops. Tighe & Bond will complete targeted adaptation analysis for top three
Task 7: Meeting with Advisory Committee	Tighe & Bond	Town	Assumes Tighe & Bond will lead a meeting with the Advisory Committee to discuss the natural hazards, vulnerability assessment, and adaptation/mitigation strategies.

Town of Pepperell MVP / HMP Roles and Responsibilities

Task	Task Leader	Task Support	Assumptions
Task 8.1: Prepare for Workshops	Town	Tighe & Bond/ NMCOG	Town staff to identify stakeholders with input from Tighe & Bond and invite stakeholders. Tighe & Bond to prepare presentation for workshops. Other materials for workshops will be prepared during other tasks Assumes Town staff will arrange location, order and facilitate food, and invite stakeholders.
Task 8.2: MVP workshops	Town/ Tighe & Bond	NMCOG	Two 4-hour meetings. Assumes Tighe & Bond will facilitate workshops Assumes NMCOG will attend one workshop.
Task 9: Draft and Final MVP/HMP Report	Tighe & Bond	Town	Assumes Tighe & Bond will compile draft MVP/HMP report and deliver documentation of tasks completed to support HMP update. Town staff will submit report to EEA and MEMA/FEMA.
Task 10: Public Community Listening Session	Town	Tighe & Bond	Tighe & Bond will prepare a brief PowerPoint presentation and attend listening session. Town staff will lead presentation
Task 11: Ongoing Coordination	Town	Tighe & Bond	Town to facilitate and document meetings, including invitations, meeting space, and meeting notes Town to prepare and issue press releases about project and notifications about meetings. Tighe & Bond to provide agendas and necessary handouts.

Task	Task Leader	Task Support	Assumptions
			Town to complete required quarterly reporting on grant. Tighe & Bond to provide invoices and review quarterly reports prior to Town submitting. NMCOG to review all draft deliverables prepared by Tighe & Bond

Community Resilience Building

WORKSHOP GUIDE

Excluding entirety of report to reduce paper use

www.CommunityResilienceBuilding.org

CRB Workshop Participant Worksheet

The following guidance is designed to help you and your core team identify a diverse, cross-section of participants for a Community Resilience Building Workshop(s). Ultimately, the participants will be representatives of and vested in a resilient future for your community. The final list of participants is yours to create and will depend largely on the goals and intended outcomes that are right for your community (refer to Step A1 and A2 of the CRB Workshop Guide). Review attached list of participant affiliations from previous Workshops.

Guiding Questions to Help Surface Workshop Participants:

A. Who are the key decision makers in your community? (leadership)
B. Who is directly responsible for implementing decisions? (staff/volunteers)
C. Who has influence on decisions in your community? (boards, commissions, etc.)
D. Which entities will be impacted by decisions? (community members)

CRB Core Team (refer to Step A1 of the CRB Workshop Guide):

Name	Affiliation

Participants:

Categories - Positions	Name	Affiliation	Vantage Point (State, Regional/County, Local)
LEADERSHIP (Mayor, President, Elected Council Members, Provost, State/US Representatives, CEO, etc.)			
BOARDS, COMMISSSIONS, FORMAL COMMITTEES (Planning and Zoning, Finance/Budget/Capital Plan, Conservation, Economic/Community Development, Education, etc.)			

PUBLIC SAFETY - HAZARD MITIGATION (Police/Fire/Ambulance; Safety Officer, Homeland Security, Port Authority, CERT, Campus Security, etc.)			
COMMUNITY PLANNING (Municipal/Campus Planner, Economic Development, Long Range – Regional Planner, Neighborhood Association, Land Trusts, Faith-based/Civic Organization, etc.)			
OTHERS (Finance, Administration, Operations, Neighborhood Associations, Chamber of Commerce)			

Elected Officials (or equivalents):
City/Town Council Members – (other appointed boards/commissions)
State Representatives and Senators
U.S. Representatives and Senators (or state-based aids/liaison)

Corporation Leadership: CEOs/Board Chair/President (or equivalent)
Federal Government: Secretary/Director/Division Head (or equivalent)
Academia: Provost/President (or equivalent)

Municipal Departments (or equivalents):
Emergency Management & Homeland Security
Engineering Department
Finance Department
Fire Department
Grants Office
Health & Social Services Department
Land Use, Construction & Review Department
Legal Affairs Department
Neighborhood Revitalization Zone Coordinator
Office of Planning & Economic Development
Parks and Recreation Department/Conservation
Police Department
Port Authority
Public Facilities Department
Public Library
Small & Minority Business Resource Office
Special Service Districts
Water Pollution Control Authority
Zoning Department
Corresponding Volunteer or Appointed Boards and Commissions

Key Stakeholders:
Water/Power Utility
Museums and Zoos
Sustainability Groups/Committees
Residential/Commercial Real Estate Agencies
Local Chapters of Professional Organizations: (APA. ASLA, PWS, etc.)
Land Grant Universities, Private Universities/Colleges, Community Colleges
Local & Regional Community Foundations
Local/Regional/State Housing Authorities
Major Employers
Environmental/Conservation NGOs
Engineering and Design Consulting Firms
Independent Nursing/Hospice Providers
Animal Shelters
Neighborhood Associations/Partnerships
Chamber of Commerce/Business Councils

HAZARD MITIGATION PLAN FOR THE NORTHERN MIDDLESEX REGION

2015 Update

Prepared by:
Northern Middlesex Council of Governments
40 Church Street
Lowell, Massachusetts 01852

Excluding entirety of report to reduce paper use

Tighe&Bond
Engineers | Environmental Specialists

APPENDIX B

Pepperell MVP / HMP Advisory Committee Meeting Agenda

TO: Attendees

LOCATION: Pepperell Town Hall – Conference Room A

DATE: October 7, 2019

TIME: 3:30 to 4:30 PM

3:30 PM Introductions & Sign In

3:35 PM Inventory and Rank Natural Hazards

Goal: Finalize list of natural hazards that apply to Pepperell, and determine the top four.

- Worksheet will be presented on computer.
- Together as a group we will discuss each hazard and complete the ranking.

4:00 PM Review and Confirm Community Assets

Goal: Finalize list of Pepperell's "Community Assets" to be used in the risk and vulnerability assessment.

- Community Asset Inventory and mapping will be presented on computer.
- Together as a group we will discuss the four categories (see back of this agenda) and the inventory to confirm whether items are missing or should be excluded.

4:20 PM Define Business Engagement Strategy

Goal: Advisory group to help engage local businesses to attend MVP Workshops on October 28, 2019 or November 2, 2019

4:30 PM Adjourn

1. **Built Environment**: Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.
    a. Bridges
    b. Communication utilities (e.g., cell towers)
    c. Power utilities (e.g., gas pipeline, power plant, etc.)
    d. All town-owned buildings/facilities, including police, fire, IT, etc.
    e. Dams (public and private)
    f. Medical facilities (e.g., urgent care, etc.)
    g. Funeral homes
    h. Post offices
    i. Water facilities
    j. Wastewater facilities
    k. Transportation (e.g., local or regional bus stations, etc.)
    l. Railroad
    m. Gas stations

2. **Economy**: Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.
    a. Major employers
    b. Supermarkets
    c. Pharmacies
    d. Towing services
    e. Hardware stores
    f. Oil delivery services
    g. Tree removal services
    h. Construction companies

3. **People**: Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.
    a. Schools
    b. Vulnerable populations, environmental justice area
    c. Churches
    d. Child care
    e. Food pantries
    f. Historic sites
    g. Special needs schools
    h. Nursing homes/elderly housing/elderly care
    i. Community centers
    j. Libraries
    k. Cemeteries
    l. Affordable housing
    m. Shelters

4. **Natural Environment**: Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.
    a. Open space
    b. Major wetlands and waterbodies
    c. Vernal pools
    d. Trails
    e. Habitat

Meeting Sign-in Sheet

Date: October 7, 2019 **Time:** 3:30 PM

Location: Town Hall, Conference Room A

RE: MVP Planning Grant

Attendees:

Name (please print)	Email
Walter Richards	skeeter.Richards@Gmail.com
Denise Pigeon	dpigeon@nashobatech.net
LISA DAVIS	ldavis@town.pepperell.MA.US
Beverly Woods	bwoods@nmcog.org
Tony Beattie	Robinwoodfarm@gmail.com
Janet Moonan (TRB)	jsmoonan@theboard.org
Tom Nephew	tanephew@gmail.com
Casey Campetti	lccampetti@gmail.com
Paula Terrasi	pterrasi@town.pepperell.ma.us
Kalene Gendron	Kgendron@nashoba.org
Jim Scarsdale	jscarsdale@outlook.com
David Querze	dquerze@town.pepperell.ma.us
Kat Belliveau	katjbelliveau@gmail.com
Andrew MacLean	amaclean@town.pepperell.ma.us

Pepperell MVP / HMP Advisory Committee Meeting Agenda

TO: Attendees

LOCATION: Pepperell Town Hall – Conference Room A

DATE: January 27, 2020

TIME: 3:30 to 4:30 PM

Please sign in

3:30 PM Status Update & Review of Draft Documents

Goal: Review progress to date and set deadline for input by Committee on draft documents.

- Asset inventory maps and lists
- Draft multi-hazard vulnerability assessment
- Draft capabilities assessment

4:00 PM Mitigation Strategies

Goal: Review previous mitigation strategies and discuss new mitigation strategies.

What is a hazard mitigation? Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries, and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, education programs, infrastructure projects, and other activities. *See reverse of agenda for categories under which mitigation actions fall.*

- Worksheet will be presented on computer.
- Together as a group we will discuss existing strategies and future strategies.

4:30 PM Adjourn

Hazard mitigation measures can generally be sorted into six categories, according to FEMA's Local Multi-Hazard Mitigation Planning Guidance:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built, and direct public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.

2. **Property Protection:** Modification or removal of existing buildings or infrastructure to protect them from a hazard. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and ways to mitigate them. Such actions include outreach projects, real estate disclosure requirements, hazard information centers, and school-age and adult education programs.

4. **Natural Resource Protection and Green Infrastructure:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include low impact development, sediment and erosion control, stream corridor restoration, watershed management, urban forest and vegetation management, and wetland restoration and preservation.

5. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.

6. **Emergency Services Protection:** Actions that will protect emergency services before, during, and immediately after an occurrence. Examples of these actions include protection of warning system capability, protection of critical facilities, and protection of emergency response infrastructure.

Meeting Sign-in Sheet

Date: January 27, 2020 **Time:** 3:30 PM

Location: Town Hall, Conference Room A

RE: MVP/HMP Planning Grant

Attendees:

Name (please print)	Signature
Tom Stephen	
Paula Terrasi	
Ken Kalinowski	
Dave Quenze	
Jim Scanzani	
Tony Beattie	
Andrew Maylor	
Lisa Davis	phone
Jennie Moore	

Tighe&Bond
Engineers | Environmental Specialists

APPENDIX C

MVP Workshop Guest List

NAME	AFFILIATION
Tracie Ezzio	Pepperell Family Pharmacy
Laurie Masiello	Masy Corporation
Owner / Manager	Astron Corporation
Bill Gikas	C & S Pizza
Chief Brian Borneman	Pepperell Fire Chief
Chief David Scott	Pepperell Police Chief
David Stairs	Communications Director, TOP
Dave Walsh	Walsh Brothers
Frank Masarelli	Massarelli Escavating
Carl Shattuck	Shattuck Trucking
George Clark	Clark Retirement Park
Virginia Malouin	Resident, Farm Owner
Dave & Mary Sears	Clover Luck Farm
Owner / Manager	Kimball's Farm
Owner / Manager	Wilkins Farm
David Mead	Mead Tree Service
Owner / Manager	Shattuck Oil
Owner / Manager	Wilson Brothers HVAC
Owner / Manager	Lorden Oil
Master Plan Committee Members	Town of Pepperell
Conservation Commission	Town of Pepperell
Department of Public Works Staff	Town of Pepperell
First Responders	Town of Pepperell
Board of Assessors	Town of Pepperell
Tax Collector	Town of Pepperell
Board of Health Members	Town of Pepperell
Council of Aging Members	Town of Pepperell
Lawrence Library Staff	Town of Pepperell
Senior Center Staff	Town of Pepperell
Members of Finance Committee	Town of Pepperell
Town Hall Staff	Town of Pepperell
Planning Board Members	Town of Pepperell
Board of Selectmen	Town of Pepperell
Kalene Gendron	Nasoba BOH / Health Agent
Alicia Geilen	NMCOG
Beverly Woods	NMCOG
Jay Donovan	NMCOG
Janet Cramb	Janet Cramb Real Estate
Melissa Tzandoudakis	Lyons & Tzandoudakis
Town of Dunstable - BOS, TA & PB	Town of Dunstable
Town of Groton - BOS, TA & PB	Town of Groton
Town of Townsend - BOS, TA & PB	Town of Townsend
Samule Melanson	Hydro Dam on Main Street

NAME	AFFILIATION
Judy Lorimer	Pepperell Horse Association
Michael Rosser	Trout Unlimited
Elizabeth Campbell	NRWA Director
Kara Runsten	State of MA
Michelle Rowden	State of MA
Scott Farrar	National Grid

Town of Pepperell
MVP/HMP Workshop #1
October 28, 2019

Table of Contents

Meeting Agenda

ATTENDEES: Pepperell Municipal Vulnerability Preparedness Community Resilience Building Workshop

LOCATION: Community Center

DATE: October 28, 2019

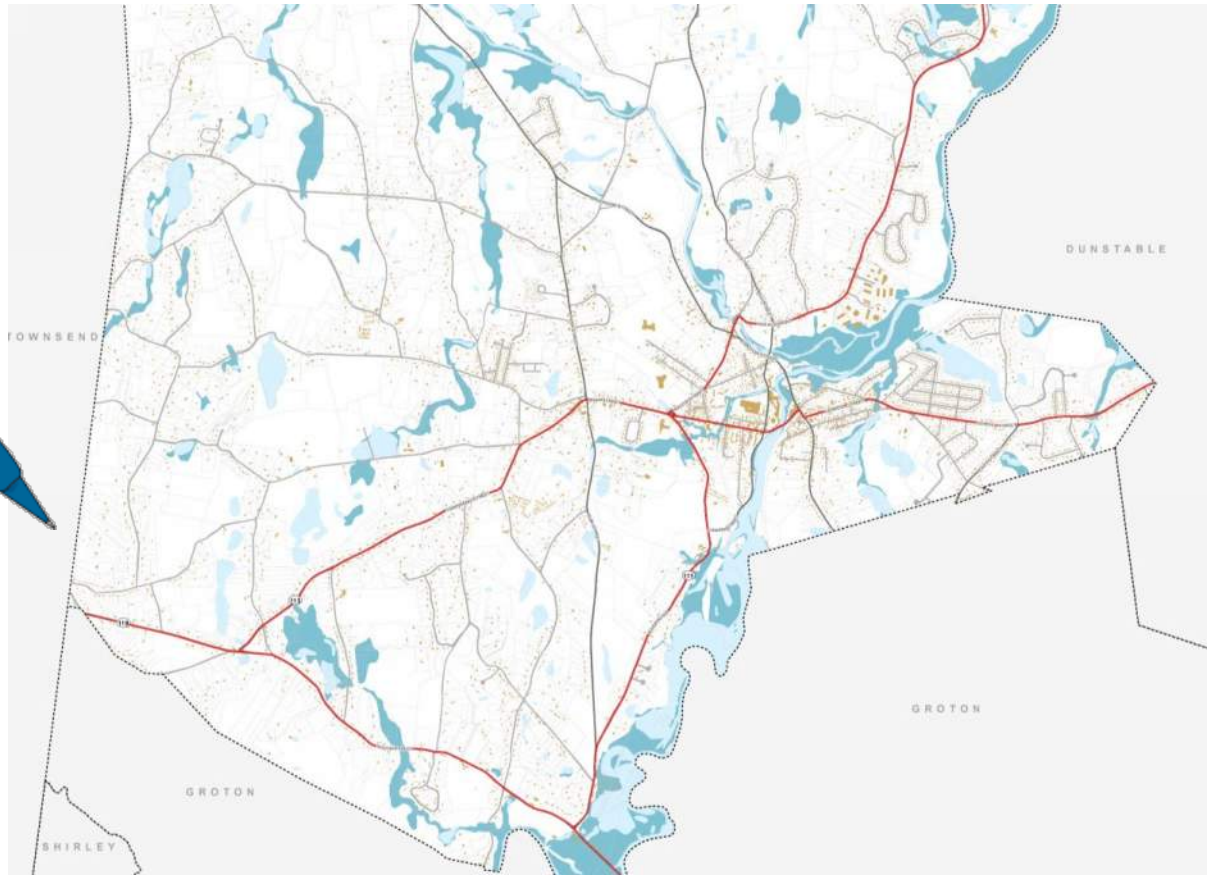
START TIME: 12:00 PM

12:00 PM	Sign in, Refreshments	
12:15 PM	Welcome and Introductions	Town Administrator or Town Planner
12:20 PM	Individual Mapping Exercise – Community Assets Strengths and Vulnerabilities	Tighe & Bond
12:40 PM	Workshop Logistics and Table Icebreakers, 5 minute break	Core Team - Lead
1:00 PM	Session 1: Natural Hazard Risks and Climate Change	Tighe & Bond
1:10 PM	Table Discussion #1: Identifying Risk Areas and Community Strengths	Table groups
1:50 PM	Break	
2:00 PM	Session 2: Mitigation Strategies for Vulnerable Assets	Tighe & Bond
2:10 PM	Table Discussion #2 Identify Actions to Address Vulnerabilities or Protect Strengths	Table groups
2:50 PM	Short Break	
3:00 PM	Session 3: Groups Priortize top 5 to 6 actions	Table groups report out
	Small group report out to full group on top 5-6 actions	
3:45 PM	Wrap up and closing remarks	Tighe & Bond & Town
4:00 PM	Adjourn	

PLEASE SIGN IN

Where do you live or work in Pepperell?

Help us by marking it on the map on the table.



TOWN OF PEPPERELL

COMMUNITY RESILIENCE BUILDING WORKSHOP

October 28, 2019

Tighe&Bond

WELCOME & INTRODUCTIONS

Help Pepperell Build Resilience and Preparedness:

- Plan for more frequent and intense weather events
- Improve pre-event planning, response & recovery, and long-term actions
- A prepared and resilient Pepperell will be able to maintain functions, protect its residents and businesses, and be ready for future storm events and a changing climate

A brief thanks to Pepperell's Hazard Mitigation Plan and MVP Core Team

Lisa Davis

David Querze

Beverly Woods

Brynn Montesanti

Paula Terrasi

Ken Kalinowski

Andrew MacLean

Kalene Gendron

BEFORE WE GET STARTED

Help us complete a preliminary mapping exercise

- Question #1: Which community assets are most important to you or the community?

WHAT ARE COMMUNITY ASSETS?

Built Environment: Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.

Economy: Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.

People: Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.

Natural Environment: Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.

BEFORE WE GET STARTED

Help us complete a preliminary mapping exercise

- Question #1: Which community assets are most important to you or the community?
- Question #2: In your experience, which community assets are most vulnerable to natural hazards*?

WHAT ARE NATURAL HAZARDS?


Inland Flooding


Tsunami


Severe Winter Storm

Blizzards
Snow
Ice Storms


Drought


Average/Extreme Temperatures


Tornadoes


Landslide


Wildfires


Other Severe Weather

Nor'easters
High Wind
Heavy Precipitation
Microbursts


Hurricanes/Tropical Storms


Invasive Species


Earthquake

PEPPERELL'S TOP NATURAL HAZARDS

Inventory of Natural Hazards

Type of Natural Hazard	History of Occurrence in Pepperell	Hazard Probability	Hazard Frequency	Geographic Extent	Severity of Impact	Hazard Risk Ranking
Hydrological Hazards						
Inland Flooding	Yes	3	3	2	3	11
Coastal Flooding	No	0	0	0	0	N/A
Drought	Yes	3	3	2	2	10
Atmospheric Hazards						
Extreme Temperature	Yes	3	3	3	1	10
Hurricanes / Tropical Storms	Yes	2	2	3	2	9
Other Severe Weather	Yes	3	3	3	1	10
Severe Winter Storm	Yes	3	3	3	2	11
Tornadoes	No	1	0	1	3	5
Microburst	Yes	3	3	1	1	8
Geological Hazards						
Coastal Erosion	No	0	0	0	0	N/A
Earthquake	Yes	1	0	3	3	7
Landslide	No	1	0	1	1	3
Tsunami	No	0	0	0	0	N/A
Other Hazards						
Wildfires	Yes	3	1	1	1	6
Invasive Species	Yes	4	3	2	1	10

ASSESSMENT METHOD

Definitions

Points		Description
Hazard Probability (Possible occurrence in the future)		
1	Unlikely	Less than a 1% probability over the next 100 years
2	Possible	1-10% probability in the next year or at least one chance in the next 100 years
3	Likely	10-100% probability in the next year or at least one chance in the next 10 years
4	Highly Likely	Near 100% probability in the next year
Hazard Frequency		
0	Very Low	Events that occur less frequently than once in 1,000 years (less than 0.1% per year).
1	Low	Events that occur from once in 100 years to once in 1,000 years (0.1% - 1% per year).
2	Medium	Events that occur from once in 10 years to once in 100 years (1% - 10% per year).
3	High	Events that occur more frequently than once in 10 years (greater than 10% per year).
Geographical Extent (Area Impacted by a Given Natural Hazard)		
1	Small	Less than 10% of the Town affected
2	Medium	10-50% of the Town affected
3	Large	More than 50% of the Town affected
Severity of Impact from Hazard		
1	Minor	Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e. one or two communities); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
2	Serious	Scattered major property damage (more than 10% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services briefly interrupted up to 1 day; some minor injuries.
3	Extensive	Consistent major property damage (more than 25%); major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and possible fatalities.
4	Catastrophic	Property and public infrastructure destroyed (more than 50%); essential services stopped for 30 days or more, multiple injuries and fatalities.

PEPPERELL'S TOP NATURAL HAZARDS

SEVERE WINTER STORMS

OTHER SEVERE WEATHER

INLAND FLOODING

DROUGHT & EXTREME TEMPERATURE

+ **CLIMATE CHANGE**

=

AMPLIFIED EXISTING RISKS

- Community and regional infrastructure
- Local and regional economies
- Public Health
- Natural resources and our environment

Tighe&Bond

WORKSHOP LOGISTICS

- **Two table-top/group discussions**

- **Fill out matrix**

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
								Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

- **Facilitated group prioritization**

Tighe&Bond

BRIEF OVERVIEW OF THE HAZARD MITIGATION and MVP PLANNING PROCESS

1) Define potential risk due to natural hazards including impacts of climate change

2) Identify key community assets and vulnerability to risk

3) Define mitigation projects to improve resiliency

4) Prioritize projects for areas most at risk

HISTORICAL EVENTS

- **August 1948 Highest Temperature Recorded**
  Temperature of 105 degrees recorded in Pepperell
- **January 1957 Lowest Temperature Recorded**
  Temperature of -29 degrees recorded in Pepperell
- **March 1968 Ice Jam**
  Ice jam on the Nashua River
- **1987 Major Flooding of Nashua River**
  Road closures, school closed
- **July 2002 Thunderstorm Wind**
  Winds recorded over 70 mph
- **March 2010 Nashua River Flooding**
  Flooding of the Nashua River leads to closure of Route 111 and Route 119
- **August 2011 Hurricane Irene**
  Devastating flooding, wind damage
- **October 2011 Halloween Storm**
  Power out for seven days
- **March 2018 Nor'easter**
  Pepperell received 20 inches of snow from a winter nor'easter

SEVERE WINTER STORMS

OTHER SEVERE WEATHER

INLAND FLOODING

DROUGHT & EXTREME TEMPERATURE

Session #1

Identify Risk Areas and Community Strengths

1:00 PM

DISCUSSION AT TABLE

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
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Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

EXAMPLES OF VULNERABILITIES & STRENGTHS

Vulnerabilities

- Main road floods during storms, blocking emergency response.
- Power outages during heat waves lead to health concerns.
- Sewer pump stations become submerged and inoperable
- Senior housing without back-up generators during heat waves.
- Residents without access transportation during hurricane evacuation.
- Limited areas of refuge in schools during tornados.

Strengths

- Critical road elevated and passable by emergency management.
- Hardened utility lines reduce outages due to ice storms.
- Undersized culvert replaced to reduce flooding in key intersection.
- Improvement to communication systems during extreme weather.
- Private businesses provide services aligned with emergency operations.
- Floodplains provide stormwater storage and downstream flood reduction.

TRIGGER QUESTIONS

- What infrastructure/facilities are exposed to current and future hazards? Transportation, waste water treatment, nursing homes, schools, office park, hazardous materials facility, dams, laboratories, churches, pharmacies, groceries, gas stations?
- What makes this infrastructure vulnerable? Location, age, building codes, type of housing?
- What are the consequences of this infrastructure being vulnerable? Lack of access to critical facilities – urgency care/ pharmacies?
- What are the population characteristics of the people living in high-risk areas? Elderly, low/moderate income, special needs, languages spoken?
- What are the strengths and vulnerabilities of people in your community? Active civic groups, organizations, associations; full-time police, fire, and emergency medical services; strong lines of communication for emergency information?
- How can hazards intensify these characteristics? Where are areas for improvement in the community?
- What natural resources are important to your community?
- What benefits do these natural resources provide (storm buffering, fire breaks, erosion control, water quality improvement, slope stabilization, recreation)?
- Which natural resources are exposed to current and future hazards?
- What have been the effects of these hazards on these natural resources?
- Where are the high-risk areas and what vulnerabilities exist for the environment?

Session #2

Identify Actions to Address Vulnerabilities and Protect Strengths

2:00 PM

DISCUSSION AT TABLE

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
								Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

TYPES OF MITIGATION ACTIONS

1. Prevention
2. Property Protection
3. Public Education and Awareness
4. Natural Resource Protection and Green Infrastructure (nature-based solutions)
5. Structural Projects
6. Emergency Services Protection

Session #3

Table Groups report out to Full Group

3:00 PM

WHEN PRIORITIZING, CONSIDER…

- Funding availability and terms
- Consensuses in community for project
- Needed to advancing longer-term outcomes (e.g. phase of a project)
- Does it contribute towards meeting local and regional planning objectives

DISCUSSION AT TABLE

Select Top 5 to 6

www.CommunityResilienceBuilding.org

Community	Location	Ownership (Town, State, Federal, Private)	V or S	Actions to Address Pepperell's Top Hazards: Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H-M-L	Time Short Long Ongoing
Societal									
Environmental									
Economy									

Tighe&Bond

REPORT TO LARGE GROUP & RANK

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards				Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

NEXT STEPS

- Second Workshop on November 2, 2019
- Prepare MVP/HMP Report
- Become a certified Municipal Vulnerability Preparedness Community
- Maintain MVP status with annual progress updates to State (combined with Hazard Mitigation Planning update)
- Eligible for MVP action grant funding

Community Asset Categories

1. **Built Environment**: Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.
    a. Bridges
    b. Communication utilities (e.g., cell towers)
    c. Power utilities (e.g., gas pipeline, power plant, etc.)
    d. All town-owned buildings/facilities, including police, fire, IT, etc.
    e. Dams (public and private)
    f. Medical facilities (e.g., urgent care, etc.)
    g. Funeral homes
    h. Post offices
    i. Water facilities
    j. Wastewater facilities
    k. Transportation (e.g., local or regional bus stations, etc.)
    l. Railroad
    m. Gas stations

2. **Economy**: Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.
    a. Major employers
    b. Supermarkets
    c. Pharmacies
    d. Towing services
    e. Hardware stores
    f. Oil delivery services
    g. Tree removal services
    h. Construction companies
    i. Farms

3. **People**: Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.
    a. Schools
    b. Vulnerable populations, environmental justice area
    c. Churches
    d. Child care
    e. Food pantries
    f. Historic sites
    g. Special needs schools
    h. Nursing homes/elderly housing/elderly care
    i. Community centers
    j. Libraries
    k. Cemeteries
    l. Affordable housing
    m. Shelters

4. **Natural Environment**: Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.
    a. Open space
    b. Major wetlands and waterbodies
    c. Vernal pools
    d. Trails
    e. Habitat

Pepperell Community Assets- Strengths and Vulnerabilities

Individual Mapping Exercise: The purpose of this mapping exercise is to allow workshop participants to consider important community assets and see which locations should be counted at the top for assets that providing a significant strength to the community in the face of natural hazards. The mapping exercise also asks participants to consider which assets or locations in Pepperell are most vulnerable to natural hazards*.

What is a Community Asset? Community asset as anything that is important to the character and function of Pepperell. Community assets are split up into four different categories: People, Economy, Built Environment, and Natural Environment described below.

Community Asset Categories	Critical Sectors	Characteristics of Community Assets
People	Schools, Vulnerable Populations, Cultural Facilities, Cultural Resources	Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.
Built Environment	Critical Municipal Facilities, Emergency Response, Water, Wastewater, Energy, Stormwater, Transportation,	Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or needed for critical facilities to operate.
Economy	Business District, Food and Drug Supplies,	Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.
Natural Environment	Natural Resources	Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.

PLEASE USE YOUR DOTS AND POST-ITS TO COMPLETE THE FOLLOWING:

Question #1: Which community asset(s) are most important to you?

Directions: Put green dot on the assets, write asset name on post it and note why you made this choice.

Question #2: In your experience, which community assets are most vulnerable to natural hazards*?

Directions: Put a red dot on the asset(s) or area, write asset/area name on post it and note why you made this choice.

***Natural Hazards: Severe Winter Storms, Other Severe Weather, Inland Flooding, Average/Extreme Temperatures & Drought**

Town of Pepperell
Municipal Vulnerability and Preparedness Stakeholder Workshop
October 28, 2019
12:00 pm – 4:00 PM

Name	Affiliation	Contact Information – Email or Phone
Paul aTerrasi	TOP Cons + DPW	pterrasi@town.pepperell.ma.us
Jennie Mooney	Tighe & Bond	jsmooney@tighebond.com
Brynn Montesanti	TOP - PB to BOH	bmontesanti@town.pepperell.ma.us
SCOTT FARRAR	NATIONAL GRID	SCOTT.FARRAR@NATIONALGRID.COM
Walter Richards	IA Auto	W Richards @ IA Auto.com
Deb Fountain	Master Plan Comm	deborahffountain@gmail.com
Debbie Nute	Treasurer	dnute@town.pepperell.ma.us
Margie Lafleur	BOH Chair	mlafleur@town.pepperell.ma.us
Cheryl Luteza	Assistant to Zoning Board of Appeals	CLuteza@town.pepperell.ma.us
Beverly Woods	NMCOG	bwoods@nmcog.org
Joyce Mooney	PB/MPC	pepperknollfarm@yahoo.com jmooney@town.pepperell.ma.us

Town of Pepperell
Municipal Vulnerability and Preparedness Stakeholder Workshop
October 28, 2019
12:00 pm – 4:00 PM

Name	Affiliation	Contact Information – Email or Phone
David Quenzi	Emergency Mgmt	dquenzc@town.pepperell.ma.us
Deb Spratt	Library	dspratt@cwmars.org
Ken Kelinnski	DPW	Kkelinowski@town.pepperell.ma.us
Kris Hartwell	DPW	Khartwell@town.pepperell.ma.us
JOAN LADIK	TOWN CLERK	JOANLADIK@YAHOO.COM
JOHN LADIK	FINCOM	JOHN.F.LADIK@GMAIL.COM
Tony Beattie	Robinwood Farm	978-877-7545 Robinwoodfarm@gmail.com
Tom Nephew	B & W Realtor	508-331-6400 tanephew@gmail.com
Kalene Nendron	Board of Health	Kgendron@nashoba.ORG
Andrew MacLean	Town Administrator	
Denise Pigeon	Nashoba tech	dpigeon@nashobatech.net

Town of Pepperell
Municipal Vulnerability and Preparedness Stakeholder Workshop
October 28, 2019
12:00 pm – 4:00 PM

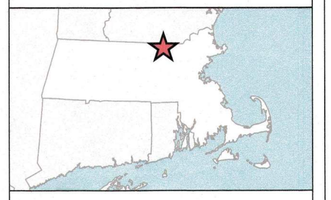
Name	Affiliation	Contact Information – Email or Phone
Michelle Rowden	EEA	michelle.rowden@mass.gov
Gabrielle Belfit	Tighe & Bond	
Sharon Rooney	Tighe & Bond	

Town of Pepperell

LEGEND

- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access; Other Numbered Highway
- Major Road - Collector
- Building Footprint
- Parcels
- Waterbody
- FEMA 100-Year Flood Zone
- Town Boundary

LOCUS MAP



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NOTES

Pepperell, Massachusetts

October 2019

Tighe&Bond
Engineers | Environmental Specialists

TOWNSEND
DUNSTABLE
GROTON
GROTON
SHIRLEY

BEMIS ROAD
HIGH OAKS PATH
WHEELER ROAD
LAWRENCE STREET
LORD EN LANE
CRANBERRY ROAD
CHESTNUT STREET
OAK HILL STREET
BAYBERRY ROAD
BONTON STREET
NORTH STREET
SEMINOLE DRIVE
BROOKLINE STREET
PRESCOTT STREET
BLOOD STREET
SHEFFIELD STREET
SARTELLE STREET
VILLAGE ROAD
CLARK STREET
MAPLE STREET
HEALD STREET
ASHLEY STREET
WEST STREET
SHIPLEY HILLS
HOG HILL ROAD
EDGEWOOD STREET
PALMER ROAD
DEARFIELD ROAD
WILLOW STREET
AMES STREET
JEWETT STREET
FOX LANE
MINNS STREET
COTTAGE STREET
TUCKER STREET
TUCKER PARK
GROTON STREET
NASHUA ROAD
ELLIOT STREET
JULIA LANE
MADDS ROAD
HIGHLAND STREET
MILES STREET
CASSIE LANE
PIERCE STREET
INSURGENT LANE
DEERFIELD DRIVE
DEER ISLE DRIVE
MERRIMAC DRIVE
LOMAR PARK DRIVE
LOMAR PARK DRIVE
RIDGE ROAD
DOW STREET
BROOKDALE LANE
GLADMAN LANE
JUNE STREET
OAK STREET
SHAWNEE ROAD
HERGET DRIVE
HAMEL AVENUE
PARKWOOD DRIVE
OAKLAND STREET
FIRST AVENUE
BOWERS STREET
1ST STREET
BACON STREET
IDAL STREET
YVONNE DRIVE
CYNTH DRIVE
HOVIA DRIVE
NOVA SCOTIA DRIVE
EAST STREET
VERSES STREET
ALLEN STREET
HARBEN STREET
LEGION STREET
PROVINCE STREET
PROSPECT STREET
ST. JOHN'S STREET
HIGH STREET
WILLIAM STREET
CANAL STREET
RIVERSIDE
SUNCREST DRIVE
WILDERNESS WAY
KAYLA LANE
SHATTUCK STREET
OWENS END STREET
HARBOR STREET
HILLSIDE STREET
LAKIN STREET
FRIENDS WAY
LIRYC LANE
BANCROFT STREET
OTTADA WAY
SOUTHS STREET
POWHATAN ROAD
POWHATAN ROAD
SHIRLEY STREET
SAM STREET
MASON STREET
ORION ROAD
CELESTIAL WAY
SIRIUS LANE
REED STREET
BIRCH HILL DRIVE
MAURA LANE
MOUNT LEBANON STREET
YALE STREET
111
113
119

Table 1

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards				Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought (WILDFIRE)	H - M - L	S Short L Long O Ongoing
Infrastructural									
Main St. Dam	1	Private - Power Co.	V	damage from ice, debris ✓ assess feas. of microgrid to mit. downstream props. ✓				M	ongoing
Main St. Bridge	2	Public	S					M	Long
Covered Bridge	3	Town	S					L	L
Sewer main/pump sta.	# N/A - throughout town	Town	S/V					M	O
Route 119		State	S		assess feas. ✓ bldg at raising road & reconstruct bridge	✓ and/or town acquire props.		L	O-L
Societal									
Senior center	4	Public/Town	S					L	L
Varnum School	5	Town/Regional	S					L	L
SNMC	6	Priv.	S					L	L
Senior housing	River Rd & Foster St. 7 & 8	State/Fed.	V	develop ✓ create database of contact notifications & contingency plan for evacuation w/senior ctr.				M	S
2 veterinary hosp.	9A + 9B	Priv.	S					L	S
Environmental									
Farms	several throughout town	Private.	S			increase ✓ water holding capacity		L	O
Town Forest	10	public	V				implement/update mgmt. plan ✓	M	O
Ch. 61 lands	several throughout town	Priv.	V				public education of value ✓ & BMPs to mit. for other infra.	L	S
~~Town~~ conservation lands	"	Town, State, land trust	V					L	S
Gulf Brook						Restore orig. stream ✓ flow & remove berms & mill		H	S
Economy									
Gas heating oil Co.	#11	Priv.	S/V	emergency plan/ generator ✓ MOA w/town to ensure pub. safety can continue				H	S
Farms	throughout town	"	S					L	O
Tree removal service	## across town	"	S	emerg. ✓ service agreement ✓				H	S
Pharmacies	12A + B	"	S	✓ access to emer. supplies of prescriptions		✓		H	S
Donelands	13	"	S					L	L
Kimballs Fruit farm	14	"	S					L	L
veterinary hosp.	—	"	S					L	L

TABLE 1

Community Resilience Building Risk Matrix

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Infrastructural									
Public safety communications	15 throughout town	Town	S/V		explore backup sys. redundant / replace/upgrade towers unless relocation			H	O
Scada system	"	"	S/V					H	S
Police + fire facilities	15/16 A&B	"	S	resilient comm. redundant comm. sys.	✓			H	O
Public wells/water sys.	17 A+B+C	"	S/V		✓	see CWC Brook action	water loans	H	S
Sewage Treatment plant + discharge	18	"	S/V				study of covering clarifier	L	L
Societal									
Route 113		Town	S/V				investigate ✓ causing road + culvert replacement	L	L
Town library	19	Town	S	investigate use as shelter →	✓			L	L
airport	20	Private	S/V			in floodplain ✓		L	L
Environmental									
Economy									

#1

Table 1

#Built Environment
Communication
DPW
Police see #1
Fire

The group decided upon categories for assets and plotted them on a matrix board.
In Built environment we listed

		Priority
V	Main St Dam	ongoing M
S	" " Bridge	long M
S	Covered Bridge	long L
S/V	Sewer Main	ongoing H
S	Rte 119	long L
S/V	Public Safety Comm	ongoing H
V	SCADA (sewer)	short H
S	Police & Fire	ongoing H
S/V	Public wells/ water mains	short H
S/V	Sewer treatment	long L
S/V	Rte 113	long L
S/V	Airport	long L

1 #2

Society

S	Senior ctr	Long L
S	VB school	Long L
S	Southern NH Med Ctr	Long L
V	Senior housing	Short M
S 2	Vet hospitals	Short L
S	Libraries	Long L

Environmental

S	Farms	Ongoing L
V	Town forest	" M
V	Ch 61 land	Short L
V	Conservation land	Short L
V	Gulf Brook - beaver	Short H

Economy

S/V	Gas/heating/oil	Short H
S	Farms	Ongoing L
S	Tree Removal	Short H
S	Pharmacies	Short H
S	Doctors	Long L
S	Kimball Trust Farm	Long L
S 2	Vet hosp	Long L

#3

Identified each assets as Vulnerable or Strengths

Mitigation Actions

1. Prevention
2. Property Protection
3. Public Education & Awareness
4. Natural Resource Protection & Green Infrastructure
5. Structural Projects
6. Emergency Services Protection.

Susceptibility / Assets	Severe Winter Storms	Other Inadequacies - Storm flood warning
~~Main St Dam~~		
Main St dam	✓ ice, wind co-ordinate w/ owner	✓ add flood gates to mitigate flooding
Main St Bridge	flood & street downstream flooding	
Covered Bridge		
Sewer Main / Pump Station		
Rte 119 (State owned)		Assess feasibility of elevating road & construct bridge ✓

#4

Susceptibility of Assets	Severe Weather Storms	Other Storms	Inland flood	Temp & Wildfires
Public Safety, Communication	↑	Wireless tech to Assess mitigate new facility		
		replace/wireless		
Sewer System	↓			
police & fire	resilient redundant System	✓ mitigate w/ wireless		
Public wells	✓	✓	✓	✓

can mitigate by shutting well heads down or pumping less
see Golf Book action

Treatment plant	study of covering clarifiers
Rt 113	✓ raising - chg culvert elevation of road

#5

Susceptibility of Assets	Severe Storms	Other Storms	Inland flood	Temp & fires
Library	✓ power outages	✓		

Society

Senior Hsng ✓ power outages ✓
contingencies to aid residents to evacuate. Senior Ctr may have data base of vulnerable residents

Town Forest ✓ Harvest trees ✓ continuing maintenance plan fire roads

Airport could have helicopters assist ✓ ✓ ✓

Ch 61A public educ & awareness forest fires ✓
better mgmt practices

#6

Asset	Winter Storms	Other Storms	Inland Flood	Temps / fire
Gas / heat / oil	✓	✓	✓	
pharmacies	✓	✓	✓	
tree removal	✓	✓		

Gas/heat/oil: memorandum from town to purchase/appropriate gas to run emergency vehicles.

pharmacies: access to emergency supply of prescriptions.

tree removal: contracts to remove

#7

TABLE #1

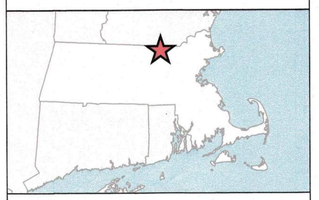
Table 1

Town of Pepperell

LEGEND

- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access; Other Numbered Highway
- Major Road - Collector
- Building Footprint
- Parcels
- Waterbody
- FEMA 100-Year Flood Zone
- Town Boundary

LOCUS MAP



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NOTES

Pepperell, Massachusetts

October 2019

Tighe&Bond
Engineers | Environmental Specialists

P-0671

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TABLE 2

Table 2

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards				Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Bridges	119, 113, Groton St. Hollis St., Mill St	Town / State	V/S	Plowing & sanding	~~Sandbag~~ None	Sandbagging; adjust flashboards; update floodplain bylaw	Inspect expansion joints	M/L	O
Power utilities	Groton St. Lowell St.	Private	V/S	Tree trimming; hazard tree removal; education on proper generator installation	Tree trimming; hazard tree removal	ongoing natural gas pipe replacement to address leaks	Educate homeowners	H	O
Dams	Main St.	Private	V	Monitor ice conditions on river/assess conditions for ice jams	None	address flashboards; regular dam inspections; get AEP from Eagle Creek	Monitor ice conditions	M/L	O
Water facilities	Bemis Br. Rd. Jersey St., Nashua	Town / Private	V/S	Replace water mains to prevent breaks; generator education for private wells	None	Analyze vulnerability of Nashua Rd wells to contamination from flooding	Continues monitoring of well levels, public education on water conservation	M	L
Waste water facilities	Lomer Park	Town	V/S	Runoff management/stormwater BMPs	None	Flood plain analysis on impact to plant.	Monitor for sufficient flow into plant	H	S
Societal									
Schools	Hollis St. (2) Chase Ave.	Town / Private	V/S	Snow removal from roofs. Evaluate design weight loads for roofs.	Structural assessments for vulnerabilities.	None needed	Confirm air conditioning for schools	M	O
Vulnerable Pops/Medically Frag.	Town wide		V	Educate the vulnerable population for preparing for an event of Power management.	Leveraging the CERT program.	→	→	M	O
Child care	Hollis St.	Private	V						
Nursing homes/elderly housing	Main St. River Rd Nason St., Maple, Hollis	Town / Private	V/S	maintaining transportation access & ensure door ways are accessible for emergencies	→	None	Install air conditioning systems	m	S
Food Pantries	Hollis	Private	V/S	generator?	→	None	None	m	S
Environmental									
Major Wetlands and Waterbodies	Town wide	Public / Private	V/S	None	None	Mosquito management	Monitor water quality for toxic algae	m	S
Trails	Nashua River Trail	state	V/S	Manage tree canopy	→	None	None	L	L
Open Space	town wide	Town/Private	S					L	L
Economy									
Major Employers	Lomer Park	Private	V/S	Norman Bros. is a resource for debris removal.	→	Floodplain awareness/education	None	m	S
Supermarkets	Main St.	Private	S						
Pharmacies	Groton St. College St.	Private	S						
oil delivery	Groton St. Leighton St (?)	Private	V?/S						
Farms	Town wide	Private	V/S						
Hardware stores	Main St.	Private	S						
								H.	S

* Add shower facilities at the COA to serve as an additional shelter.

Table 2

Vulnerable Population/
Medically fragile population –

- Perform an exceptional
  Needs survey

TABLE2

Town of Pepperell

LEGEND

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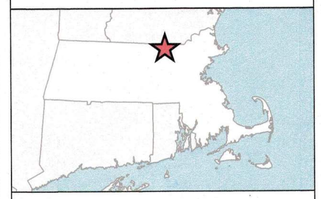

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Pepperell, Massachusetts

October 2019

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Engineers | Environmental Specialists

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TABLE # 3

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards				Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
CULVERTS	T.W.	Town, State	V	Indepth analysis and all + evaluation of all T.W. culverts, engineering, design + construction of most vulnerable culverts; enhanced maintenance (equipment)				H	S, L (analysis - S, L - construction)
Infrastructural									
Route 119, 113, 111 (MAJOR ARTERIES)	1a, 1b, 1c	State + town	V	~~Floodplain~~ Raise 119, Watershed Stormwater Retrofit Assessment		Floodplain Bylaw; Raise 119 - coordinate with MADOT		H	S -
Communications Centre	2	Town	V/S	- evaluate potential design + construct an enhanced safety ~~facility~~ complex			Backup systems	H	L S
WWTP	3	Town	V	analyze engineering evaluation to minimize impact of flooding →				M	O
Schools / Shelters	Nessitt Rd 4A, Varnum Brook 4B	Town	S	~~elect~~ evaluate their capabilities for use in an emergency			- outreach + communication of available resources	M	S
HydroDAM	5	Private	V			Study to assess dam + how to minimize risk,		H	S, L (Private / Federal control?)
Societal									
Elderly Housing	7A, 7B, 7C	Private	V	prepare evacuation plan, to include transportation, shelters, cooling AC				M	S
People w/ Disabilities	Town wide		V						
Churches	8a, 8b, 8c, 8d, 8e	Private	S	public education / outreach - help them to be prepared.				M	S
PATCH	9	Private - Non Profit	S	Communication -				M	S
INFRA. Firestation, DPW	6A	Town	S/V	Town wide safety ~~Cell~~ complex				M	L
Environmental									
Municipal Wells	Bemis 10A, B; Nashoba Rd 10C	Jersey St - 10D, E; Town	V/S	evaluate to minimize risk ~~...~~ to isolate tanks to provide clean water				H	S (together)
Private Wells	Town wide	Private	V	educate, have backup source of water, retrofitting				H	S (together)
Transfer Station	11	Town	V/S	debris management plan				L	S
Conservation ~~Land~~ Lands	T.W.	Town, Private	S/V	land acquisition to mitigate flooding, snow dump property protection.				L	L
Economy									
Supermarket (Donelans, Cumberland Farm)	13A, 13B	Private	S	public education, outreach, engagement				M	S
Gas Stations	15a, b, c	Private	S/V					M	S
Pharmacies	14A 14B	Private	S					N	S
Horse farms / Farms	Town wide	Private	S/V	← Manure management regs, tick + mosquito control, Best management practices				L	S
Medical Centre	16	Private	S	education / community engagement, understanding their capacity				M	S
Funeral Homes	17	Private	S					L	S
Local Contractors	T.W.	Private	S/V	public education, outreach, making certain they have a plan in place				H	S
Lomar Park	18	Private							
Shattuck Oil / Wilson Bros		Private	S/V	- making certain they know they are first responders				M	S

Margin notes:

Fire Station DPW — 6A, 6B, ~~Private~~ Town, S

* infrastructure: Nenco Pond Dam - #12 - Public Study to determine fixes

Table 3

Economy:
Gas station

Urgent Care – Stay put or move to schools to provide

PFS – Public Safety

Landfill / Staging area
Transfer Station

Local contractors (asset)
local economy

Townsend H2O tank street 8th + have clean water

- Flood Zone Bylaw Floodway
- LID Bylaw

Flooding Rte 119 ⇒ Goshen
Flooding Main St
Shelter school
Flooding School bus active (stored w/in flood zone)
Evac
shelter school - cool/ramp
Para grid on Goshen

Table 3 Mitigation Actions

Culverts - we have identified some culverts as vulnerable, need complete evaluation of culverts
- maintenance of culverts

Rte 119, 113, 111 = floodplain bylaw to eliminate, raise Rte. 119 petition State Officials MASS DOT
- watershed study with retrofit evaluation for Rte. 119

- Hoosac Dam - Study to determine fixes
- Communications - cell tower public service Center
  do we need a safety complex

Schools - evaluate their ability in emergencies

Hydro dam - emergency plan

Public Churches + PACH -

Outreach when shelters available

Public Wells - minimize negative impacts

Public/Private wells - backup source (tank on Mason St + Tannery St)

Transfer Station - clean up debris?

Hydro - Private owned but Grants to help?

Town of Pepperell

LEGEND

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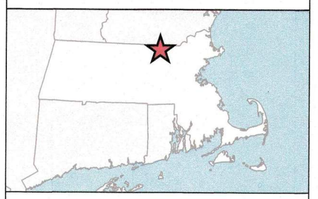

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Table #3

Pepperell, Massachusetts

October 2019

Tighe&Bond
Engineers | Environmental Specialists

TOWNSEND
DUNSTABLE
GROTON
GROTON
SHIRLEY

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P-0671

TABLE # 4

no public transportation other than senior shuttle Bus

** emergency evacuation for livestock in floods

Police St. nasty

Cell Towers

Community Resilience Building Risk Matrix

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Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm Snow/Blizzard Ice	Other Severe Weather WIND	X Inland Flooding Precip/Ice Jam	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Major Routes - 119, 111, 113 *	crossing Town	119 State, others T	V/S	Old Plows need replacing	support DPW w/ brush removal / eq.	Elevate Rt. 119 + Bridges / Dam removal	/ Road washout	H	L
Airport / Helipad	Rt. 111	Private	S	Source of supplies / evacuation - maintain as important asset				L	O
Medical Facility	Rt. 113	Private	S	immediate care - protect access / power				M	O
Town emergency communication RV	911	Town	V/S	generator maintenance - building maintenance			mold - leaky roof	H	L
Power Utilities	varies	NGRID, Private U	V/S	Vulnerability of substation on river; push utility for flood proofing; tree trimming needs to be escalated effort				H	L
Societal									
Elderly Housing Foster	River Rd Mason St	State	V	provide evacuation trans. / adequate sheltering?				H	O
Senior Center / Shelter G	Nashua	Town	S/V	senior center can flood: flood proofing Bldg / No showers / replace generator				H	S/L
Food Pantry	Rt. 111	Town	S	transportation to delivery foods / generator?				H	S/L
Churches & Libraries / Comm Ctr		Town / Private	S	— Historic Site Library / generator for Library	/ Designate as 2nd tier shelter	/ Evaluate to remodel as full Red Cross Shelter		H	S/L
Schools (Shelters) G	Varnum Brook Nissi Hi	Town / R.D.	S					H	S/L
Environmental									
Rail Trail	crosses Town	State	S/V	Not accessible in winter / Purchase snowmobile				M	S/O
Nashua, Nissitissit R	Townwide	N.R.W.A. funds projects	S/V	wild/scenic river / Address private Dam issue / provide public ed on river monitoring W.Q.			& flood risk to abutters	M	O
Wheeler St. sensitive	Wheeler St		S/V	Increase Public awareness of habitat value & role in flood prevention				M	O
Rt 111 sensitive hab	Rt. 111		S/V					M	O
Wetlands / Vernal Pools	Town wide		S/V					M	O
Conservation Lands	varies	Town	S					M	O
Economy									
Banks / True Value	varies	Private / Private	S/V / S					L	O
Donelans Supermarket		Private	S					L	O
Shattuck Oil		Private	V	fuels have leaked	stricter inspection standards as part of annual inspection / licensing			M-H	O
Farms	119		V/S	allow alt. energy	solar WINDFARM **	$ subsidize to address loss ** dealing w/ drought or floods		M-H	O
Lomar Ind. Park		Private	S/V	floods: encourage road maintenance, floodproofing to keep operations active				L	O

* main corridor

Infra Dams & Bridges - town (private) — Covered Bridg - Historical site — private ~~State~~ — V/S — V/S

Dam blocks flow

WWfacility - Rt. 111 — TOWN — V/S
→ Flood mitigation assessment + ps elevate utilities

gas stations on Main St corridor

3 Public wells

Bemis Rd
Jersey St.
Nashua Rd

generators??
elevating elec. utilities

Can also be used as emergency access

Table #4 notes

JM - portable generator for vulnerable town assets if not equipped w/ a generator
  i.e... library
    - cooling center but not a warming center

DS - senior center? generator? but in a flood zone

DS - churches are an asset, communication tool to members who are residents

DS - reverse 911 / communications facility

DN - JM → livestock on farms that are sources of food —
  Lyndell Farm - Heald St
  Clover Luck - Jewett St

DN - our schools are our shelters

4

DN - can funds help us for example cut trees in a vulnerable area to prevent natural disaster

JM - can any funding be used on generators, etc...

Winterstorm weaknesses

1) old fleet of equipment & trucks have to keep up w/ some storms

- ensure electrical supply for wells elevated
- elevating roadways
- bridges may need elevating
- preventative maintenance on town buildings
- flood proof utility areas?

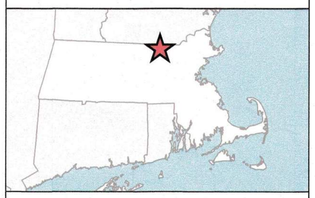
Table 4

Town of Pepperell

LEGEND

- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access; Other Numbered Highway
- Major Road - Collector
- Building Footprint
- Parcels
- Waterbody
- FEMA 100-Year Flood Zone
- Town Boundary

LOCUS MAP



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NOTES

Pepperell, Massachusetts

October 2019

Tighe&Bond
Engineers | Environmental Specialists

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P-0671

Table 4

Town of Pepperell - Zoom In

LEGEND

- Limited Access Highway
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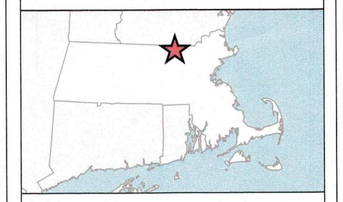
LOCUS MAP



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Feet

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NOTES

Pepperell, Massachusetts

October 2019

Tighe&Bond
Engineers | Environmental Specialists

TABLE 4

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P-0671

Culverts

- in depth analysis & eval
- implement design, permit, const. program

Major Arteries (Rt 119, 113, 111)

- watershed / stormwater assess
- bylaws, update floodplain bylaw
- floodplain
- study on 119 to elevate
- need new plans?

Communications Center

- eval design/const for advanced safety complex - LT
- backups for existing system - ST
- alternative comm, Redundancy

Hydro Dam

- EAP - require them to do it

Municipal & Private Wells

- educate
- backup sources
- isolate tanks to provide clean H_2O
- Reduce impacts from ↑ stormwater - Lawrence St/Gulf Brook Restore Remove Dam

Power Utilities

- tree trimming & lg. dead tree mgmt
- public ed on power use

WWTF

- management / maint
- floodplain adjustment will impact? evaluation

Nursing Homes / Elderly Housing

- plan for AC, evacuation

Major Wetlands

- beavers
- mosquito management

add Shower @ COA

Emergency Mgmt

- Generators for facilities ~~(eg. library)~~
-

~~Elderly Housing~~
- ~~evacuation transportation~~

Schools | Churches | Libraries

- generators
- communication

Farms

- emergency evacuation plan for livestock

~~Public Health~~ Pharmacies
- ~~water + sewer~~ agreement to allow access for energy supplies

Gas Heating & Diff
- agreement w/ private vendor about supplies for highway dep.

Town of Pepperell
MVP/HMP Workshop #2
November 2, 2019

Table of Contents

Meeting Agenda

ATTENDEES: Pepperell Municipal Vulnerability Preparedness Community Resilience Building Workshop

LOCATION: Community Center

DATE: November 2, 2019

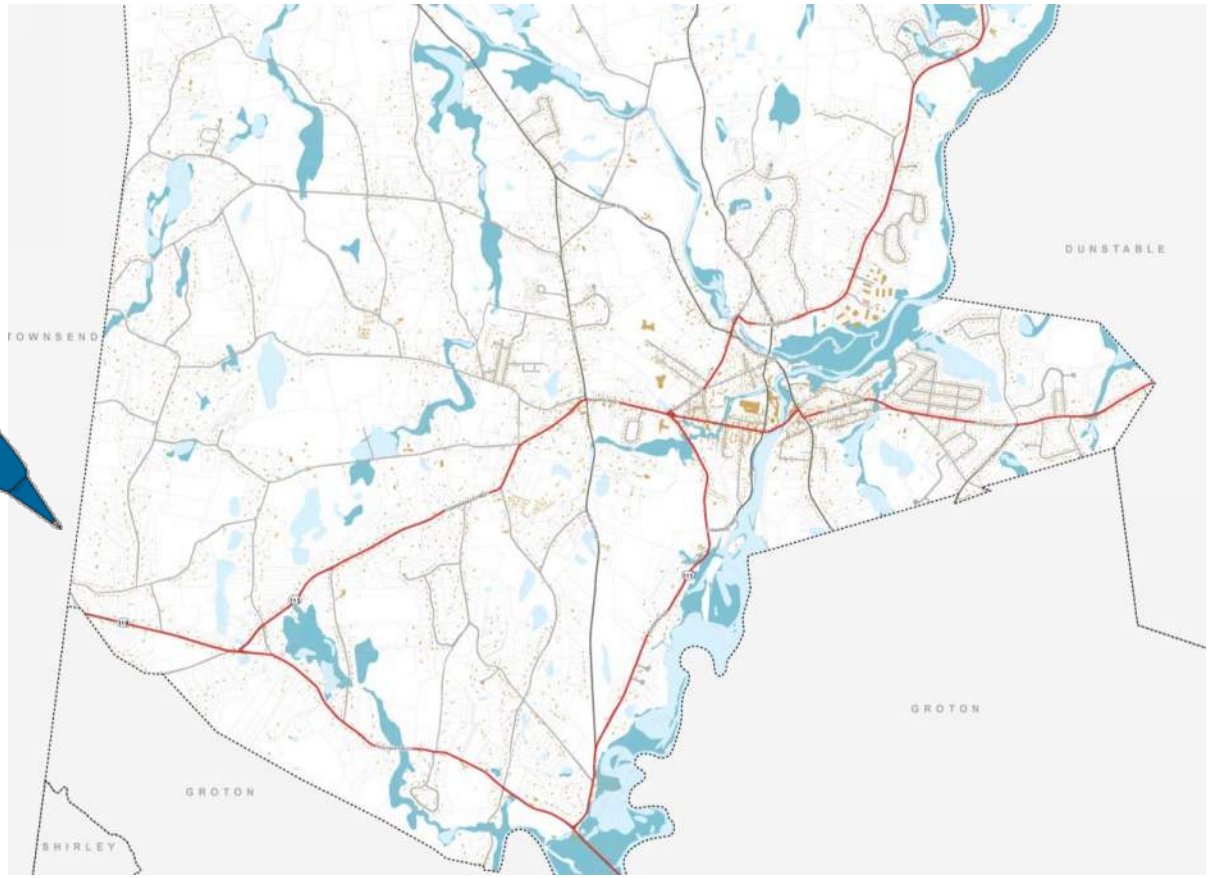
START TIME: 9:00 AM

9:00 AM	Sign in, Refreshments	
9:15 AM	Welcome and Introductions	Town Administrator
9:20 AM	Presentation on Hazards, Climate Change, and Workshop Logistics	Tighe & Bond
9:45 AM	Session 1: Identifying Risk Areas and Community Strengths	Tighe & Bond
10:00 AM	Table Discussion #1: Identifying Risk Areas and Community Strengths	Table groups
10:45 AM	Break	
11:00 AM	Session 2: Mitigation Strategies for Vulnerable Assets	Tighe & Bond
11:10 AM	Table Discussion #2 Identify Actions to Address Vulnerabilities or Protect Strengths	Table groups
11:50 AM	Short Break	
12:00 PM	Session 3: Groups Priortize top 5 to 6 actions	Table groups
12:20 PM	Session 4: Table Groups Report to Full Group	Table groups
12:45 PM	Wrap up and closing remarks	Tighe & Bond & Town
1:00 PM	Adjourn	

PLEASE SIGN IN & MAKE A NAMETAG

Where do you live or work in Pepperell?

Help us by marking it on the map on the table.



Tighe&Bond

TOWN OF PEPPERELL

COMMUNITY RESILIENCE BUILDING WORKSHOP

November 2, 2019

Tighe&Bond

WELCOME & INTRODUCTIONS

Help Pepperell Build Resilience and Preparedness:

- Plan for more frequent and intense weather events
- Improve pre-event planning, response & recovery, and long-term actions
- A prepared and resilient Pepperell will be able to maintain functions, protect its residents and businesses, and be ready for future storm events and a changing climate

A brief thanks to Pepperell's Hazard Mitigation Plan and MVP Core Team

Lisa Davis

David Querze

Beverly Woods

Brynn Montesanti

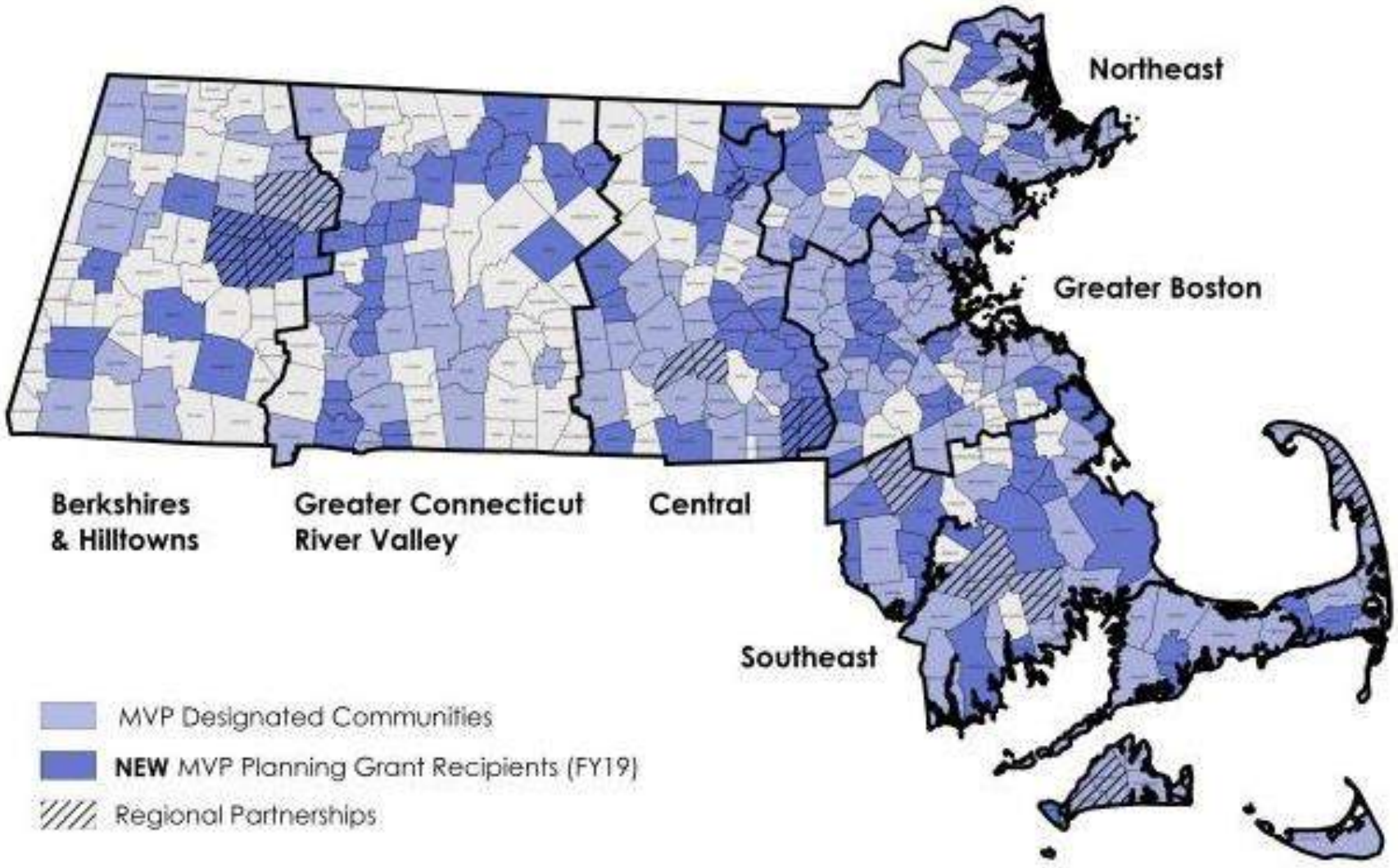
Paula Terrasi

Ken Kalinowski

Andrew MacLean

Kalene Gendron

MVP PLANNING GRANTS



MVP ACTION GRANTS

- Detailed Vulnerability and Risk Assessment*
- Community Outreach and Education
- Local Bylaws, Ordinances, Plans, and Other Management Measures**
- Redesigns and Retrofits***
- Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques
- Nature-Based, Infrastructure and Technology Solutions to Reduce Vulnerability to Extreme Heat and Poor Air Quality

* Most common project type

** Second-most common project type

***Third-most common project type

MVP ACTION GRANTS (CONT)

- Nature-Based Solutions to Reduce Vulnerability to other Climate Change Impacts
- Ecological Restoration and Habitat Management to Increase Resiliency

NEW IN 2019

- Energy Resilience
- Chemical Safety
- Land Acquisition for Resilience
- Subsidized Low-Income Housing Resilience Strategies

\+ Expanded eligibility of project location

BRIEF OVERVIEW OF THE HAZARD MITIGATION and MVP PLANNING PROCESS

1) Define potential risk due to natural hazards including impacts of climate change

2) Identify key community assets and vulnerability to risk

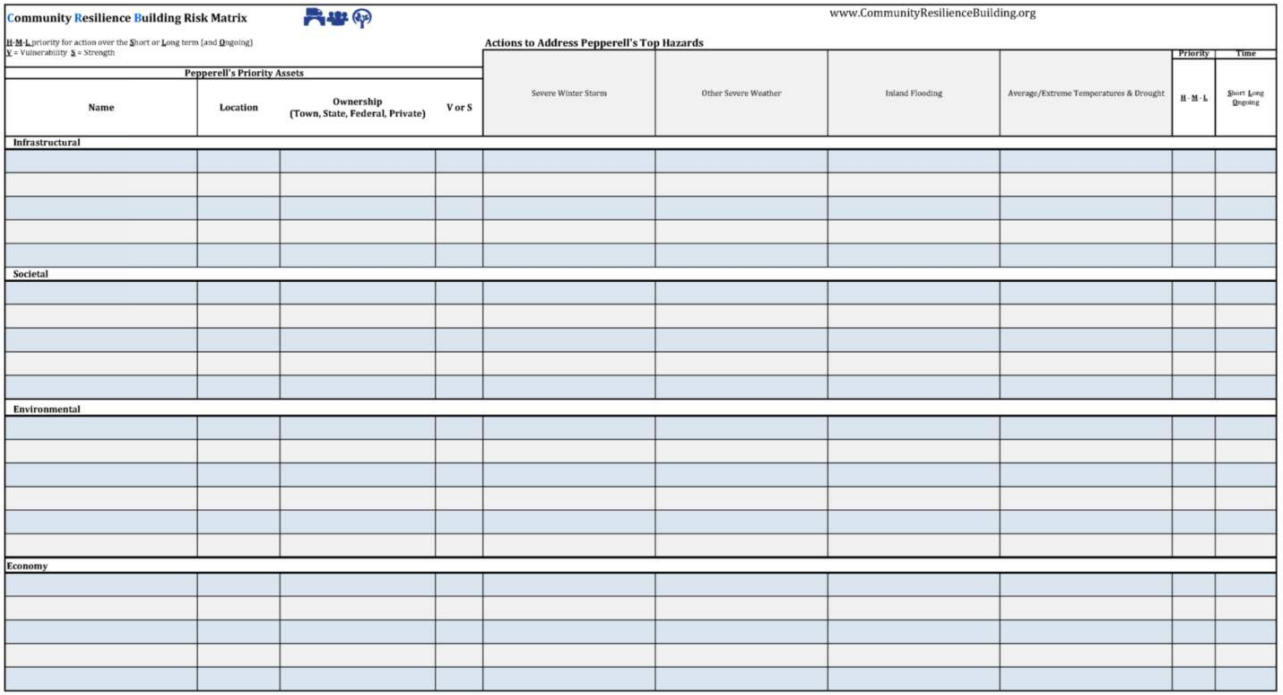
3) Define mitigation projects to improve resiliency

4) Prioritize projects for areas most at risk

WORKSHOP LOGISTICS

- **Three facilitated table-top/group discussions**

- **Fill out matrix**



Community Resilience Building Risk Matrix — www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

- **As a group, we report and prioritize**

NATURAL HAZARD RISK ASSESSMENT

HISTORICAL EVENTS

- **August 1948 Highest Temperature Recorded**
  Temperature of 105 degrees recorded in Pepperell
- **January 1957 Lowest Temperature Recorded**
  Temperature of -29 degrees recorded in Pepperell
- **March 1968 Ice Jam**
  Ice jam on the Nashua River
- **1987 Major Flooding of Nashua River**
  Road closures, school closed
- **July 2002 Thunderstorm Wind**
  Winds recorded over 70 mph
- **March 2010 Nashua River Flooding**
  Flooding of the Nashua River leads to closure of Route 111 and Route 119
- **August 2011 Hurricane Irene**
  Devastating flooding, wind damage
- **October 2011 Halloween Storm**
  Power out for seven days
- **March 2018 Nor'easter**
  Pepperell received 20 inches of snow from a winter nor'easter

WHAT ARE NATURAL HAZARDS?


Inland Flooding


Tsunami


Severe Winter Storm

Blizzards
Snow
Ice Storms


Drought


Average/Extreme Temperatures


Tornadoes


Landslide


Wildfires


Other Severe Weather

Nor'easters
High Wind
Heavy Precipitation
Microbursts


Hurricanes/Tropical Storms


Invasive Species


Earthquake

MASSACHUSETTS CLIMATE PROJECTIONS

By end of century:

Changes in precipitation

- 18% increase in consecutive dry days
- 57% increase in days with > 1 in. rainfall
- 7.3 inches additional annual rainfall

Rising temperatures

- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32* F
- 1,280% increase in 90-degree days/year

Sea level rise

- 4-10.5 feet along the MA coast

Extreme weather

- Increase in frequency and magnitude

CHANGES IN PRECIPITATION

Climate Indicator		Observed Value **1971-2000 Average**	Mid-Century **Projected Change in 2050s**	End of Century **Projected Change in 2090s**
Days with Precipitation > 1"	Annual	7 days	Increase by 10-42% 8-10 more days per year	Increase by 15-55% 8-11 more days per year
	Winter	2 days	Increase by 10-69% 2-3 more days per year	Increase by 25-109% 2-3 more days per year
	Spring	2 days	Increase by 2-46% 2 more days per year	Increase by 11-82% 2-3 more days per year
Total Precipitation	Annual	47 inches	Increase by 2-13% Increase of 1 - 6 inches	Increase by 3-16% Increase of 1.2 - 7.3 inches
	Winter	11.2 inches	Increase by 1-21% Increase of 0.1 - 2.4 inches	Increase by 4-35% Increase of 0.4 - 3.9 inches
Consecutive Dry Days	Summer	12 days	Variable (-1 - +2 days)	Variable (-1 - +3 days)
	Fall	12 days	Increase by 0 - 3 days	Increase by 0 - 3 days

Projected changes in precipitation variables by the middle and end of century based on climate models and the medium and high pathways of future greenhouse gas emissions.

https://resilientma.org/changes/changes-in-precipitation

IMPACTS OF CHANGING PRECIPITATION

- Episodic droughts
- Public drinking water supply
- Flora and fauna
- Agriculture

RISING TEMPERATURES

Nashua Basin		Observed Baseline 1971-2000 (°F)	Projected Change in 2030s (°F)	Mid-Century Projected Change in 2050s (°F)	Projected Change in 2070s (°F)	End of Century Projected Change in 2090s (°F)
Average Temperature	Annual	46.78	+2.20 to +4.44	+2.99 to +6.39	+3.54 to +9.02	+3.90 to +10.95
	Winter	25.2	+2.20 to +5.10	+2.81 to +7.60	+3.65 to +9.22	+3.94 to +10.58
	Spring	44.94	+1.64 to +3.47	+2.51 to +5.53	+2.72 to +7.71	+3.25 to +9.45
	Summer	67.56	+2.24 to +4.55	+3.14 to +7.02	+3.53 to +10.13	+3.98 to +12.60
	Fall	49.01	+2.18 to +5.10	+3.71 to +6.64	+3.58 to +9.54	+4.05 to +11.79
Maximum Temperature	Annual	57.77	+2.06 to +4.26	+2.73 to +6.47	+3.23 to +9.09	+3.55 to +10.95
	Winter	35.13	+1.84 to +4.62	+2.44 to +7.05	+3.02 to +8.41	+3.43 to +9.60
	Spring	56.16	+1.52 to +3.43	+2.35 to +5.51	+2.67 to +7.91	+3.25 to +9.55
	Summer	79.16	+1.97 to +4.68	+2.98 to +7.23	+3.42 to +10.45	+3.87 to +12.93
	Fall	60.19	+2.34 to +4.92	+3.56 to +6.97	+3.45 to +9.79	+3.96 to +12.25
Minimum Temperature	Annual	35.78	+2.33 to +4.78	+3.26 to +6.47	+3.80 to +8.94	+4.24 to +11.00
	Winter	15.26	+2.49 to +5.62	+3.27 to +8.10	+4.23 to +10.02	+4.41 to +11.40
	Spring	33.72	+1.77 to +3.82	+2.66 to +5.92	+2.83 to +7.51	+3.25 to +9.31
	Summer	55.97	+2.46 to +4.60	+3.23 to +7.16	+3.65 to +9.81	+4.12 to +12.27
	Fall	37.83	+1.99 to +5.23	+3.62 to +6.59	+3.68 to +9.27	+4.11 to +11.62

https://resilientma.org/changes/rising-temperatures

IMPACTS OF RISING TEMPERATURES

- Heat and public health
- Agriculture and livestock
- Aquatic and terrestrial habitat
- Energy systems and infrastructure
- Drought and wildfires

EXTREME WEATHER & IMPACTS

Blizzards

- There have been more than 5 in Massachusetts since 2011

Nor'easters and Hurricanes

- Upward trend since the 1970s

- **Public safety**
- **Economy**
- **Property and infrastructure**
- **Natural resources**

https://resilientma.org/changes/extreme-weather

PEPPERELL'S TOP NATURAL HAZARDS

Inventory of Natural Hazards

Type of Natural Hazard	History of Occurrence in Pepperell	Hazard Probability	Hazard Frequency	Geographic Extent	Severity of Impact	Hazard Risk Ranking
Hydrological Hazards						
Inland Flooding	Yes	3	3	2	3	11
Coastal Flooding	No	0	0	0	0	N/A
Drought	Yes	3	3	2	2	10
Atmospheric Hazards						
Extreme Temperature	Yes	3	3	3	1	10
Hurricanes / Tropical Storms	Yes	2	2	3	2	9
Other Severe Weather	Yes	3	3	3	1	10
Severe Winter Storm	Yes	3	3	3	2	11
Tornadoes	No	1	0	1	3	5
Microburst	Yes	3	3	1	1	8
Geological Hazards						
Coastal Erosion	No	0	0	0	0	N/A
Earthquake	Yes	1	0	3	3	7
Landslide	No	1	0	1	1	3
Tsunami	No	0	0	0	0	N/A
Other Hazards						
Wildfires	Yes	3	1	1	1	6
Invasive Species	Yes	4	3	2	1	10

ASSESSMENT METHOD

Definitions

Points		Description
Hazard Probability (Possible occurrence in the future)		
1	Unlikely	Less than a 1% probability over the next 100 years
2	Possible	1-10% probability in the next year or at least one chance in the next 100 years
3	Likely	10-100% probability in the next year or at least one chance in the next 10 years
4	Highly Likely	Near 100% probability in the next year
Hazard Frequency		
0	Very Low	Events that occur less frequently than once in 1,000 years (less than 0.1% per year).
1	Low	Events that occur from once in 100 years to once in 1,000 years (0.1% - 1% per year).
2	Medium	Events that occur from once in 10 years to once in 100 years (1% - 10% per year).
3	High	Events that occur more frequently than once in 10 years (greater than 10% per year).
Geographical Extent (Area Impacted by a Given Natural Hazard)		
1	Small	Less than 10% of the Town affected
2	Medium	10-50% of the Town affected
3	Large	More than 50% of the Town affected
Severity of Impact from Hazard		
1	Minor	Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e. one or two communities); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
2	Serious	Scattered major property damage (more than 10% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services briefly interrupted up to 1 day; some minor injuries.
3	Extensive	Consistent major property damage (more than 25%); major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and possible fatalities.
4	Catastrophic	Property and public infrastructure destroyed (more than 50%); essential services stopped for 30 days or more, multiple injuries and fatalities.

PEPPERELL'S TOP NATURAL HAZARDS

SEVERE WINTER STORMS

OTHER SEVERE WEATHER

INLAND FLOODING

DROUGHT & EXTREME TEMPERATURE

+ **CLIMATE CHANGE**

=

AMPLIFIED RISKS

- Community and regional infrastructure
- Local and regional economies
- Public Health
- Natural resources and our environment

Tighe&Bond

Session #1

Identify Risk Areas and Community Strengths

9:45 AM

Tighe&Bond

DISCUSSION AT TABLE

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
								Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

WHAT ARE COMMUNITY ASSETS?

Built Environment: Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.

Economy: Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.

People: Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.

Natural Environment: Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.

EXAMPLES OF VULNERABILITIES & STRENGTHS

Vulnerabilities

- Main road floods during storms, blocking emergency response.
- Power outages during heat waves lead to health concerns.
- Sewer pump stations become submerged and inoperable
- Senior housing without back-up generators during heat waves.
- Residents without access transportation during hurricane evacuation.
- Limited areas of refuge in schools during tornados.

Strengths

- Critical road elevated and passable by emergency management.
- Hardened utility lines reduce outages due to ice storms.
- Undersized culvert replaced to reduce flooding in key intersection.
- Improvement to communication systems during extreme weather.
- Private businesses provide services aligned with emergency operations.
- Floodplains provide stormwater storage and downstream flood reduction.

Session #2

Identify Actions to Address Vulnerabilities and Protect Strengths

11:00 AM

DISCUSSION AT TABLE

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
								Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

TYPES OF MITIGATION ACTIONS

1. Prevention
2. Property Protection
3. Public Education and Awareness
4. Natural Resource Protection and Green Infrastructure (nature-based solutions)
5. Structural Projects
6. Emergency Services Protection

Session #3

Table Groups Prioritization

12:00 PM

DISCUSSION AT TABLE

Select Top 5 to 6

www.CommunityResilienceBuilding.org

Actions to Address Pepperell's Top Hazards

	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H - M - L	Time Short Long Ongoing
Societal									
Environmental									
Economy									

Tighe&Bond

WHEN PRIORITIZING, CONSIDER…

- Funding availability and terms
- Consensuses in community for project
- Needed to advancing longer-term outcomes (e.g. phase of a project)
- Does it contribute towards meeting local and regional planning objectives

Session #4

Table Groups report out to Full Group

12:20 PM

REPORT TO LARGE GROUP & RANK

Community Resilience Building Risk Matrix www.CommunityRe

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flood			
Infrastructural									
Societal									
Environmental									
Economy									

Tighe&Bond

NEXT STEPS

- Prepare MVP/HMP Report
- Become a certified Municipal Vulnerability Preparedness Community
- Maintain MVP status with annual progress updates to State (combined with Hazard Mitigation Planning update)
- Eligible for MVP action grant funding

Community Asset Categories

1. **Built Environment**: Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or for critical facilities to operate.
    a. Bridges
    b. Communication utilities (e.g., cell towers)
    c. Power utilities (e.g., gas pipeline, power plant, etc.)
    d. All town-owned buildings/facilities, including police, fire, IT, etc.
    e. Dams (public and private)
    f. Medical facilities (e.g., urgent care, etc.)
    g. Funeral homes
    h. Post offices
    i. Water facilities
    j. Wastewater facilities
    k. Transportation (e.g., local or regional bus stations, etc.)
    l. Railroad
    m. Gas stations

2. **Economy**: Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.
    a. Major employers
    b. Supermarkets
    c. Pharmacies
    d. Towing services
    e. Hardware stores
    f. Oil delivery services
    g. Tree removal services
    h. Construction companies
    i. Farms

3. **People**: Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.
    a. Schools
    b. Vulnerable populations, environmental justice area
    c. Churches
    d. Child care
    e. Food pantries
    f. Historic sites
    g. Special needs schools
    h. Nursing homes/elderly housing/elderly care
    i. Community centers
    j. Libraries
    k. Cemeteries
    l. Affordable housing
    m. Shelters

4. **Natural Environment**: Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.
    a. Open space
    b. Major wetlands and waterbodies
    c. Vernal pools
    d. Trails
    e. Habitat

Town of Pepperell
Municipal Vulnerability and Preparedness Stakeholder Workshop
November 2, 2019
9:00 am – 1:00 PM

Name	Affiliation	Contact Information – Email or Phone
Renee D'Argento	Master Planning Adv. Com. Climate Working Grp	978-807-3875 rdargento01463@yahoo.com
Ken Hartlage		khartlage@mac.com
Tony Beattie	Robinwood Farm	975-877-7545
Jim Scandalis	MASHARD	978-495-0480
Wm Van Leeuwen		978-433-6031
Caitlin Andrus	NMCOG	978-454-8021
Charles P Walkovich	Planning Board	cwalkovich@GMail.com 508-771-2137
Bruce McHugh	Planning Board	rmchugh@pepperellma.us
Casey Compelli	Planning Board Historical Comm.	412-689-3710
Rob Pond	Cons. Comm	978 433 5842
Beth Faxon	Resident	978 697 1556

Town of Pepperell
Municipal Vulnerability and Preparedness Stakeholder Workshop
November 2, 2019
9:00 am – 1:00 PM

Name	Affiliation	Contact Information – Email or Phone
Gabrielle Belot	Tighe & Bond	gbelfit@tighebond.com
Laurie Mosiello	MASY	Laurie.Mosiello@masy.com
John Mosiello	MASY	John.Mosiello@masy.com
DAVID WALSH	WALSH BROS.	978 621 9976
Andrew MacLean	Town of Pepperell	

Town of Pepperell

Where do you live or work?

Nov 2, 2019

TOWNSEND

DUNSTABLE

GROTON

SHIRLEY

Police Station
Fire Station
Town or City Hall
Department of Public Works
School
Animal Shelter/Veterinary Facility
Bridge
Child Care Facility
Elderly Housing
Power Generating Plant
Power Substation
Public Health Office
Communication Tower
Wastewater Treatment Plant
Water Pumping Station
Water Storage Tank
Water Treatment Plant

FEMA 100-Year Flood Zone
High Hazard
Significant Hazard
Low Hazard
N/A
Public Water Supplies
Trail
Waterbody

MassDOT Roads
Limited Access Highway
Multi-Lane Highway, NOT Limited Access; Other Numbered Highway
Major Road - Collector

Open Space Parcels
Town Land, Permanently Protected
Town Land, Unprotected
State Land, Permanently Protected
Land Trust, Permanently Protected
Agricultural Preservation Restriction (APR)
Conservation Restriction (CR)
Land Under Chapter 61, 61A, or 61B

LOCUS MAP

0 1,250 2,500
Feet

1:15,000

NOTES

Pepperell, Massachusetts

November 2019

Tighe&Bond
Engineers | Environmental Specialists

G:\GIS\MA\Pepperell\Pepperell_MVP_Map_24x36.mxd Date Saved: 11/1/2019 User: jsm

P-0671

Table 1

To Pepperell a Regional evacuation center

Electrical resiliency: micro grid would benefit sustaining power for Utilities + Town Buildings, Shelters etc.

– Study of Feasibility & Benefits vs Private Generators

H-S

General Public - Emergency Management Protocol. what to do, where to get help. in event of natural disaster

Sign up Reverse 911

Town Hall

Police/ Fire

see more below

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Bridges - Nashua R - Town; Nissitissit R (Hollis) - State			V/S			Rt 119 - Study on Condition & Improvements		H	L
" - Nashua			V/S						
Emergency Services (in shelter)	Main St.	Town	V/S	Feasibility & Design for New Public Safety Complex – phase 1				H	S
~~(Lomar Park)~~ WWTPs DPW	Lomar Rd	Town/Private	V/S	WWTP ~~Resiliency~~ Improvements - ROAD Access study				M	S
Private & Public Water	3 wells 50% private	Town/Private	V/S	Public = Resiliency Improvements; sustainable water supply; Wellhead plans; Water System Master Plan; Zoning & overall Micro Grid to sustain utilities				M	S
Societal				study; Floodproofing		[Zoning & bylaw updates – private]			
Senior Center	10 Main St	Town	V/S	Floodproofing Bldg – generation				H	S
Elderly Housing	varies	Private/Public	V	Preparedness education, evacuation transportation, generators					
Schools/Shelter**	varies	Town	S	~~Generator~~ upgrades - Overall Shelter Management Plan				Emergency Preparedness	
Library	Main St	Town	S	Generator, evaluate efficacy as PS OR 2nd tier PS				Plan & Shelter Assessment	
Historic Places	varies	Town / Private	V/S	Inventory & BC guidelines Development following NFIP guidelines					
Environmental									
Nashua & Merrimack floodplains –	storage habitats – aquifer		S	WQ study 36 sources to control from septics public education. update BOH regs + inspections				H	O
Sensitive habitats	varies		S/V	invasive species removal: conditions survey: public education				Priority Lands Aquisition Buy Lands	
Farms + Open Space	varies	Town / Private	S/V	purchase lands in floodplain & open space / zoning bylaws to maintain OS					
Forest + Woodland	varies	Town / State	S/V	~~monitoring~~ ~~invasives~~ dev. forest management plans for resiliency					
Recharge from Septics	varies	Private	S/V	Benefit to recharge / treatment to pollute floodplains/aquifer CWMP					
Trail Systems	varies	Town / State	S						
Economy									
Farms	varies	Private	S	ask DEP for ground water; More incentives to grow ~~Farmers Market~~	Plan Regional storage + distribution	Food Hub – Equity issue to seniors & WIC (Schools		H - O	
Trails + ~~recreation~~ recreation trails	varies	Town	S	Look for local sites to restore & remove invasives				M	O
Rail road Square	E. Pepperell (east Main)		S/V	plant trees for shade (cooling as				M	S
Main St. Business	Main St	Private	S	(Utility Resilience Grant) Target PE to business owner about utility resiliency & staying open & safe in a storm					S/L
Lomar Park + Mill St. Ind Park		Private							

Trail Hub

* WWTP
Cable
Cell Town
DPW
Senior Center

** Culverts

*** Jersey St. Fire Station Park Assex –

** Map 6 St Fallout Shelter

*** Loss of transportation corridors – need more Plows
impact everything in Pepperell
complete streets ensure "access"

(D TABLE 1

— fill out Complete Sts survey

Advisory team - Jim, Tony,

Core Team: core team: Ken, Kaline, Andrew, David Querze, Paula, Lisa Davis, Beverly Woods, Brynn Montesanti.

Inventory people, places, hyhast. impacted by weather -

report presented to Comm'ty - get add'l comments -
End in late winter -
& Spring 2020.

Nature based solutions.

IUMC06 - regional hazard mitigation plan - will be updating Pepperell's piece

S/W - Hazards (2) TABLE 1

Societal

~~Sr. Ctr~~. affordable Hsg on Canal St - exposed to flooding

Babcock Village - risk of isolation, being cut off from services

Asset. — library; cooling; generator; social ctr.

Vulnerable ~~Sr~~. pop: Clark's off of 111

Schools as shelters.

60x120 — Fallout shelter size

Environmental

Nashua/Nissitissit - stores flood H_2O; vulnerable to contamination

protection of aquifers — strength + vulnerable —

flora/fauna: both strength + vulnerable.

Farms - open spaces —

forests/woodlands - carbon capture -

private septic systems.

Trail systems.

S/W Hazards (3) TABLE 1

Infrastructure:

- Covered bridge: historic but also transportation nexus - alternate route if others are closed - wld end up being a critical route -
- Mill Street bridge -
- Hollis St bridge

Multiple vulnerable bridges to flooding on the Nashua & ~~Mississ~~ Missisquoi

- 113 Main St.
- 119

Critical circulation in all directions - n. to N. H; E ↔ W

Municipal emergency services
Shattuck School - police

sewer treatment plant -
proximity to Nashua River -
cell tower; cable -
} Lomar Park.

Jersey St. Fire Station -
Town Hall

S/W (4) TABLE 1

Sr. Ctr — cooling center; Meals on Wheels; shelter. w/in the 100 yr flood plain.

wells water:

Jersey St. well is in service

Washua River well: toxic dirt. — affects S. New Hampshire

potential for dams/bridge, going out tromps road infrastructure —

water supply absolutely critical 50% of town is on private H_2O.

Bemus well is being upgraded — 8½ million for manganese/iron. Shut down now.

societal

S|W Hazards. (5) TABLE 1

Economy

RR St – biggest concentration of economy – right next to river

Rivers – trails/recreation – eco-tourism as impo to the town.

Main St. businesses – historic bldgs. –

highly vulnerable to loss of transportation

Mitigation (6) TABLE 1

- need study About town's water capacity (wells) WATER System masterplan — private + public.
  - bylaw that protects private wells as well as public. master plan - current + future water (MASS DEP/Sustainable water initiative)

- Septic systems + ground water re-charge in flood plain areas. improve regulations + inspection practices - not part of MVP plan.

- purchase more open spaces - especially in sensitive ecosystem areas.

- forest management — rare eco habitats. sensitive habitats that old be experiencing invasive species — remove them.

Farming: plan for regional food storage + distribution.

Mitigation (7) TABLE 1

Strategies.

— $ FEMA grants — cld be down the road as part of hazard mitigation program.

Protect bridges + dams:

— ~~do we need~~ 11A is the most vulnerable; need engineering study.

— loss of transportation corridors & severe weather — need more plows + street clearing/ maintenance equipment

— need ~~here~~ feasibility + design study for public safety complex

— need infrastructure + road access study for Lamar Park as public/private venture

— electrical resiliency for all town operations, senior center, for all town bldgs + operations. — need a study for that.

— Zoning study to protect public water supplies.

Mitigation (8) TABLE 1

Strategies:

— SR. Ctr (flooding + power Risk) flood proofing the Bldg.

— all designated shelters must have generators

— for private homeowners we need public education about emergency mngmt protocols; available state resources.

— need town plan for ex: Emergency response (reverse 911 on cell phone)

— identify 1 or more of town bldgs that come up to standard best practices. Pepperell cld be major evacuation center? Are we now? Are we regional? Fallout Shelter (1962)

— do not have local historic district. Under nat'l flood insurance program diff. set of requirements to receive $ — adapt Building Code for Pepperell to restore historic bldgs after weather disaster.

Mitigation (9) TABLE 1

farmer's water use in drought periods —.

SRs access to affordable food is an equity issue and part of the Food Hub idea as a regional storage + distribution system for farmers —

also speaks to school nutrition.

target info to business owners. about utility resilience.

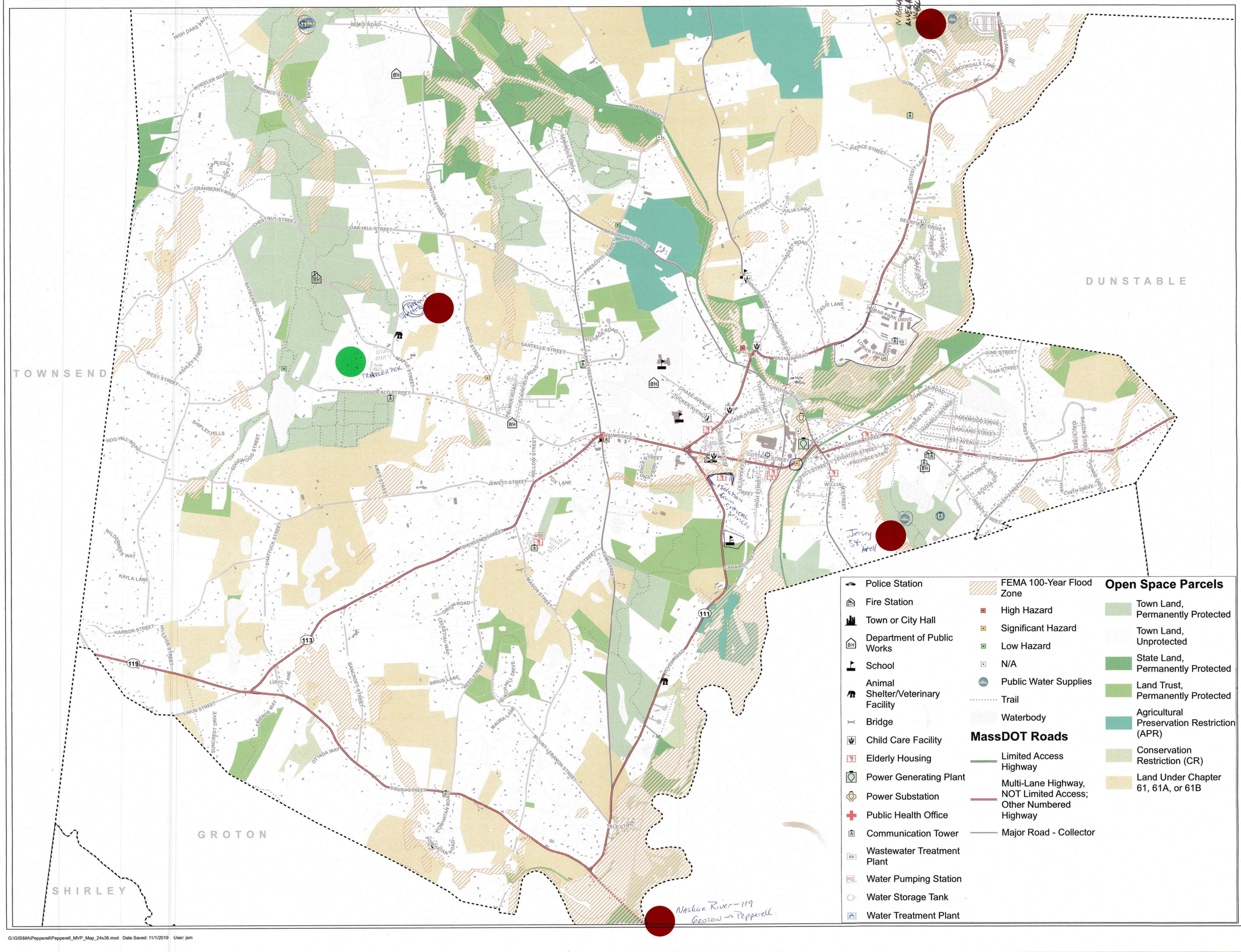
(10)

Key

bc = because
wld = would
w/in = within

Town of Pepperell

Table 1



LOCUS MAP

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Feet

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NOTES

Pepperell, Massachusetts

November 2019

Tighe&Bond
Engineers | Environmental Specialists

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Town of Pepperell

Table 1

DUNSTABLE

Police Station
Fire Station
Town or City Hall
Department of Public Works
School
Animal Shelter/Veterinary Facility
Bridge
Child Care Facility
Elderly Housing
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Power Substation
Public Health Office
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Conservation Restriction (CR)
Land Under Chapter 61, 61A, or 61B

Infrastructure

Environmental (not noted-varies) Townwide

Societal

Economy

LOCUS MAP

N W E S

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NOTES

Pepperell, Massachusetts

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Engineers | Environmental Specialists

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Table 2

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Actions to Address Pepperell's Top Hazards

Pepperell's Priority Assets				Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S					H - M - L	Short Long Ongoing
Infrastructural									
Dams	Heath St Sartelle, Main St	Public private	V			study of dam removal or improve		H/M	S
WWTP + pump stations	3 across town	town	S/V	study of improved resiliency of WWTP and/or expansion to serve addtl users				L	Long-term
Public + priv. wells + water plant	three major wells throughout town	pub./priv.	S/V	investigate more distributed power incl. renewable energy for renewable energy trials.	-study of siting			H	S
Power grid	throughout - outside town by Eversource	priv.	"	↑ Time ↑	study of impacts of climate change on water supply quantity + qual.			H	S
Bridges + major arteries	Main St. Rt. 119	State/town	"	structural analysis of bridges + flooding	impacts/remediation of major roadways			H	S
Societal Culverts	Town-wide			capacity anal. to address climate change				H	S
RV/Trailer	throughout town	priv.	V	survey of pop. on wells? +	emergency response plan w/NGOS shelter capacity w/community input			H	S
elders/disability/low-income	"	N/A	V	"	"			H	S
school-aged children	Women Mass.	"	V	"	"			H	S
emer. shelters			S/V	power redundancies for shelters				H	S
Environmental									
Nashua + Nissitissit Rivers	on map	Pub. + priv. lands abutting	S/V	land acquisition + best practices for review + up date aquifer prot. by law + pub. education on BMPs;	education for on land management in light of climate chg.			H	S
well contributing areas	mapped areas	Pub./priv.	V					M	S
Wet. + prop.	across town	priv.	S/V	permanent protection	-munic. training for enforcement BMPs			H	S
properties w/in flood plain	Rt. 119 corridor	Pub/priv.	V		by law revs/ords to address floodplain devel.			H	S/O
forested land (CR)	throughout town	"	S/V	acquisition + BMPs	land acquisition - study of policy, land + impact on wat. resources (incl. species)		state-listed spec.	H	S/O
						invasive species removal	apply for grant prog.		
Economy									
Shattuck oil	Groton St.	priv.	V/S	MOU to allocate resources	munic. user services			M	S
Wilson Auto	Nashua St.	"	V/S					M	S
Farms	across town	pub. + priv.	S/V	develop best practices for land mgmt. to address climate chg. + education				M	L
supermarkets/food security	Main St.	priv.	S/V	coordinate efforts of NGOs (Patch + other NGOs)			for emer. food + medicines - emer. response network	H	S
pharmacies	Main St. Lowell + Groton	"	S/V					H	S
sky-diving park			S						

11/2 Workshop - Table 2

~~NTSS~~

- Infrastructure
  Bridges - town would set shut off
  DAMS -
- Societal -
  - schools vs. school age pop
  elderly / senior housing
- environmental

Nashua & Nashua River

WRPD -

open space parcels

Flood Plain

- fuel companies - fuel depot

1

fuel storage –
Shattuck
~~Oil~~ Nillson Bros

-environmental –
forested lands ?

-cell service spotty only
1 internet provide

Farms – 1600 acres
in ag production
39 families farm

Supermarket – only
1 in town –
food insecurity

-streams are private
land acquisition
stormwater – none

flen flooding:

- stormwater impacts on species - natural resources + habitats

- study + analyze floodplains + current impacts on natural resources including endangered species

- power supply - distributed power sources -

identify alternative feasibility for sitting renewable

culverts - study of
vulnerability
water supply -
emergency response
plan.
land manag.
state program - how
how
do you manage your
forest + agricultural
lands - best practices
"feasibility
revisit weed day
districts
enforcement plan -
training -

non profit groups
community based orgn
are resources that can
be pulled together -
Study. emergency mgmt
& plan -

emergency management
plan needs to include
non profits. how do
we make them successful

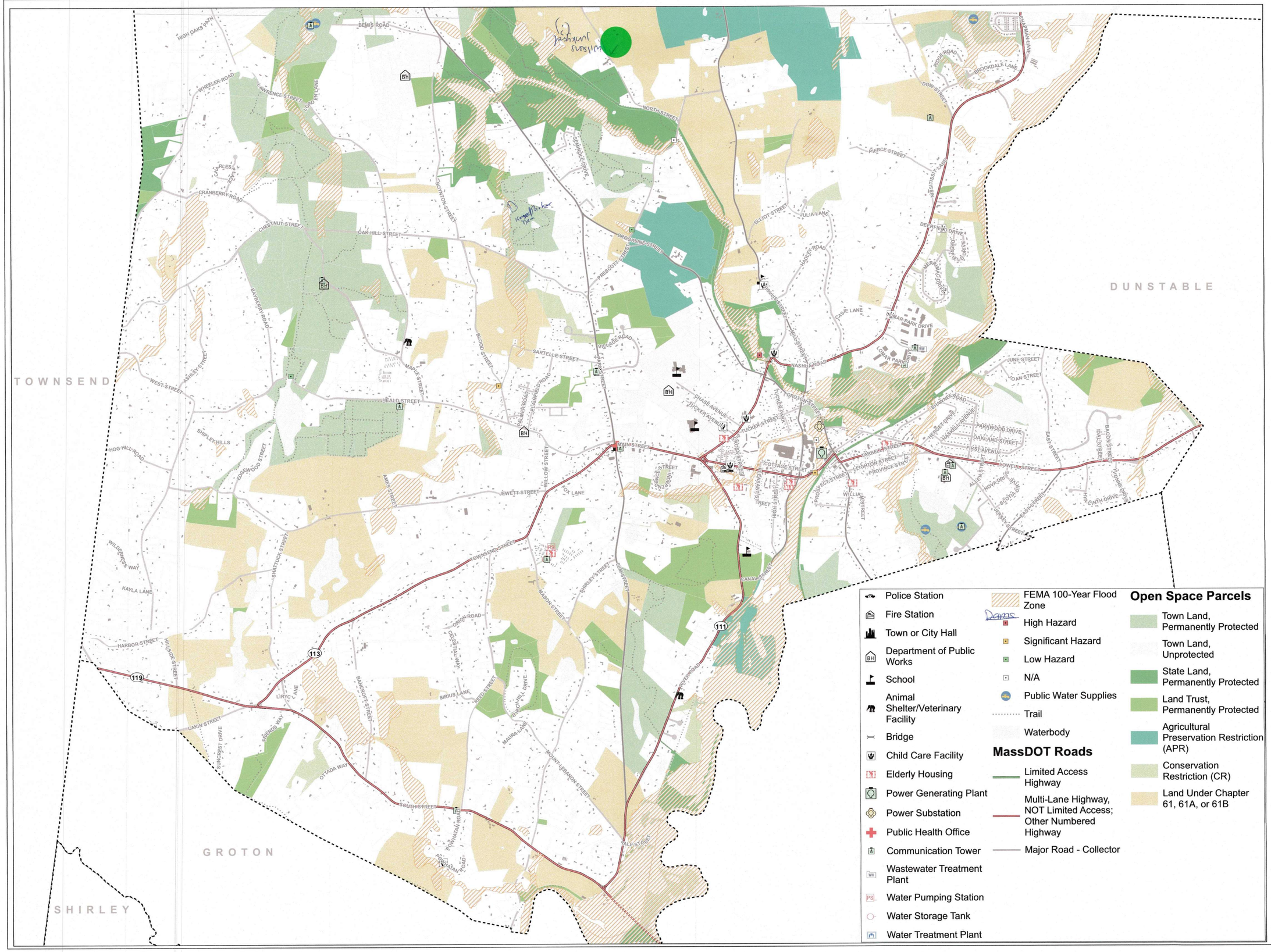
action items - studies
are short term but
implementation is
long term & ongoing

vulnerable population - high priority

top 5

1. - emergency management plan for vulnerable populations + critical infrastructure
2. culverts for properties within flood plain
3. land acquisition
4. zoning by law revisions
5. Major Arteries - 119 111 113 (Bridges) FLOODING

Town of Pepperell



LOCUS MAP

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NOTES

Table 2

Pepperell, Massachusetts

November 2019

Tighe&Bond
Engineers | Environmental Specialists

- Police Station
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- Water Pumping Station
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- Water Treatment Plant
- FEMA 100-Year Flood Zone
- Dams
  - High Hazard
  - Significant Hazard
  - Low Hazard
  - N/A
- Public Water Supplies
- Trail
- Waterbody

MassDOT Roads

- Limited Access Highway
- Multi-Lane Highway, NOT Limited Access; Other Numbered Highway
- Major Road - Collector

Open Space Parcels

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November 2019

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Table 3

+ watershed eval + retrofits

+ SW bylaw

+ Risk Assessment
Inventory of Seniors + Vulnerabilities H

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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Pepperell's Priority Assets: Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H - M - L	Time Short Long Ongoing
1 cell towers (Centre)			V/S	1 ✓	✓	~	X		
2 Communication Centre (V/S)			V/S	2 B ✓	✓	~	X		
3 119 Bridge			V/S	3 ✗ trees (storm damage)	+ (power loss)	Townwide culverts			
4 Main St Bridge			V/S	4 ✗		✓ + inventory & assess	+ Mitigation		
5 Rte 119/113/111			V/S	5			- Flood Plain Bylaw		
Infrastructural			V/S				- Stormwater Bylaw, Management		
6 Water/wastewater (Private 6, Public, H2O)				6 ✓ B	✓	✓ (culvert)	✓ ~~- Emergency inventory + action planning (public municipal + private)~~		
7 Fire Dept (both sides of river)		Town	S	7 ✗ B	✗	✗	✗		
8 Airport (private)			S/V	8		✓	- Town-wide culvert/bridge eval.	H	
9 Fuel Facilities (Shattuck Oil, Gas station near River)		Private	S/V	9 B		✓ ? (already mitigated?)			
10 Bank				10 ✓ B	✓		- Get facilities + ind. generator ready	H	S
11 Generators			S	11					
13 hydro dam		Private	✓	12 ●	✓	✓			
14 urgent care		private	V/S	13 B ✓	✓				
15 pharmacy		private	S	14 B ✓	✓				
16 **Societal** Bridges/roads/culverts			V/S	15 ✓	✓	✓	* Education/Communication Plan (H)		H/O
Senior living (Babbitasset, Brown, Pepperell Meadows)		town/state	V	16 B ✓	✓	✓	* Inventory, Action Plan; Regionalization plan		
Schools			S	B ✓	✓				
Churches			S	B					
child care centers			S	B ✓	✓				
Funeral Homes			S	B					
Environmental									
Open space			S/L, S/L	✓	✓	✓ open space protection on rivers through zoning & purchase	✓		
rivers			V			✓ "	✓		
Fire (forest) heavily forested			S				✓		
Trails (access)			S						
Nashua River Rail Trail (plow)									
Economy									
Lomar Park		private	S/V	B ✓	✓	✓			
Tree Removal / heavy equip op.		private	S	✓	✓	✓			
~~restaurant~~			S	inventory of stores / supplies, communication plan for emergency situation →	✓				
oil delivery			S/V	B					
FARMs/~~rest~~/grocery			S/V	✓	✓	✓	✓ ~~monitor~~		

*Applies to multiple

B. Generator - ready

table 3 (1)

MVP - Municipal Vulnerability Preparedness
DoE grant - 79 cities + towns

Sustainability - core value

identifying inventory + resources impacted by climate changes

Jennie
Sharon
Gabrielle

Complete streets → Share w/ Lamar

MVP - action grants $10 M funds

4 Steps →

Key strengths + assets

4 top hazards
- Extreme temps + drought
- Severe weather
- Severe winter storms
- Inland flooding

} + climate change-amplified risks

(2)

vunerabilities + strengths

fuel - diesel / oil / gas
generators - plan
dam is vulnerable
Babitassit village - near river
urgent care + doctors office + pharmacy
supermarkets + restaurant
2 bridges bisect town
119 bridge floods
trees down - block roads
communications center + cell towers
cable company - communications
banks - cash ⇒ credit cards don't work w/ no power
people - need individual plans
AED / CPR trained people
Grotton St substation electricity
boats - canoes - ATVs - off roads
airports
floodplains - how river has changed
rivers - Gneff ~~Stream~~ Brook - perennial stream
wild fires - wheeler / Lawrence / head pond areas
back lots, limited access
rail trails - access
hiking trails ⇒ throughout town

37
farms - flooding
cultural monuments / covered bridge
wells - Bemis, 2 Jersey, Nashua Rd

(3)

threats most likely
extreme winter + flood
(summer drought less effect)
fire dept on both side of river - asset!
oil facilities - shattuck oil
Council 5+ Main St. Banks - local staff
severe weather issue - power outages

Seniors →
Babitasit Village
Pepperell Meadows
Tarbell Dunhauses (over 55)
police/emergency services issued 'cards'
for seniors to complete w/ health issues/
vulnerabilities that need help

better communication plan
fill bathtub w/ water
help people to help themselves - before

marked flooding areas in town
do culverts need to be fixed?
communication plan - how to test and hand
service your generators + gas on hand

facilities round tables
to share emergency preparedness tips
services people - technicians
to solve mechanical/electrical issues
prepare electrical connections for generators
for town facilities, businesses, homes
store water for emergencies
have containers for water to fill up
plan for generators for key facilities
Churches - large empty spaces
some have kitchen facilities
network of volunteers + skilled people
'Sister Community' to offer aid, not from
an area that is also affected
Pepperell - aging population
evaluate flooding + bridge + culvert issues
storm water bylaws
fuel emergency access
promote self sufficiency - education

(1)

Ongoing, short term, long term

Education + Communication plan
Resiliencies / maintenance
facilities generator ready + individuals
storm water bylaw, Culverts + bridges evaluation
storm water management
flood plain bylaw

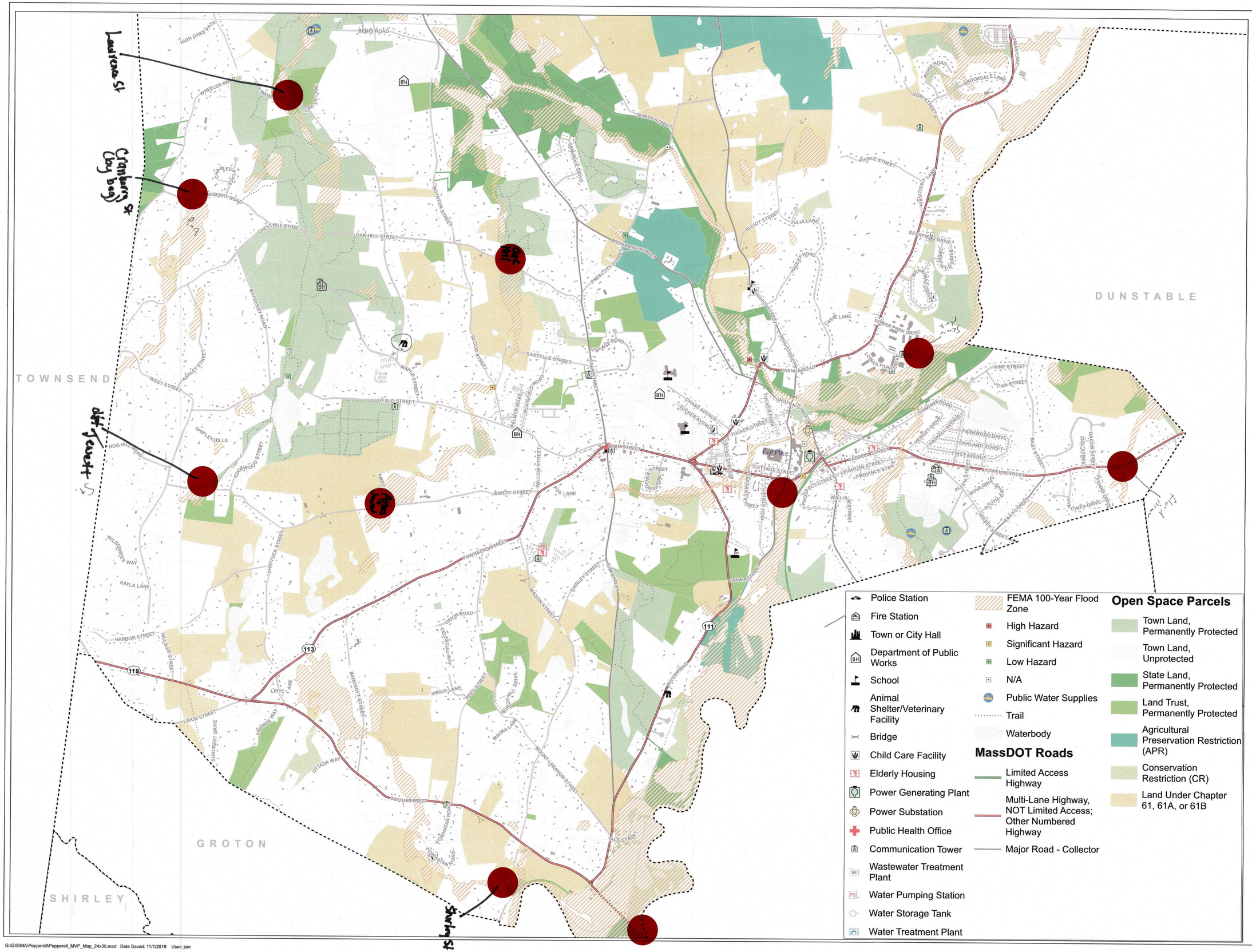
Watershed evaluation

aging population, 3 senior neighborhoods
vulnerable populations

regrandication

TABLE 3

Town of Pepperell



Legend

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Pepperell, Massachusetts

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Tighe&Bond
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TABLE 3

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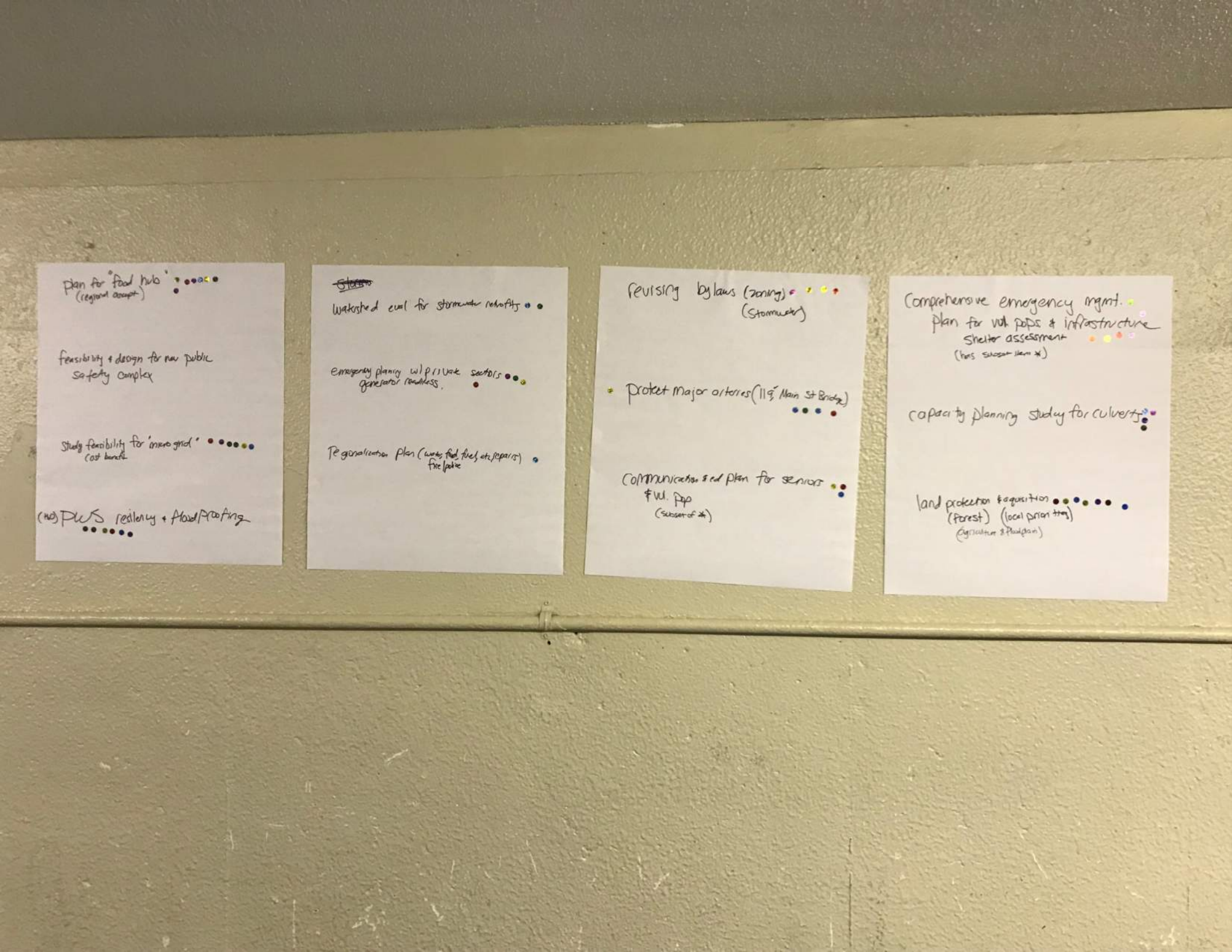
plan for "food hub"
(regional concept)
feasibility + design for new public safety complex
study feasibility for "micro grid"
cost benefit
(NO) PWS resiliency + flood proofing
~~Storm~~
Watershed eval for stormwater retrofits
emergency planning w/ private sectors
generator readiness.
Regionalization plan (water, fuel, fuels, etc./repairs)
fire/police
revising by laws (zoning)
(stormwater)
protect major arteries (11th Main St Bridge)
communication & ed plan for seniors
& vul. pop
(subset of #)
Comprehensive emergency mgmt.
plan for vul pops & infrastructure
shelter assessment
(has subset items #)
capacity planning study for culverts
land protection & acquisition
(forest) (local priorities)
(agriculture & floodplain)

Tighe&Bond
Engineers | Environmental Specialists

APPENDIX D

EXISTING CAPABILITIES OF PEPPERELL TO ADDRESS NATURAL HAZARDS

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities.

Please review the list below- taken from the 2015 Adopted HMP. Provide any comment you would like to see in the updated plan, or update as indicated (highlighted items). Comments might include specific improvements since the last plan, or identified weakness based on experience over the last 5 years. Please add any new Implementation Elements as appropriate.

Existing Flood Hazard Mitigation Resources					
Implementation Element	*Lead Agency*	***Area Covered***	**Effectiveness/ Enforcement**	**2015 Adopted HMP Recommended these Improvements/ Changes**	**Is this Element still effective? If not, what changes are needed for 2020 HMP Update?**
National Flood Insurance Program (NFIP) – Pepperell participates in the National Flood Insurance Program. NFIP provides flood insurance to property owners in exchange for compliance with floodplain management.	*Planning Board*	FEMA 100-year flood zones	Effective	None.	Effective, no changes are needed.
Local Wetlands Protection Bylaw – In addition to the requirements of the state's Wetlands Protection Act, the local bylaw states that a 50-foor wide undisturbed, vegetated strip of naturally occurring plant species must be maintained between a certified vernal pool or wetland resource area.	*Conservation Commission*	Town-wide	Moderately effective	Bylaw should be reviewed and modifications considered.	Effective, no changes have been made, but modifications are needed.
Zoning bylaw addresses erosion control. The Town's zoning bylaw states that site design, materials, and construction processes shall be employed to avoid erosion damage, sedimentation, or uncontrolled surface water runoff.	*Planning Board*	Town-wide	Effective	None.	Effective.
Zoning bylaw contains a Water Resource Protection Overlay District. The Water Resource Protection Overlay District consists of three zones: Water Source Protection Zone (Zone I); Well Protection Zone (Zone II) and an Aquifer-Watershed Protection Zone (Zone III). Activities within each of these zones are regulated to protect groundwater from degradation.	*Planning Board/ Water Division*	Town-wide	Effective	None.	Effective.
Local Flood Control Bylaw (Chapter 95) – The Town bylaws contain a local floodplain bylaw consistent with the requirements of the National Flood Insurance Program.	*Conservation Commission*	Town-wide	Effective	None.	Flood control is effective, but bylaw should be updated and integrated into zoning bylaw rather than through town code.
Subdivision Regulations	*Planning Board*	Town-wide	Moderately effective	N/A	New element. Current requirements require drainage to be designed to handle a 25-year storm and culverts handle a 50-year storm. Should be updated to reflect the new MS4 permit and consistent with OSRD special permit which encourages LID.
Stormwater Regulations	*To be determined*	Town-wide	Moderately effective	N/A	New element. Town needs to develop, by 2021, to meet MS4 permit.

Capability Assessment Worksheet

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible. Complete one worksheet for each jurisdiction.

Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Please indicate which of the following your jurisdiction has in place.

Plans	Yes/No Year	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Yes	Update is in Process. Yes, plan identifies hazards and mitigation strategies.
Capital Improvements Plan	Yes	Capital Planning Committee is in the process of updating the CIP to improve it further.
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Plan identifies assets that are at risk
Continuity of Operations Plan	Yes	Does not really address hazards, but deals with backup and redundancy
Transportation Plan	Yes	NMCOG Regional Transportation Plan
Stormwater Management Plan	Yes	Written Stormwater Management Plan prepared to address compliance with EPA's MS4 General Permit
Community Wildfire Protection Plan	No	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	No	

Building Code, Permitting, and Inspections	Yes/No	Are codes adequately enforced?
Building Code	State	Version/Year: IBC 2015
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire department ISO rating		
Site plan review requirements	Yes	Yes, site plan approval requires commercial projects greater than 3,000 square feet
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Yes	Yes, the bylaw is effective but should be modified to encourage Low Impact Development (LID)
Subdivision ordinance	Yes	Subdivision bylaw needs to be revised to be consistent with the Open Space Residential Development Bylaw, which encourages LID, whereas subdivision bylaw does not. Bylaws can be updated to better reduce hazard impacts and to promote mitigation.
Floodplain ordinance	Yes	Not adequate and not adequately administered.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	Included in zoning bylaws
Flood insurance rate maps	Yes	Updated in 2010
Acquisition of land for open space and public recreation uses	Yes	Seven-year action plan included in Open Space and Recreation Plan, 2017
Other		

How can these capabilities be expanded and improved to reduce risk?

Administrative and Technical

Identify whether your community has the following administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	**Yes/No**	**Describe capability** **Is coordination effective?**
Planning Board	Yes	
Mitigation Planning Committee	No	Pepperell has a Local Emergency Planning Committee
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	DPW responsible for clearing drainage; Highway Superintendent responsible for tree trimming.
Mutual aid agreements	Yes	
Staff	**Yes/No** **FT/PT[1]**	**Is staffing adequate to enforce regulations?** **Is staff trained on hazards and mitigation?** **Is coordination between agencies and staff effective?**
Chief Building Official	Yes, FT	Staffing is adequate. Staff are not trained.
Floodplain Administrator	No	Conservation Agent administers floodplain.
Emergency Manager	Yes, PT	Volunteer position with small stipend
Community Planner	Yes, PT	Staffing generally adequate Staff is trained
Civil Engineer	Yes, FT	Town Engineer is also head of DPW
GIS Coordinator	No	Town relies on regional agency (NMCOG) for GIS
Other Conservation Agent	Yes, PT	Yes, adequacy to enforce regulations.

1 Full-time (F) or part-time (PT) position

Worksheet 4.1
Capability Assessment Worksheet

Technical	Yes/No	Describe capability Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	CodeRed, reverse 911, outdoor warning signals
Hazard data and information	Yes	Hazard mitigation plan, Pepperell Emergency Services Inventory does have some data on hazards
Grant writing	Yes	East department is responsible for grant writing.
Hazus analysis	No	
Other		

How can these capabilities be expanded and improved to reduce risk?

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Access/ Eligibility (Yes/No)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	No	In process
Authority to levy taxes for specific purposes	Yes	Has not been used for mitigation
Fees for water, sewer, gas, or electric services	Yes	Used to expand services
Impact fees for new development	No	
Storm water utility fee	Yes	Yes, fee adopted.
Incur debt through general obligation bonds and/or special tax bonds	Yes	Could be used to fund routine mitigation.
Incur debt through private activities	No	
Community Development Block Grant	No	
Other federal funding programs	Yes	Received funds from FEMA for Halloween Storm (2011), Irene (2012), and Juno (January 2015), and Storm in 2018
State funding programs	Yes	Received grants from MEMA in past.
Other		

How can these capabilities be expanded and improved to reduce risk?

Education and Outreach

Identify education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Town has a climate change and Resiliency Working Group
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Emergency Response Program includes an educational component.
Natural disaster or safety related school programs	No	
StormReady certification	No	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	No	
Other		

How can these capabilities be expanded and improved to reduce risk?

Capability Assessment

The capability assessment identifies the town's strengths and weaknesses for mitigating risks identified in the Hazard Mitigation Plan. The assessment examines the town's current capabilities and includes changes since completion of the 2015 Hazard Mitigation Plan. The assessment is useful in developing an effective hazard mitigation strategy in that it ensures that the goals and strategies articulated throughout the Plan are realistic and achievable, based on the town's governmental and staffing structure, and recognizing the extent of resources and tools available to the community.

FEMA defines four types of capabilities that should be considered within the Hazard Mitigation planning process:

1. **Planning and Regulatory Capabilities** based on the jurisdiction's implementation of ordinances/bylaws, policies, local laws, State statutes, plans and programs that relate to guiding and managing growth and development;
2. **Administrative and Technical Capabilities** associated with the jurisdiction's staff and their skills and tools that can be used for mitigation planning and implementation;
3. **Financial Capabilities** which include the fiscal resources that the town has access to or is eligible to use to fund mitigation actions; and
4. **Education and Outreach** programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Each of these capabilities is discussed in detail in the following narrative.

Planning and Regulatory Capabilities

In 1974, Pepperell entered the National Flood Insurance Program, making residents eligible to buy subsidized flood insurance. As a result, a floodway regulation was enacted as part of the Town Code (Chapter 95), rather than through the Zoning Bylaw. This regulation addresses encroachment, including fill, new construction, and substantial improvements to existing structures. It also prohibits building in the floodway unless certification by a registered professional civil engineer is provided to the Building Inspector by the applicant, demonstrating that such encroachment will not result in any increase in flood levels within the community.

Pepperell has enacted a local Wetlands Protection Bylaw requiring that a 50-foot wide undisturbed, vegetated strip of naturally occurring plant species be maintained from a certified vernal pool or wetland resource area. The requirements of the bylaw go beyond what is outlined the state's Wetland Protection Act. The State's Rivers Protection Act also preserves the town's riverine areas, by protecting a 200-foot wide Riverfront area, as measured along each side of a river from the mean annual high water line outward horizontally and parallel to the river.

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) has certified 45 vernal pools in Pepperell. An additional 132 potential vernal pools have been identified that have yet to be certified. These pools, are critical habitat for amphibians and invertebrate animals that use them to breed. They typically hold water in the winter and spring due to rising groundwater and rainfall, remain wet through the spring and into the summer, and dry out completely by mid- to late summer. The NHESP reports that Pepperell is home to sixteen (16) animal species listed as endangered, threatened or of special concern.

Much of the eastern portion of Pepperell is part of the Petapawag Area of Critical Environmental Concern (ACEC), which is located along and to the east of the Nashua River, from the Town of Ayer north to New Hampshire. The Squannassit ACEC is located on the west side of the Nashua River adjacent to the Petapawag ACEC. Projects within an ACEC that are subject to state agency jurisdiction or regulation (particularly those that are initiated by an agency, require a state permit, or are funded by a state agency) are reviewed with closer scrutiny to avoid or minimize adverse environmental impacts. The designations provide a framework for the town and state agencies to work together to ensure long-term preservation and management of these areas.

The Town's Zoning Bylaw addresses erosion control and requires that site design, materials, and construction processes be employed to avoid erosion damage, sedimentation, or uncontrolled surface water runoff. The Water Resource Protection Overlay District outlined within the Zoning Bylaw consists of three zones: Water Source Protection Zone (Zone I); Well Protection Zone (Zone II) and an Aquifer-Watershed Protection Zone (Zone III). Allowed activities within each of these zones are regulated to protect groundwater from degradation. In addition to each zone's individual land use restrictions, the WRPOD has general performance standards and construction standards that apply to all development in the three WRPOD zones.

The Town of Pepperell has established an Open Space and Residential Development Bylaw in order to:

- Allow for flexibility in design and minimize land disturbance;
- Encourage the protection of open space, natural and cultural resources, agricultural land, and the town's water supply;
- Enhance community character; and
- Provide affordable housing to persons of low and moderate income.

Pepperell's Open Space Residential Development (OSRD) regulation allows for the issuance of a Special Permit for flexible site design with reduced lots sizes and dimensional requirements. An OSRD must set aside at least 40% of the total tract area as permanently protected open space.

Pepperell's Subdivision regulations require that surface water drainage be designed to accommodate a twenty-five year storm, and that culverts be designed to handle a fifty-year storm, with consideration given to avoidance of damage for a one-hundred year storm. The regulations also require that stormwater management systems by designed in accordance with Massachusetts Department of Environmental Protection's (DEP) Stormwater Manual.

Pepperell requires a site plan review for nearly all development projects other than single and two family dwellings. In approving or disapproving a site plan, the following issues are considered: landscaping, open space, signage, parking, utilities, outdoor lighting, screening, and overall compliance with the standards set forth in the zoning bylaw. Site plan approval lapses after one year from the approval date, if substantial use has not commenced, except for good cause.

In 2016, EPA and DEP issued a new MS4 Stormwater Permit for Massachusetts that went into effect on July 1, 2018. This permit requires the operators of a regulated small municipal separate storm sewer system (MS4), including Pepperell, to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage. Under the permit, Pepperell will be required to develop and implement a storm water management program that includes six minimum control measures, and there are water quality testing, monitoring, mapping, maintenance and reporting requirements contained within the permit as well. Pepperell submitted its Notice of Intent (NOI) to EPA and MassDEP on October 1, 2018 outlining the BMPs that the Town planned to include in their stormwater management program in order to comply with the terms of the General Permit. The Town of Pepperell has established a Storm Water Enterprise Fund, which will function as a stormwater utility. Fees are assessed quarterly on each tax parcel.

The 2016 Pepperell Open Space and Recreation Plan Update stressed the importance of preserving open space, natural resources and outdoor recreational opportunities. Protecting farmland has been the focus of many land protection projects within Pepperell, and will continue into the future. Pepperell has continued to protect open space by working with state and non-profit partners and landowners. Over the past fifteen years, an additional sixty-one parcels totaling almost 985 acres have been protected, bringing the Town's total acreage of protected open space to over 3,074 acres, accounting for approximately 20% of the town's land area. Permanently protected lands include state lands and municipal properties subject to Article 97, a conservation restriction or other deed restriction, as well as private properties subject to a conservation restriction, agricultural preservation restriction, or a deed restriction.

As a result of a two-year planning process, Pepperell is wrapping up a major update to the Town's Master Plan. It is anticipated that the Planning Board will adopt the document within the next few months. The Master Plan recognizes that climate change planning in Pepperell

has been undertaken through multiple projects, including the recent preparation of the town's Municipal Vulnerability Preparedness Plan, the updating of the Hazard Mitigation Plan, completion of the most recent Open Space and Recreation Plan, and the town's Green Community activities. The Master Plan builds upon many of the recommendations and initiatives put forth as part of these programs. The document contains many strategies that are predicated on recognition of the fact that the climate change will continue to occur, and that municipal staff and boards, businesses, and residents will make major decisions today and in the future that will influence the town's vulnerabilities.

Building community resilience will require significant town government policy adjustments to address the root causes of climate change, as well as measures that increase social cohesion, localize food and energy systems, and advance public education and participation. Resilience requires that both the public and private sectors make structural shifts and capacity investments that support assessing and addressing the complex challenges of climate disruption.

Climate change and greenhouse gas emission reductions are addressed by recommendations throughout the Master Plan, rather than in a single section, and are summarized in the Implementation Chapter matrix of recommendations. The matrix specifically denotes those recommendations that will have a climate benefit for the community. Mixed-use, compact development that encourages walking and biking, use of alternative transportation modes, improved development practices, use of renewable energy systems, environmentally-friendly design guidelines, preservation of open space, water conservation measures, and enhanced stormwater management efforts are some of the strategies that help reduce greenhouse gas emissions, mitigate the impacts of climate change, mitigate natural hazards and reduce overall energy usage.

Administrative and Technical Capabilities

Administrative and Financial Capabilities

The Town Administrator oversees and coordinates Pepperell's day-to-day operations with the assistance of the Town Accountant, Tax Collector/Treasurer, and Assessor. Their work is supported and guided by several elected and appointed boards, including the Board of Selectmen, the Finance Committee, and the Board of Assessors. Each of these entities has a specialized and statutory role in financial and administrative policy.

The Town Accountant is appointed by the Board of Selectmen. It is the legal obligation of the Town Accountant to oversee all the financial activity of the Town, maintain all financial records, and review all bills, including payrolls, to ensure that they are within the budget and are not fraudulent or unlawful. The Town Accountant retains custody of all municipal contracts and prepares the financial reports for the municipality. Primarily working directly with other town departments, the accounting office has limited contact with the public. The Town Accountant also serves as an advisor to the Finance Committee.

In Pepperell, the duties of the treasurer and tax collector are combined into one office: Treasurer/Tax Collector. The Treasurer is responsible for the receipt, posting, classifying, depositing and investment of all money belonging to the Town. The Treasurer is also responsible for the administration of tax title and foreclosure accounts, debt service, trust funds, investments and bank account reconciliation. Using guidelines established by the Department of Revenue, the Tax Collector is responsible for the collection of all taxes, liens and fees associated with real and personal property, as well as other funds owed to the town, such as fees for permits, licenses, utilities, and services.

The Finance Committee consists of five members appointed by the Board of Selectmen for a three-year term. The Finance Committee reviews and analyzes the overall budget, and forecasts the Town's financial position for the future fiscal year based on prior trends. The Committee also identifies and recommends funding sources for proposed capital items, and reviews and makes recommendations on warrant articles. All Town Meeting articles that call for the expenditure of funds must be referred to the Finance Committee for its consideration. Each year the Finance Committee must review previous year expenditures and estimate budgetary requirements for the upcoming year and provide appropriation recommendations to Town Meeting.

Public Safety

The Pepperell Fire Department is a combination department with five full-time personnel and approximately 25 volunteers and paid-on-call firefighters. Twenty of these personnel are also emergency medical technicians. From 6 AM until 6 PM there is one firefighter/paramedic on duty as well as the chief. The Pepperell Department focuses on fire suppression, fire prevention, public education and emergency medical services

In addition to responding to fire and emergency medical calls, the fire department is also tasked with responding to other emergencies, such as a motor vehicle crash, building collapse, water and ice rescue, mass casualty incident, weather related emergency, or natural disasters. In addition, permits and inspections are issued or performed by the department. The Pepperell Fire Prevention program provides educational programs for children in pre-K to 8th grade.

The Pepperell Fire Department participates in an active mutual aid response system for fire, hazardous materials, and EMS operations. The Department is a member of Massachusetts Mutual Aid Fire District 6, as well as Border Area Mutual Aid (BAMA), a group of 30 Massachusetts and New Hampshire Fire Departments. Fire District 6 coordinates the mutual aid response of Massachusetts fire departments in the Greater Lowell area. The following services are available through these organizations:

- Centralized communications control center for mutual aid activities;

- Operation of multi-channel radio system for dispatch and coordination of firefighting apparatus and emergency medical units;
- Mobile command and communications vehicle for complex operations;
- Ten alarm running card system for coordination and deployment of apparatus, personnel and other resources;
- Regional hazardous materials response team (funded by the Massachusetts Department of Fire Services);
- Mobile air supply unit for refilling self-contained breathing apparatus at incidents;
- Evacuation and rehabilitation buses;
- Fire safety house trailer for fire prevention and training purposes; and
- Critical incident debriefing team.

The mission of the Pepperell Police Department is to: "Provide the highest level of protection and service to the citizens, business people, and visitors of Pepperell. Members of the Pepperell Police Department shall provide safety and security for the community by enforcing the bylaws of the Town of Pepperell, the laws of the Commonwealth of Massachusetts, and the Constitution of the United States of America. Members of the Pepperell Police Department shall be dedicated to provide the highest quality of public service with honesty, respect, and fairness." The Police Department goals are to do the following:

- "identify criminal activity, pursue and apprehend criminal offenders and proceed in the prosecution of known offenders,
- maintain a proactive patrol and investigation force and thus reduce the opportunity to commit crime;
- facilitate the safe movement of people and vehicles through analysis and commitment of selective traffic enforcement resources;
- perpetuate a sound managerial environment that focuses upon department goals and provides for career development; and
- instill public confidence in the agency by maintaining a high degree of professionalism, dedication and expertise in police service."

When fully staffed, the Police Department consists of 18 full-time sworn law enforcement personnel, an administrative assistant and a civilian clerk.

The Pepperell Police Department is a member of the North Eastern Massachusetts Law Enforcement Council (NEMLEC), a non-profit corporation and law enforcement council composed of a consortium of 60+ police and sheriff departments in Middlesex and Essex Counties. Member agencies operate pursuant to an interagency mutual aid and assistance agreement. NEMLEC is a professional organization focused on member needs and priorities, and governed by an elected Board. Member police chiefs actively participate in its operation

by serving in leadership roles on operational units and committees. NEMLEC manages all aspects of the organization through member meetings, open processes and a comprehensive intranet system.

NEMLEC units are composed of highly trained and skilled officers from member agencies under the command of a police chief. They are a primary source of assistance and support and are available to member police chiefs who activate them in accordance with written protocol. The available units include the following:

- Motorcycle Unit (MCU);
- Incident Management Assistance Team (IMAT);
- Regional Communications (RC);
- Regional Response Team (RRT);
- School Threat Assessment/Response System (STARS); and
- Special Weapons and Tactics (SWAT).

In Pepperell, the emergency communications center is operated as a separate department, rather than being tied to the police or fire departments. The Communications Department is responsible for the following tasks:

- Emergency and routine dispatching of Pepperell police, fire, ambulance, highway, water and sewer departments;
- Answering 911 calls and business calls for the above entities;
- Performing medical dispatch services;
- Operation of the National Crime Information Center (NCIC)/Law Enforcement Alerting Portal (LEAPS) computer to retrieve driver and criminal history through a national database;
- Chronologically documenting all incidents and calls;
- Coordinating civil defense personnel during times of emergency or disaster; and
- Using the Code Red notification system to alert the public.

The Communications Center is staffed with four full-time and two part-time dispatchers. Both the Director and Assistant Director are responsible for filling a shift in addition to their other duties. During the week, seven of the 21 shifts are staffed with two personnel, while on dispatcher is on duty during the remaining shifts. Groton serves as the alternate Public Safety Answering Point (PSAP) and as the back-up for Pepperell. Currently, the town is studying the possibility of regionalizing 911 dispatch services in partnership with the towns of Ashby and Townsend.

The primary function of the Animal Control officer is to enforce local by-laws and the Massachusetts General Laws as they relate to animal issues. In Pepperell, the Animal Control officer performs the following functions under the direction of the Board of Health:

- Maintains a record of complaints and investigates complaints;
- Educates the public relative to animal control regulations;
- Picks up, transports and holds lost, injured or dangerous animals;
- Seeks to return animals to their rightful owners;
- Responds to emergency calls;
- Destroys rabid animals;
- Removes dead animals from public ways with the assistance of the Highway Department;
- Investigates animal cruelty and neglect allegations;
- Investigates dog and cat bites; and
- Serves criminal or civil notices relative to the enforcement of animal control laws and bylaws.

State law requires that all animal control officers receive formal training. Training enables the officers to be more effective at protecting themselves, the animals, and the public.

Pepperell also has an Animal Inspector whose primary duty involves rabies control in the domestic animal population. The Animal Inspector works under the supervision of the Board of Selectmen and is also responsible for barn inspections. The inspector may also be called upon to assist with domestic animal quarantines in the event of a disease outbreak

Pepperell's Emergency Management Director (EMD) and Emergency Management program ensure that effective emergency services are in place during large-scale emergencies or disasters as outlined within the Town's Comprehensive Emergency Management Plan (CEMP). The CEMP is developed by the Local Emergency Planning Committee (LEPC), which is chaired by the EMD, and approved by the Town Administrator and Board of Selectmen. The EMD is responsible for maintaining the CEMP and for activating and managing the Emergency Operations Center. The LEPC meets quarterly to discuss public safety issues. There are also twenty-seven volunteers that support emergency services.

On a day to day basis, the EMD works with the heads of Police, Fire, Emergency Medical Services, Communications, Board of Health, DPW and Council on Aging to coordinate major emergency event planning for the Town. This effort includes public awareness and education, community outreach, resource management, manpower deployment, mutual aid agreements and coordination with the Massachusetts Emergency Management Agency (MEMA), the American Red Cross and other statewide resources. MEMA coordinates state level emergency operations and can assist the Town in the event of a disaster. MEMA also serves as a conduit for resources from other jurisdictions and the Federal Emergency Management Agency (FEMA).

Pepperell's Emergency Management director also oversees four other programs:

- Emergency Shelter Operations;
- The Auxiliary Police;
- The Community Emergency Response Team (CERT); and
- The Radio Amateur Civil Emergency Services (RACES)

The Inspection Department enforces State and local laws, by-laws, and regulations. The Department issues permits for all types of construction, including all public and private buildings. It also issues permits for additions and alterations of buildings, installation of pools, sheds, and garages, and other improvements to properties. The Building Inspector is required to perform periodic inspections for businesses and buildings that must obtain a Certificate of Inspection. The Plumbing and Wiring Inspectors also work out of this department.

Public Works

The Department of Public Works (DPW) consists of the Highway Division, Sewer Division, Water Division, and Transfer Station. The Pepperell Director of Public Works also serves as the Town Engineer. The Department provides technical and engineering services on matters related to municipal operations and land use, including assistance to town departments, boards and committees. The Town Engineer reviews subdivision plans and participates on the Signs and Safety Committee.

The Highway Division maintains and repairs the town's roadways, street signs, sidewalks and subsurface drainage systems to provide for safe vehicle and pedestrian travel. It removes snow, salts and sands, re-seeds grass in the roadway rights-of-way, and trims and removes trees. In addition, it also maintains DPW vehicles and equipment in-house.

The Sewer Division is responsible for operating and maintaining the wastewater treatment facility that serves the towns of Pepperell and Groton. The Sewer Division employs six licensed operators who regularly inspect the plant and eight pumping stations. Seasonal inspections and monitoring of the collection system and its infrastructure is an ongoing process. Inspections are performed utilizing the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) guidelines.

The Water Division operates and maintains the public drinking water system for Pepperell in accordance with the Federal Safe Water Drinking Act and Massachusetts Department of Environmental Protection (MassDEP) regulations.

Planning and Development

The Planning Board, Zoning Board of Appeals, Conservation Commission, Board of Health and Historical Commission carry out community planning and development review in Pepperell with the assistance and support of Town staff.

The Planning Board consists of five elected members and one appointed associate member, and is responsible for reviewing proposed subdivisions and site plans, and issuing special permits. All zoning bylaw revisions must go through the Planning Board. The duties and powers of the Planning Board are outlined in Chapters 40A and 40 of the Massachusetts General Laws. The Planning Board is supported and advised by a part-time professional planning consultant.

The Zoning Board of Appeals is appointed by the Board of Selectmen, serves as the special permit granting authority for some special permits, exercises statutory jurisdiction over variances and comprehensive permits, and hears appeals on the decisions of the Building Inspector. The Board consists of three members and two alternates. The Zoning Board of Appeals is authorized under Chapters 40A and 40B of the General Laws of the Commonwealth of Massachusetts as well as the Pepperell Zoning Bylaw.

The Conservation Commission administers the Massachusetts Wetlands Protection Act, MGL c.131 § 40 and the Pepperell Wetlands Protection Bylaw, has responsibility for protecting natural resources, and manages the Town's conservation properties. Each building permit application is reviewed by the Conservation Commission to determine whether a project falls under its jurisdiction. The Commission has partnered with the Nashua River Watershed Association to address the control of aquatic invasive plants on the Nashua River via the implementation of a five-year treatment plan. The Commission also coordinates volunteer activities for trail monitoring, cleanup and maintenance. The Conservation Commission is supported by the town's Conservation Agent.

The Pepperell Board of Health is composed of three elected members; its mission is to protect public health through the enforcement of health codes and regulations, and promote a healthy community. The Board adopts and modifies regulations to address various public health issues, such as the sale of tobacco and fill importation. Through assistance from the Nashoba Associated Boards of Health, the Board provides inspection services regarding food safety, safe and sanitary housing, and Title V, and conducts nuisance complaint investigations. The Nashoba Associated Boards of Health also provides community nursing services, such as immunizations, chronic disease management, and health screenings for Pepperell residents.

The Pepperell Historical Commission is charged with "the preservation and development of the historical and archaeological assets" of the town, in accordance with MGL Chapter 40, section 8D, and seeks to identify and promote the town's historical resources. The five members of the Commission are appointed by the Board of Selectmen for three-year terms. Historical Commission researches places of historic or archeological value, cooperates with the state archeologist in conducting research, and may advertise, prepare, print and distribute books, maps, charts, plans and pamphlets which it deems necessary for its work.

For the purpose of protecting and preserving historic resources, the Commission may make recommendations to the selectmen and to the Massachusetts Historical Commission that locations be certified as historical or archeological landmarks, and that procedures be implemented that preserve historic resources in town. The Commission is required to report to the State Archaeologist the existence of any archeological, paleontological or historical site or object discovered.

The Affordable Housing Committee consists of seven members: three residents at large plus one representative each from the Planning Board, Zoning Board of Appeals, Board of Selectmen, and Finance Committee. The Committee is appointed by the Board of Selectmen to oversee the development of the Housing Production Plan (HPP) and to promote affordable housing opportunities. The HPP remains in effect for five years and serves as a "blueprint" for the community in developing affordable housing units to address the 10% affordable housing goal established by the state's Department of Housing and Community Development (DHCD). The Affordable Housing Committee helps implement the HPP by promoting affordable housing projects that address the housing needs of the community, while meeting the community standards.

Human Services

The Pepperell Council on Aging (COA) supplies or coordinates most of the services that directly benefit senior citizens. The COA staff relies on volunteers to assist in providing support services, information, and referrals relative to housing, fuel and food assistance, home care, guidance on Social Security, insurance counseling, lending of medical equipment, grief support, home visits, wellness checks, tax preparation services, Meals on Wheels, and transportation services. In addition, the Senior Center offers a number of educational programs, fitness classes, entertainment, and social opportunities. The Center also provides a daily lunch for approximately 180 people each week.

The Town's Veterans Agent helps veterans and their dependents with financial, medical or burial benefits. Pepperell has a part-time Veteran's Services Officer who has office hours at Town Hall each Wednesday afternoon. The Department of Veterans' Services oversees a state assistance program based on need, which provides financial, medical, educational and service benefits to veterans and their dependents. The Veteran's Services Officer administers the Program's main financial and medical assistance components, and offers assistance and referrals in the areas of federal compensation and pensions, fuel assistance, state and federal educational benefits, tax exemptions, annuities, home loans, counseling and job training. Approximately 300 Pepperell veterans are served annually.

The Pepperell Housing Authority Board consists of four members elected by Pepperell voters plus a fifth member appointed by the Governor. The Housing Authority manages low- and moderate-income public housing units. Currently, Pepperell has 70 units: 57 one-bedroom

apartments for senior or disabled citizens; six units are bedrooms within congregate apartment housing for mentally challenged elderly or disabled citizens, and are staffed 24 hours/day; seven units are for families and of these, six are two-bedroom apartments and one is a 3-bedroom unit.

Financial Capabilities

Financial resources available to the Town for funding mitigation activities include the town's general fund. The Town's FY 2019 revenues totaled $27,350,321, with approximately 60% of the Town's FY 2019 budget was dedicated to education expenses. The Town's bond rating from Moody's is Aa3, and in FY 2019 the Town had $ 1,186,349 in certified free cash.[1] The most recent projections estimate that the Town's budget will increase to $30,793,581 by FY 2024. Pepperell's property taxes are 24% lower than in similar communities and 61% of the state average for all municipalities.[2] Pepperell received $1,691,088 in State Aid in FY 2019, and relies heavily on local property taxes to meet its needs.

In addition to the general fund, Pepperell has a sewer enterprise fund, water enterprise fund and a transfer station enterprise fund. The Town has also established a stormwater enterprise fund, and began issuing a Storm Water Utility fee in February 2019. The fee is assessed quarterly on all tax parcels and is collected through the water and sewer billing system.

The Town of Pepperell has successfully leveraged state and federal grants for projects that benefit natural hazard mitigation, and it is expected that the town will continue to apply for competitive grants through the Green Communities program, the Hazard Mitigation grant program, the Culvert Replacement Municipal Assistance program, and other available state and federal grant programs. Pepperell has received $622,014 in Green Community grants since 2018. Most recently, the Town received a grant from the Massachusetts Division of Ecological Restoration for the removal of a dam and the replacement of a culvert on Sucker Brook.

The Town has partnered with a number of non-profit and community organizations to leverage the resources needed to successfully complete many projects. For example, the Town worked with Trout Unlimited to install three-sided or bottomless culverts and on the removal of the Turner Dam on Hollis Street. Much of the land along the Nissitissit River has been protected by the Division of Fish and Wildlife, working with the Nissitissit River Land Trust, the Nashua River Watershed Association, and the Town of Pepperell Conservation

[1] Massachusetts Department of Revenue
[2] ClearGov.com

Commission. The Town will continue to foster and grow these partnerships in the implementation of the recommendations outlined in the Hazard Mitigation Plan.

Education and Outreach

Pepperell uses the CodeRED emergency notification service to reach residents and businesses by telephone, mobile phone, text message, or email regarding time-sensitive emergencies. The Town also distributes information via the town website and through Pepperell Community Media, the local cable access channel. Pepperell Community Media, Inc. produces public access programming and cablecasting for cable customers over three channels: 191, 192, and 194. Programming includes educational and government programs for the Town, as well as an extensive video library available on *Video On Demand.* Community events, municipal meetings, and all types of local video content are available to view online. with new videos added regularly.

The Pepperell Fire Prevention program provides educational programs on fire prevention and safety for children in pre-K to 8th grade. The Water Division, Sewer Division and Conservation Commission provide educational materials to homeowners and businesses on conservation, pollution prevention, best management practices and changes in regulations.

Under its MS4 permit, the Town is required to broadly distribute educational materials on stormwater within the community, as part of a formal public education program for specific target audiences.

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APPENDIX E

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Pepperell's Priority Assets					Actions to Address Pepperell's Top Hazards					
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Workshop	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	Priority H - M - L	Time Short Long Ongoing
Infrastructural										
Main St. Dam	Main Street	Private - PowerCo	V	1	Assess feasibility of microgrid to mitigate downstream properties,monitor ice conditions on river/assess conditions for ice jams		Address flashboards, regular dam inspections, get AEP from Eagle Creek, analyze dam and how to minimize risks/impact of dam removal or chose to improve dams	Monitor conditions	M	O
Main St. Bridge	Main Street	Public	S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Route 119 Bridge	Route 119	State	V/S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Route 113 Bridge	Route 113	State	V/S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Groton Street Bridge	Groton Street	Town	V/S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Hollis Street Bridge	Hollis Street	Town	V/S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Mill Street Bridge	Mill Street	Town	V/S	1	Plowing/sanding	Structural analysis of bridges and flooding impacts/remediation of major roadways	Sandbagging, adjust flashboards, update floodplain bylaw	Inspect expansion joints	M/L	O
Covered Bridge	Groton Street	Town	S	1					L	L
Sewer Main/Pump Station	Townwide	Town	V/S	1					M	O
Major Traffic Arteries	Route 111, 113. and 119	State	S	1	Old plows need to be replaced	Assess feasibility of raising road and/or Town acquire and reconstruct bridge properties. Investigate raising Route 119 and culvert replacements.	Watershed stormwater retrofit assessment, floodplain bylaw, raise Route 119 with coordination from MassDOT,		H	L
Public Safety Communications	Main Street	Town	V/S	1	Evaluate potential enhanced safety complex design and construction; generator and building maintenance	Explore backup redundant system/wireless/relocation		Mold-leaky roof	H	O
SCADA System	Townwide	Town	V/S	1		Replace/upgrade to wireless			H	S
Pepperell Police Department	Main Street	Town	S	1	Resilient communcication/redundant communications system				H	O
Pepperell Fire Department	Park Street	Town	S	1	Resilient communcication/redundant communications system;				H	O
Public Wells and Water Systems	Townwide	Town	V/S	1	Replace water mains to prevent breaks, generator education for private well owners, evaluate ways to minimize risks, isolate tanks to provide clean water, have backup source of water; resiliency improvements study	Wellhead protection and water system master plan; zoning and bylaw updates for private systems	Restore original streamflow at Bemis Well;analyze vulnerability of Nashua Road wells to contamination from flooding; generators	Water bans; continuous monitoring of well levels, public education on water conservation	M	L
Wastewater Treatment Plant and Pump Stations	Lomar Park	Town	V/S	1	Runoff management/stormwater BMPs, evaluate how to minimize impact of flooding; Resiliency improvements- road access study	Study of improved resilience of WWTP and/or expansion to serve additional areas	Floodplain analysis on impact to plant; pump stations- elevate utilities	Study of covering clarifiers, monitor for succifient flow into plant	H	S/L
Power Utilities	Groton Street, Lowell Str	Private	V/S	1	Tree trimming; hazard tree removal, education on proper generator installation	Tree trimming; hazard tree removal	Ongoing natural gas replacement to address leaks; vulnerable substation on river- push utility for flood proofing	Educate homeowners	H	O
Culverts	Townwide	Town/State	V	1	In depth analysis and evaluation of all culverts including capacity analysis, engineering, design, and construction of Town's most vulnerable culverts				H	S
Culverts	Townwide	Town/State	V	1	Enhanced maintenance equipment					
Schools	Townwide	Town/Private	S	1	Evaluate use of schools as a shelter during emergencies	Emergency prepardness plan and shelter assessment		Outreach and communication of available resources	M	S
Medical Center	Main Street	Private	S	1	Immediate care- protect access/power				M	O
Town DPW	Main Street	Town	V/S	2						
Power Grid	Townwide	Private	V/S	2	Study impacts of climate change				H	S
Societal										

Senior Center	Nashua Road	Town	S	1	Prone to flooding- flood-proof building/add shower facilities to serve as shelter/replace generator				H	L
Varnum School		Town/Regional	S	1					L	L
SNMC		Private	S	1					L	L
Veterinary Hospitals		Private	S	1					L	S
Town Library	Main Street	Town	S	1	Investigate use as shelter; generator	Investigate use as shelter; evaluate remodeling as full shelter			H	S/L
Pepperell Airport	Nashua Road	Private	S/V	1	Airport should be maintained as source of supplies and evacuation		Floodplain		L	L
Schools	Townwide	Town/Private	V/S	1	Snow removal from roofs, evaluate design weight loads for roofs, Survey of population, emergency response plan with NGOS on needs, shelter, capacity with community input	Structural assessments for vulerabilities		Confirm airconditioning for schools	M	O
Vulnerable Population	Townwide		V	1	Educate the vulnerable population for preparing for an event, power management, Survey of population, emergency response plan with NGOS on needs, shelter, capacity with community input	Leveraging the CERT Program	Educate the vulnerable population for preparing for an event, power management	Educate the vulnerable population for preparing for an event, power management	M	O
Child Care	Hollis Street	Private	V	1						
Nursing Homes/Elderly Housing	Townwide	Town/Private/State	V/S	1	Maintaining transportation access and ensuring doors are always accessible for emergencies, Create database of senior notifications and develop a contingency plan for evacuation with senior center, public education and preparedness	Maintaining transportation access and ensuring doors are always accessible for emergencies		Install air conditioning systems	M	S
Food Pantry	Hollis Street	Private	V/S	1	Generator; transportation plan to deliver food				M	S
Churches	Townwide	Private	S	1	Public education/outreach- help them be prepared				M	S
Pepperell Fire Department	Park Street	Town	S	1	Feasibility and design for new public safety complex				M	L
PACH Outreach	Hollis Street	Private	S	1	Communication				M	S
Historical Places	Townwide	Town/Private	V/S	2	Inventory and BC guidelines development following NFIP guidelines					
Emergency Shelters	Townwide		V/S	2	Power redundancies for shelters				H	S
RV/Trailers	Townwide	Private	V	2	Survey of population, emergency response plan with NGOS on needs, shelter, capacity with community input				H	S
Environmental										
Farms	Townwide	Private	S	1	Purchase lands in floodplain and open space/zoning bylaws to maintain OS		Increase water holding capacity		L	O
Town Forest	Townwide	Public	V	1				Implement/update management plan	M	O
Ch. 61 Lands	Townwide	Private	V	1				Public education of valve and BMPs to mitifate for other infrastructure	L	S
Conservation Lands	Townwide	Town/State/Land Trust	V	1			Land acquisition to mitigate flooding, snow, property protection		L	S
Gulf Brook	Oak Hill Street			1			Restore original streamflow at Bemis Well		H	S
Trails	Nashua River Trail	State	V/S	1	Manage tree canopy				L	L
Open Space	Townwide	Town/Private	V/S	1					L	L
Transfer Station	Boynton Street	Town	V/S	1	Debris management plan				L	S
Rail Trail	Townwide	State	V/S	1	Not accessible in the winter- purchase snowmobile; rail trail can be used as emergency access				M	S/O

Nashua and Nississit Rivers	Townwide	NRWA	V/S	1	Address private dam issue, provide public education		Provide public education on flood risk to abutters, WQ studyof sources of contamination from septics, update BOH requirements and inspections, land acquisition and education on best practices for land management in light of climate change		M	O
Sensitive Habitats	Townwide		V/S	2		Invasive species removal, conditions survey, public education			M	O
Forests and Woodlands	Townwide	Town/Private	V/S	2	Develop forest management plans for resiliency	Acquisition and BMPs, Invasive species removal			H	S/O
Recharge from Septics	Townwide	Private	V/S	2	Comprehensive Wastewater Management Plan					
Properties with Floodplain	Townwide	Public/Private	V	2		Bylaw revisions to address floodplains			H	S/O
Well Contribution Areas	Townwide	Public/Private	V	2		Review and update aquifer protection bylaw and overlay distribution bylaw and public education on BMPs; strengthen bylaws for enforcement			M	S
Major Wetlands, Vernal Pools, and Waterbodies	Townwide	Public/Private	V/S	1			Mosquito management	Monitor water quality for toxic algae	M	S
Economy										
Gas Heating Oil Co.		Private	S/V	1	Emergency plan, generator, and Memo of Agreement to ensure public safety can continue, notify first responders				H	S
Tree Removal Services	Townwide	Private	S	1	Create an emergency services agreement, public education and outreach				H	S
Pharmacies	Townwide	Private	S	1	Access to emergency supplies/prescriptions, public education and outreach				H	S
Donelan's Supermarket	Main Street	Private	S	1	Public education, outreach; fuels have leaked, coordinate eddects of NGOS	Impliment inspection standards as part of annual inspection/licensing			L	L
Industrial Park	Lomar Park	Private	V/S	1	Public education, outreach; Utility resilience- target public education to business owners about utility resiliency and staying open and safe in a storm		Floodplain awareness/education, encourage road maintenance, flood-proofing to keep operations active		M	S
Oil Delivery	Groton Street, Hollis Stre	Private	V/S	1	Public education, outreach, notify first responders					
Hardware Stores	Main Street	Private	S	1	Public education, outreach					
Farms	Townwide	Private	V/S	1	Manure management regulations, tick and mosquito management, best management practices, ask DEP for cheap water- more incentives to grow	Allow alternative energy- solar wind farm, subsidize to address loss from floods and droughts, plan regional storage and distribution food hub- equity issue to seniors and VP (schoops	Emergency evacuation for livestock in floods, BMPs to address climate change		M	O
Gas Stations	Townwide	Private	S/V	1	Public education, outreach, notify first responders				M	S
Medical Center	Main Street	Private	S	1	Public education, community engagement, understanding their capacity				M	S
Funeral Homes	Main Street, Pleasant Str	Private	S	1	Public education, outreach					
Kimball Fruit Farm	Hollis Street	Private	S	1	Public education, outreach				L	L
Banks	Townwide	Private	S/V	1	Public education, outreach					
Recreational Areas	Townwide	Town	S	2	Look for local sites to restore and remove invasive species				M	O
Railroad Square	East Main Street	Town	S/V	2	Plant trees for cooling/shade area				M	S
Main Street Businesses	Main Street	Private	S	2	Utility resilience- target public education to business owners about utility resiliency and staying open and safe in a storm				S	L
Skydiving Park	Nashua Road	Private	S	2						
Veterinary Hospital	River Road	Private	S	1					L	L

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APPENDIX E

THURSDAY, MAY 21, 2020 – 7PM to 8:30PM

HAZARD MITIGATION & CLIMATE ADAPTATION

LISTENING SESSION

(COVID-19 VIRTUAL GATHERING)

Join us to hear about Pepperell's HAZARD MITIGATION & CLIMATE ADAPTATION process.

We look forward to hearing your experiences and ideas.

Please reach out if you have any questions or barriers to participate.

Lisa Davis, Town of Pepperell Planning Consultant

ldavis@town.pepperell.ma.us

The meeting can be accessed by using this link:
https://global.gotomeeting.com/join/929720389
You can also dial in using your phone.
United States: +1 (646) 749-3122
Access Code: 929-720-389

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PEPPERELL'S HAZARD MITIGATION AND MUNICIPAL VULNERABILITY PREPAREDNESS PLANNING

Listening Session **May 21, 2020**

Tighe&Bond

WELCOME

Pepperell awarded $37.5K grant for

- Municipal Vulnerability Preparedness (MVP) Community Resilience Building (CRB) Workshop Process; and
- Draft Hazard Mitigation Plan (HMP) Update

First step in unlocking additional funding opportunities for Pepperell from FEMA/MEMA and Commonwealth of Massachusetts

A BRIEF THANKS TO PEPPERELL'S HAZARD MITIGATION PLAN AND MVP CORE TEAM AND ADVISORY GROUP

CORE TEAM

- Lisa Davis*
- David Querze
- Beverly Woods*
- Brynn Montesanti
- Paula Terrasi*
- Ken Kalinowski
- Andrew MacLean
- Kalene Gendron*

ADVISORY GROUP

- Walter Richards
- Denise Pigeon
- Tony Beattie
- Casey Campetti
- Kalene Gendron
- Jim Scarsdale
- David Querze
- Kat Belliveau

*Also a member of the Advisory Group

MVP/HMP GRANT AND CRB PROCESS

1. Establish Core Team
2. Complete Evaluation/Assessment
   - Natural Hazard Risks
   - Community Assets
   - Multi-Hazard Vulnerability Assessment
   - Capabilities Assessment
   - Mitigation Strategies
3. Hold two workshops
4. Draft MVP Report
5. Hold Public Meeting
6. Draft Hazard Mitigation Plan Update
7. Hold Listening Session
8. Final MVP Report

PURPOSE OF LISTENING SESSION

- Required to comply with MVP guidance and contract with EEA
- Present Information on the Hazard Mitigation and Municipal Vulnerability Planning Processes and on work completed to date
- Provide an opportunity for feedback and comments

BACKGROUND ON MVP PROGRAM

EXECUTIVE ORDER 569 9.16.16

ENVIRONMENTAL BOND BILL 8.21.18

- $2.4 billion bond bill with focus on climate change resiliency
- Over $200 million authorized for climate change adaptation
- **Codifies EO 569, including the MVP Program**

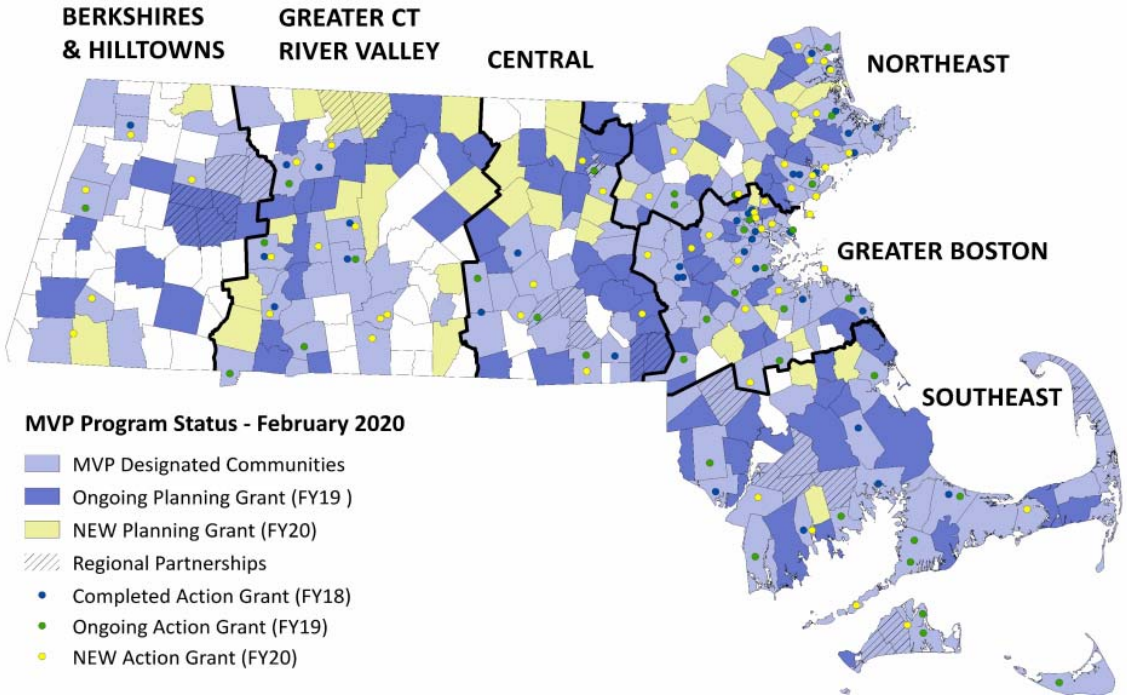
WHO HAS PARTICIPATED IN MVP PROGRAM?

Three Years of MVP

MVP Designations
82% of the Commonwealth
287 communities

Action Grant Projects
FY 18: 37
FY 19: 36
FY 20: 54

Total Awards
$33M+ in planning and action grants to date

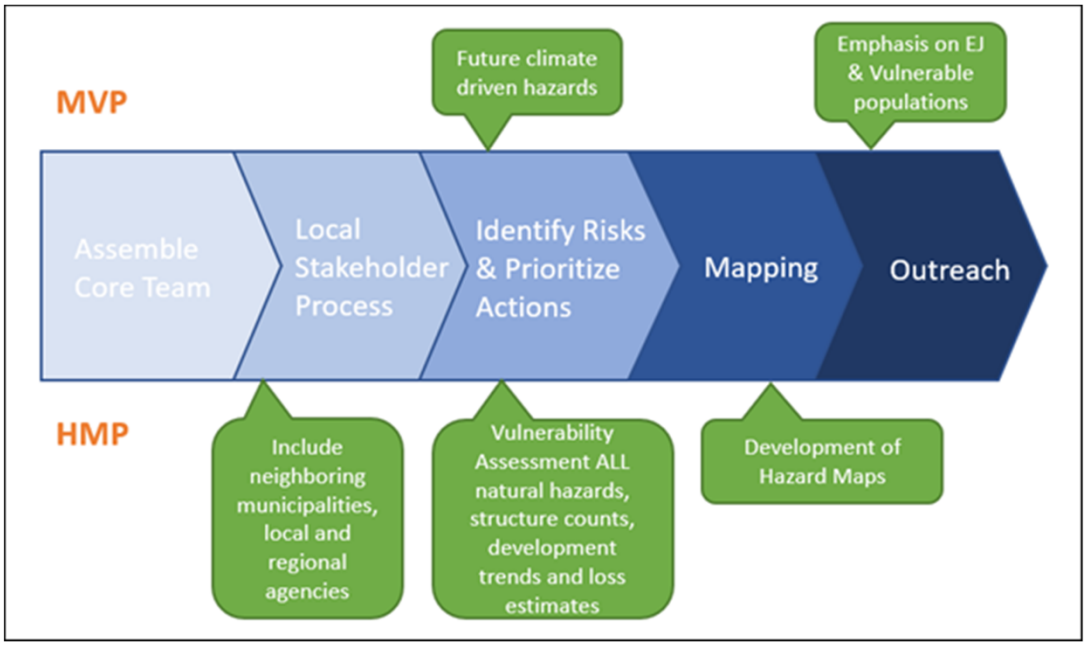


BACKGROUND ON HAZARD MITIGATION PLANNING

- **FEMA Requirements:**
  - Disaster Mitigation Act of 2000, 44 CRF Part 201.6
  - *FEMA Local Mitigation Plan Review Guidance, October 2011*
  - *FEMA Local Mitigation Planning Handbook, March 2013*
- **Pepperell included in Northern Middlesex Regional Hazard Mitigation Plan, approved August 2015.**
  http://www.nmcog.org/Websites/nmcog/images/Hazard_Mitigation_Plan_FEMA_approved_8_15.pdf
- **To maintain eligibility for FEMA/MEMA funding, must update plan every 5 years**
- **Commonwealth of Massachusetts State Hazard Mitigation & Climate Adaptation Plan 2018 must be considered in update**

HOW DO THE MVP AND HMP PROCESSES OVERLAP?

The MVP effort supplements the HMP process by providing a statewide and major watershed specific climate change data to use in the natural hazard risk assessment and a consistent methodology for public engagement through the Community Resilience Building (CRB) workshops.



WHY DO THIS PLANNING?

Help Pepperell Build Resilience and Preparedness:

Climate change is a challenge that will affect every government agency and every community across the Commonwealth, and our coordination in addressing this challenge will help protect Massachusetts residents, infrastructure and natural resources while improving quality of life year-round

Governor Charlie Baker

WHY DO THIS PLANNING?

Help Pepperell Build Resilience and Preparedness:

- Build on the Town's existing emergency management capabilities
- Plan for more frequent and intense weather events that are linked to climate change
- Engage multiple stakeholders in the planning process
- Improve access to funding for mitigation and adaptation

COMMUNITY ASSET INVENTORY

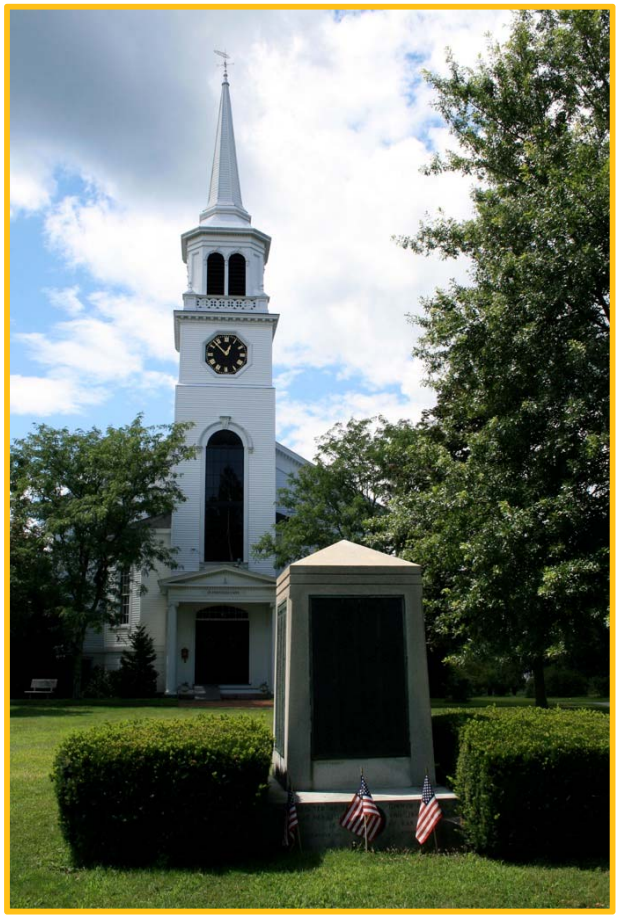
COMMUNITY ASSET CATEGORIES

FEMA defines a community asset as anything that is important to the character and function of a community.

FEMA Community Asset Categories	Critical Sectors	Characteristics of Community Assets
People	Schools, Vulnerable Populations, Cultural Facilities	Areas of greater population density, or population with unique vulnerabilities or less able to respond and recover during a disaster.
Built Environment	Critical Municipal Facilities, Water, Wastewater, Energy, Stormwater, Transportation, Cultural Resources	Critical facilities necessary for a community's response to and recovery from emergencies, infrastructure critical for public health and safety, economic viability, or needed for critical facilities to operate.
Economy	Marinas, Business and Industry	Major employers, primary economic sectors and commercial centers where loss or inoperability would have severe impact on the community and ability to recover from a disaster.
Natural Environment	Natural Resources	Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. Areas of sensitive habitat that are vulnerable to hazard events, protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.

PEOPLE – SOCIETAL ASSETS

- Child Care on Hollis Street
- Churches
- Emergency shelters
- Food Pantry
- Historical Places
- Nursing Homes/elderly housing
- Pepperell Airport
- PACH outreach
- Senior Center
- RV/Trailers
- Southern NH Medical Center
- Schools
- Town Library
- Veterinary hospitals



BUILT ENVIRONMENT – INFRASTRUCTURE ASSETS

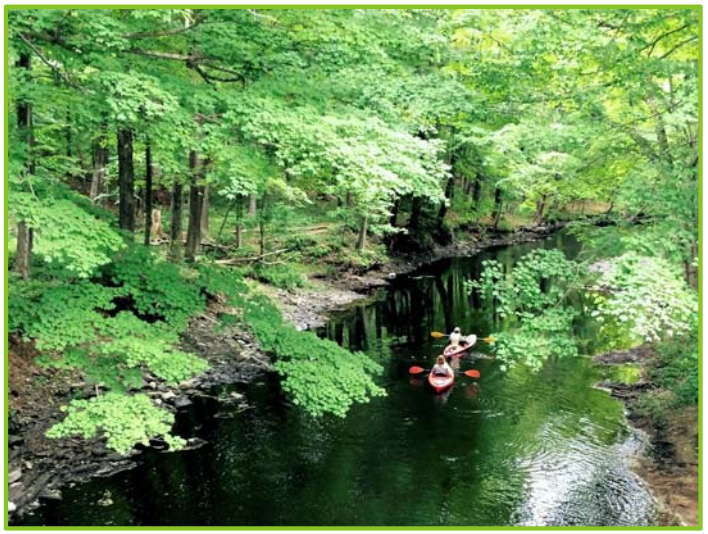
- Bridges (Main Street, Route 119, Route 113, Groton Street, Hollis Street, Mill Street)
- Culverts (town-wide)
- Department of Public Works facilities
- Fire and Police facilities
- Main Street Dam (private)
- Major traffic arteries
- Power grid
- Private medical center on Main Street
- Public safety communications
- Public wells and water facilities
- Schools/town shelters
- Wastewater treatment plant and pump stations

ECONOMIC ASSETS

- Banks
- Donelan's Supermarket (Main Street)
- Farms
- Funeral Homes (Main Street, Pleasant Street)
- Gas Heating Oil Company
- Gas Stations
- Hardware Store (Main Street)
- Industrial Park (Lomar Park)
- Kimball Fruit Farm (Hollis Street)
- Main Street Businesses
- Medical Center (Main Street)
- Oil Delivery (Groton Street, Hollis Street)
- Pharmacies
- Railroad Square (East Main Street)
- Recreational Areas
- Skydiving Park (Nashua Road)
- Tree removal services
- Veterinary Hospital (River Road)

ENVIRONMENTAL ASSETS

- Conservation lands and open space
- Major Wetlands and Waterbodies (e.g., Nashua and Nissitissit Rivers, Gulf Brook)
- Habitat (including vernal pools)
- Trails (Nashua River Trail)
- Well contribution areas



NATURAL HAZARD RISK AND VULNERABILITY ASSESSMENT

WHAT ARE NATURAL HAZARDS?


Inland Flooding


Tsunami


Severe Winter Storm

Blizzards
Snow
Ice Storms


Drought


Average/Extreme Temperatures


Tornadoes


Landslide


Wildfires


Other Severe Weather

Nor'easters
High Wind
Heavy Precipitation
Microbursts


Hurricanes/Tropical Storms


Invasive Species


Earthquake

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HISTORICAL EVENTS IN PEPPERELL

- **August 1948 Highest Temperature Recorded**
  Temperature of 105 degrees recorded in Pepperell
- **January 1957 Lowest Temperature Recorded**
  Temperature of -29 degrees recorded in Pepperell
- **March 1968 Ice Jam**
  Ice jam on the Nashua River
- **1987 Major Flooding of Nashua River**
  Road closures, school closed
- **July 2002 Thunderstorm Wind**
  Winds recorded over 70 mph
- **March 2010 Nashua River Flooding**
  Flooding of the Nashua River leads to closure of Route 111 and Route 119
- **August 2011 Hurricane Irene**
  Devastating flooding, wind damage
- **October 2011 Halloween Storm**
  Power out for seven days
- **March 2018 Nor'easter**
  Pepperell received 20 inches of snow from a winter nor'easter

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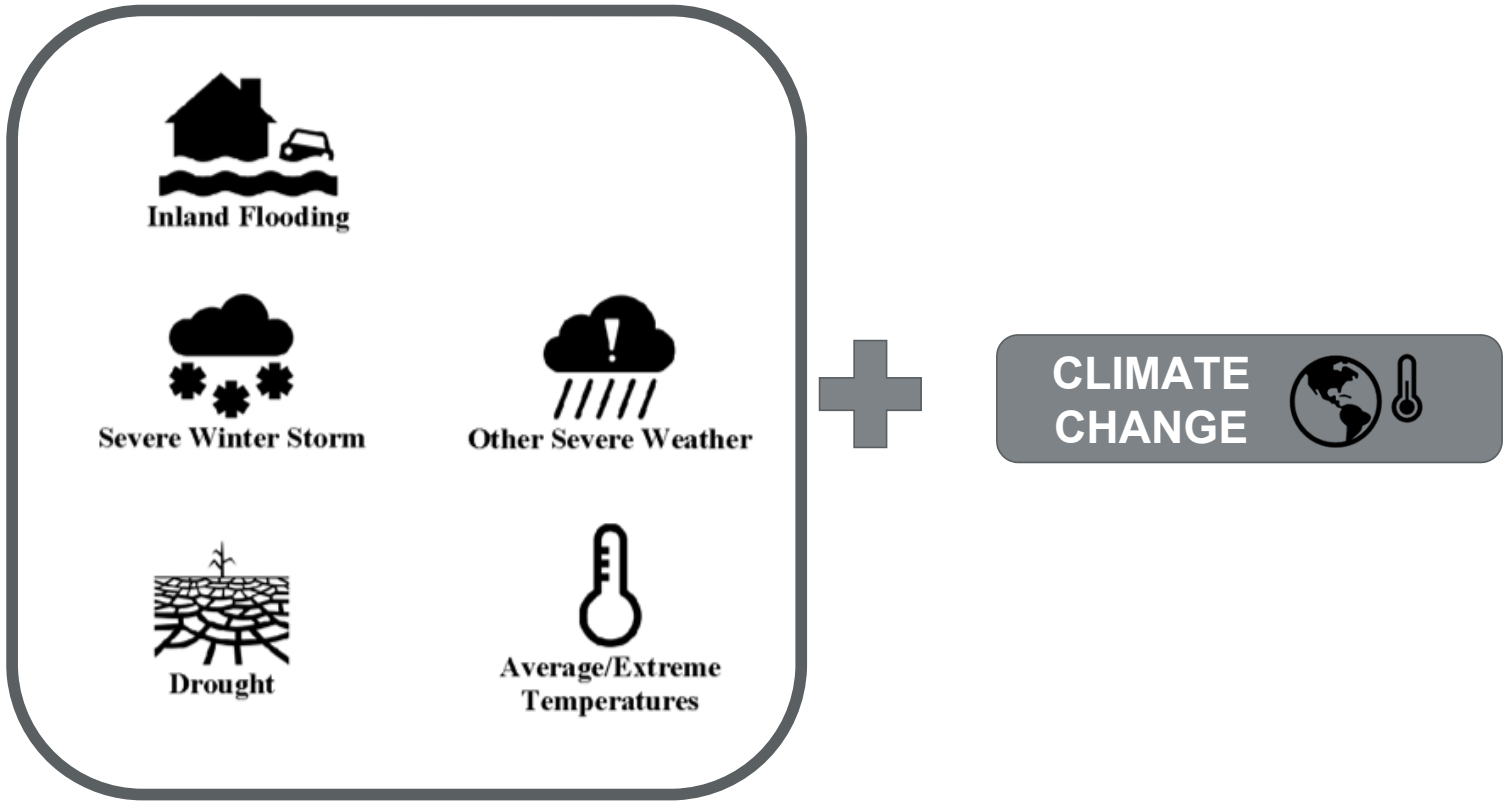
NATURAL HAZARD RISK INDEX

Type of Natural Hazard	History of Occurrence in Pepperell	Hazard Probability	Hazard Frequency	Geographic Extent	Severity of Impact	Hazard Risk Ranking
Inland Flooding	Yes	3	3	2	3	11
Severe Winter-Storm/Nor'easter	Yes	3	3	3	2	11
Drought	Yes	3	3	2	2	10
Extreme Temperature	Yes	3	3	3	1	10
Tropical Storms/ Hurricanes	Yes	3	2	3	2	10
Severe Weather-Strong Wind and High Precipitation	Yes	3	3	3	1	10
Invasive Species	Yes	4	3	2	1	10
Microburst	Yes	3	3	1	1	8
Earthquake	Yes	1	0	3	3	7
Wildfires	Yes	3	1	1	1	6
Tornadoes	No	1	0	1	3	5
Landslide	No	1	0	1	1	3

PEPPERELL'S TOP NATURAL HAZARDS



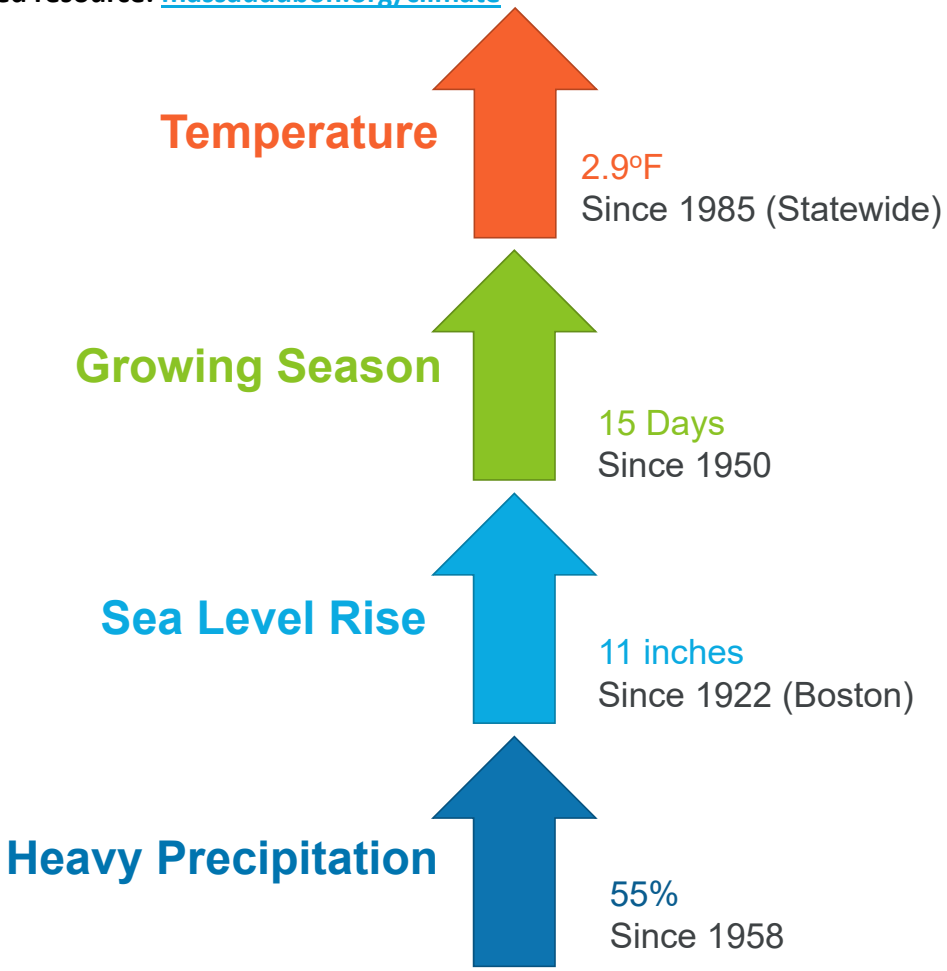
CLIMATE CHANGE

CLIMATE CHANGE REFERENCES FOR MVP PROCESS

- **Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, September 2018**
  - https://www.mass.gov/service-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan
- **Massachusetts Climate Clearinghouse**
  - https://resilientma.org/
- **Statewide and Major Watershed (Basin) Climate Change Projections**
  - https://www.mass.gov/files/ma-statewide-and-majorbasins-climate-projections-final.pdf

MASSACHUSETTS OBSERVED CLIMATE CHANGES

Recommended resource: massaudubon.org/climate



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MASSACHUSETTS CLIMATE PROJECTIONS

By end of century:

Changes in precipitation

- 18% increase in consecutive dry days
- 57% increase in days with > 1 in. rainfall
- 7.3 inches additional annual rainfall

Rising temperatures

- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32* F
- 1,280% increase in 90-degree days/year

Sea level rise

- 4-10.5 feet along the MA coast

Extreme weather

- Increase in frequency and magnitude

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CLIMATE CHANGE THREATENS PUBLIC HEALTH

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CHANGES IN PRECIPITATION

Nashua Basin		Observed Baseline 1971-2000 (Inches)	Projected Change in 2030s (Inches)	Mid-Century Projected Change in 2050s (Inches)	Projected Change in 2070s (Inches)	End of Century Projected Change in 2090s (Inches)
Total Precipitation	Annual	45.9	+0.4 to +4.9	+1.2 to +6.3	+2.3 to +7.9	+1.3 to +8.4
	Winter	11.0	-0.3 to +1.9	+0.2 to +2.5	+0.4 to +3.3	+0.6 to +4.3
	Spring	11.8	-0.0 to +2.2	+0.1 to +2.0	+0.5 to +3.0	+0.1 to +2.9
	Summer	11.3	-0.3 to +1.5	-0.3 to +2.2	-0.6 to +2.2	-1.1 to +2.2
	Fall	11.8	-1.1 to +1.1	-1.2 to +1.8	-1.6 to +1.7	-1.4 to +1.5

IMPACTS OF CHANGING PRECIPITATION

- Episodic droughts
- Concerns over food production and drinking water supply
- Stress on ecosystems
- Flooding

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EXTREME STORMS

Blizzards

- There have been more than 5 in Massachusetts since 2011

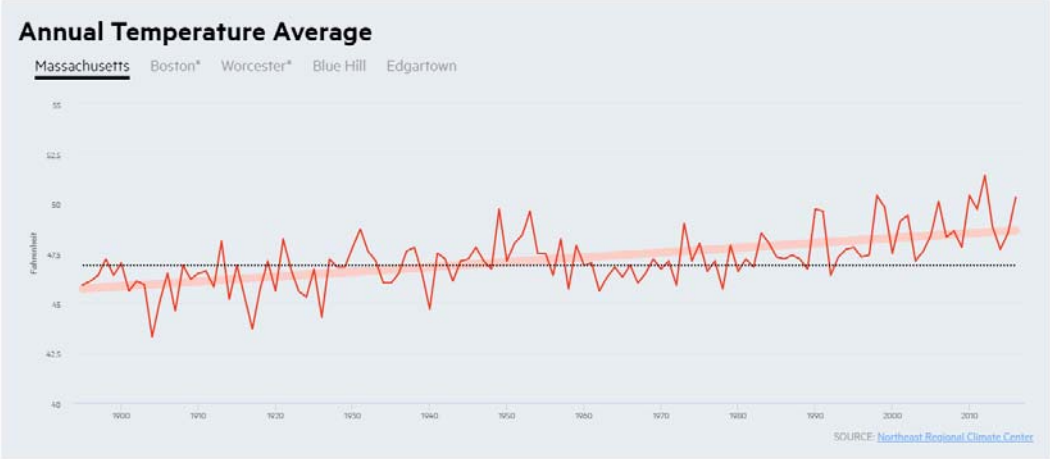
Nor'easters and Hurricanes

- Upward trend since the 1970s

IMPACTS OF EXTREME STORMS:

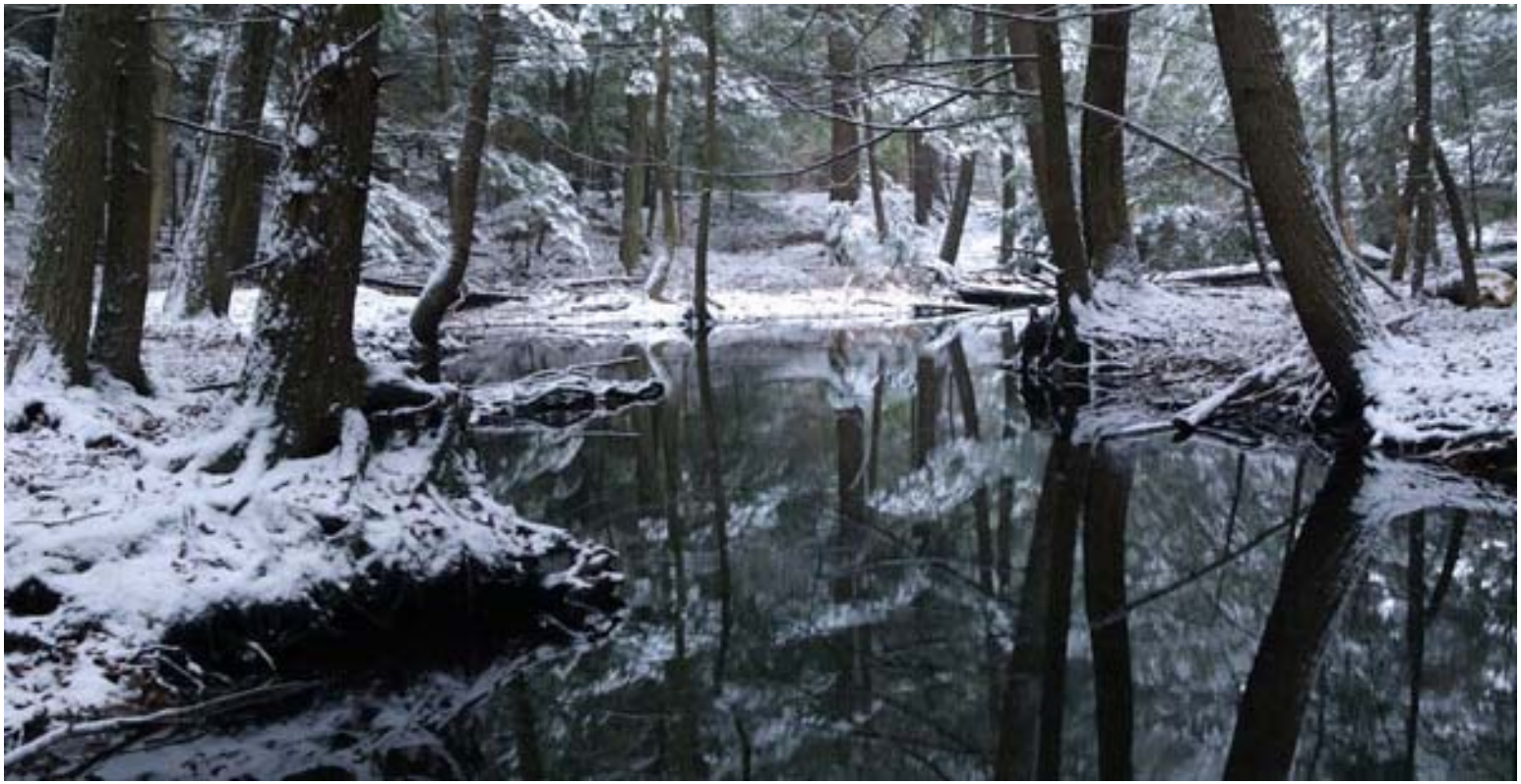
- **Public safety concerns, including increased injuries and mortality**
- **Economic damages and business disruption**
- **Property and infrastructure damage**
- **Natural resources**

RISING TEMPERATURE



IMPACTS OF RISING TEMPERATURE:

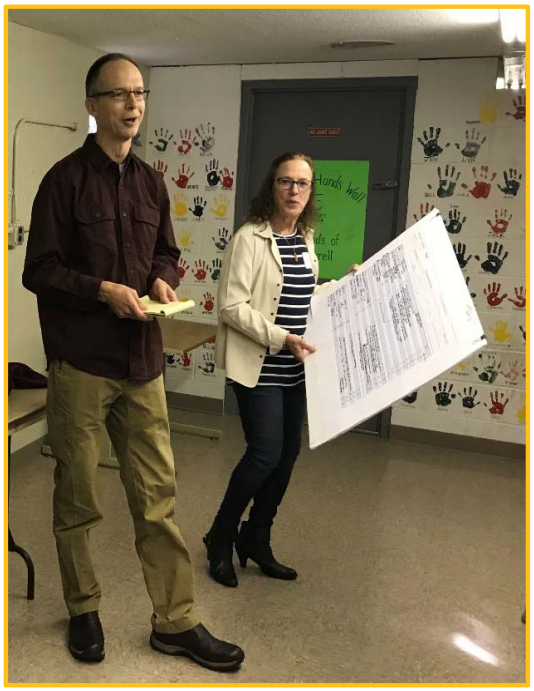
- Heat-related illnesses
- Vector borne-diseases
- Health of plants, animals, ecosystems
- Reduced crop production
- Larger energy demand
- Droughts and wildfires



MVP WORKSHOPS

WORKSHOP OBJECTIVES

- Hear from stakeholders who can help evaluate our community's strengths and vulnerabilities of residents, infrastructure, and natural resources
- Understand connections between natural hazards and local planning/mitigation efforts
- Develop and prioritize resiliency actions for the municipality, organizations, businesses, neighborhoods, and community groups
- Identify opportunities to advance actions that reduce the impact of hazards and increase resiliency in the community



Overview of the Process (Steps & Tasks)

DURING WORKSHOP

A Prepare for the Workshop
1. Establish a core team with goals.
2. Engage stakeholders.
3. Prepare materials for workshop.
4. Decide on participant arrangements.

B Characterize Hazards
1. Identify past, current, and future impacts.
2. Determine the highest-priority hazards.

C Identify Community Vulnerabilities and Strengths
1. Identify infrastructural vulnerabilities and strengths.
2. Identify societal vulnerabilities and strengths.
3. Identify environmental vulnerabilities and strengths.

D Identify and Prioritize Community Actions
1. Identify and prioritize infrastructural actions.
2. Identify and prioritize societal actions.
3. Identify and prioritize environmental actions.

E Determine the Overall Priority Actions
1. Identify highest-priority actions.
2. Further define urgency and timing.

F Put It All Together
1. Generate final workshop products.

G Move Forward
1. Continue community outreach and engagement.
2. Secure additional data and information.
3. Inform existing planning and project activities.

Community Components

Infrastructural

Societal

Environmental

https://www.communityresiliencebuilding.com/

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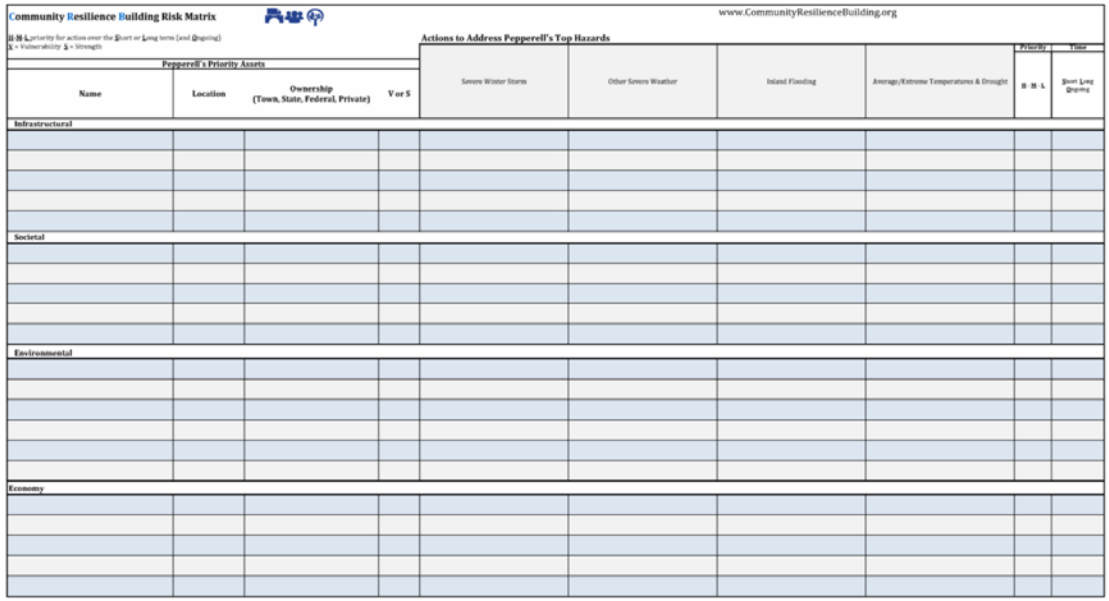
COMMUNITY RESILIENCE BUILDING RISK MATRIX

- **Series of small and large group discussions to fill out CRB Risk Matrix:**
  1. Identify important community assets and the vulnerability to top hazards
  2. Determine mitigation actions to address vulnerabilities and protect strengths
  3. Prioritize and schedule mitigation actions



Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Pepperell's Priority Assets				Actions to Address Pepperell's Top Hazards					
								Priority	Time
Name	Location	Ownership (Town, State, Federal, Private)	V or S	Severe Winter Storm	Other Severe Weather	Inland Flooding	Average/Extreme Temperatures & Drought	H - M - L	Short Long Ongoing
Infrastructural									
Societal									
Environmental									
Economy									

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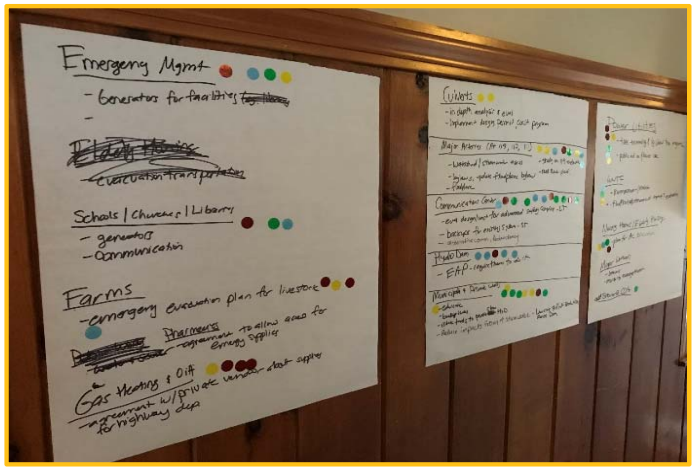
WORKSHOP RESULTS

- Groups reported top risks and strengths and mitigation actions based on prioritization and scheduling
- Mitigation actions then reviewed by Core Team
- MVP Findings Report Draft has been developed



MITIGATION STRATEGIES

TYPES OF MITIGATION ACTIONS

1. Prevention
2. Property Protection
3. Public Education and Awareness
4. Natural Resource Protection and Green Infrastructure
5. Structural Projects
6. Emergency Services Protection

EXAMPLE MITIGATION ACTIONS IN PEPPERELL

- **Prevention**
  - Update Town floodplain, zoning, and stormwater bylaws
- **Natural Resource Protection**
  - Conduct a town-wide watershed/stormwater assessment
- **Structural Projects**
  - Conduct a capacity planning study for culverts to analyze design, permit, and construction
- **Emergency Services Protection**
  - Evaluate and identify backups for the existing communications system and define alternative communications
  - Study inventory and conduct an evaluation on emergency generators
  - Conduct an agreement with a private vendor regarding gas/oil supplies for the highway department in the event of an emergency

Full list available in draft MVP Report on website

WHAT'S NEXT?

NEXT STEPS BEFORE JUNE 30, 2020

- Complete draft Hazard Mitigation Plan for Town staff and public review
- Selectmen vote to submit Hazard Mitigation Plan to FEMA
- Submit documents to EEA and FEMA

MVP ACTION GRANT OPPORTUNITIES

MVP ACTION GRANTS

Project Types

- Planning, Assessments, and Regulatory Updates
- Nature-based Solutions for Ecological and Public Health
- Resilient Redesigns and Retrofits for Critical Facilities and Infrastructure

MVP ACTION GRANTS

- Detailed Vulnerability and Risk Assessment*
- Community Outreach and Education
- Local Bylaws, Ordinances, Plans, and Other Management Measures**
- Redesigns and Retrofits***
- Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques
- Nature-Based, Infrastructure and Technology Solutions to Reduce Vulnerability to Extreme Heat and Poor Air Quality

* Most common project type

** Second-most common project type

***Third-most common project type

MVP ACTION GRANTS (CONT)

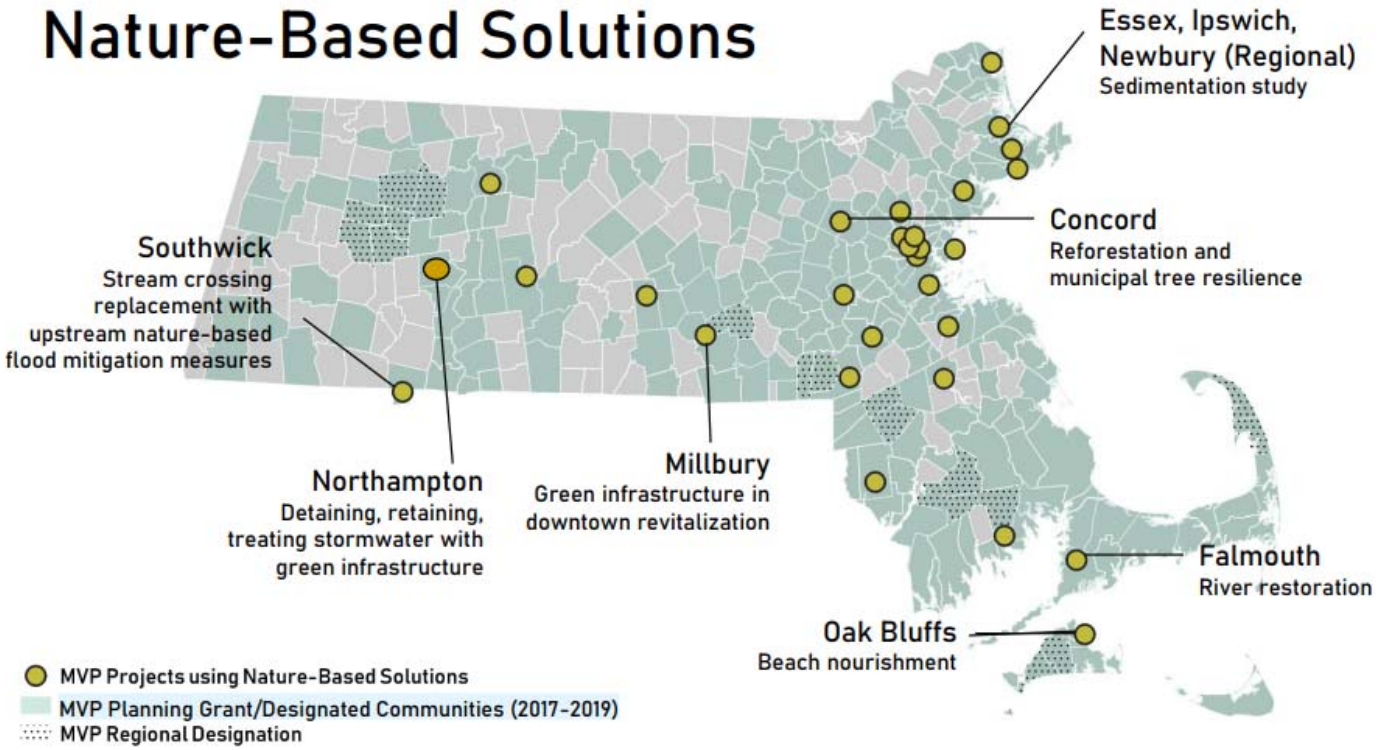
- Nature-Based Solutions to Reduce Vulnerability to other Climate Change Impacts
- Ecological Restoration and Habitat Management to Increase Resiliency

NEW IN 2019

- Energy Resilience
- Chemical Safety
- Land Acquisition for Resilience
- Subsidized Low-Income Housing Resilience Strategies

\+ Expanded eligibility of project location

Nature-Based Solutions



Statistics From Last Round

- 111 applications
- Over $30 million requested
- 54 funded projects
- Total funding $10.5 million
- Average grant size: ~$195,000

EMPHASIS OF FY21

New Public Involvement & Community Engagement Requirements

- New attachment with best practices for community engagement
- Includes menu of options for print, digital, and in-person strategies with an emphasis on strategies that will increase engagement with EJ and Climate Vulnerable Populations that you could tailor to your project
- Opportunity to also create your own innovative strategies
- Application question will ask you to fill out a matrix with your proposed strategies and include details in a narrative and in the scope/budget document

COMPETITIVE EVALUATION CRITERIA

- Project Description, Rationale, and Climate Data
- Nature-Based Solutions and Environmental Benefits
- Environmental Justice and Public/Regional Benefits
- Public Involvement and Community Engagement
- Project Transferability, Measurement of Success, and Maintenance
- Need for Financial Assistance
- Project Feasibility & Management
- Timeline, Scope, and Budget
- Overall Project Quality

THINKING ABOUT ADAPTATION STRATEGIES

- For the three Town-owned community assets most at risk, the Core Team has begun to explore specific adaptation strategies tailored to site.
- Considering specific actions to adapt to natural hazards and climate change.
- Can be structural changes, flood proofing, elevation of critical equipment, on-site plantings or stormwater management.

ADAPTATION STRATEGIES BEING EXPLORED

- **Public Safety Complex**
  - Siting and natural hazard preparedness considerations

- **Water and wastewater facilities**
  - Site-specific climate resiliency plans

FOR MORE INFORMATION

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Information on Town's website at:
https://town.pepperell.ma.us/668/MVP-Grant-Information

AND NOW FOR QUESTIONS AND ANSWERS

NEWS > LOCAL NEWS

Town hosts listening session for MVP certification

Public input valid for use of potential grant money and new hazard mitigation plan

By JON WINKLER | jwinkler@nashobavalleyvoice.com | Nashoba Valley Voice

PUBLISHED: May 31, 2020 at 6:05 p.m. | UPDATED: June 1, 2020 at 8:50 a.m.

PEPPERELL — Town officials furthered the process to achieve municipal vulnerability preparedness certification from the state by holding a virtual listening session on May 21.

Planning Board Adviser Lisa Davis said last month that the open public session was meant to gain community input on what the grant money should be put toward in terms of preserving the town's environment and making the community more resilient to climate change. Davis said the listening session "went well" and the town will likely have the entire report prepared before the deadline of June 30.

According to the Massachusetts Executive Office of Energy and Environmental Affairs, the MVP program awards local towns with grants to fund vulnerability assessments and the development of action-oriented resiliency plans. Before getting those funds, towns have to complete the MVP program and be certified by the state.

Davis said Pepperell first applied for the MVP planning grant last May and received the planning grant in July. Davis said the town has a final draft MVP report, which was discussed during the listening session. Members of the Tighe & Bond consulting firm and Beverly Woods, executive director of the Northern Middlesex Council of Governments, hosted the session. The report has to be finalized and then deemed official before being submitted to the state for certification no later than June 30.

“The biggest hazard we’ve identified is flooding and how to deal with it,” Davis said. “I think the MVP grant could be used to develop a floodplain bylaw to regulate activity within local floodplains. It could also update culverts, provide wetland restoration, go to vulnerable dams in town and emergency services. There’s a laundry list of mitigation strategies.”

On top of going through the MVP process, Davis said the town is also in the midst of establishing its own Hazard Mitigation Plan. The plan, overseen by the Federal Emergency Management Agency, is similar to the purpose of the MVP program in that it educates officials and prepares long-term strategies for communities in case of any kind of natural disaster. If the HMP is certified by FEMA, communities are eligible to receive certain forms of nonemergency disaster assistance. Pepperell originally operated under a North Middlesex HMP, but now state officials want towns to establish their own HMP.

“It’s been a convoluted process so now the state wants us to do a community-exclusive HMP,” she said.

Davis said the HMP is still awaiting approval from the Board of Selectmen, which she expects to be completed by July.

Tags: **Pepperell**

Jon Winkler | Multimedia journalist

Jon Winkler is a 25-year-old reporter covering government, education and human interest in Ayer, Groton, Pepperell, Shirley and Townsend for the Nashoba Valley Voice. He previously covered education and local government in East Hampton and Southampton, New York. Jon is a New England original, born in Nashua and raised in Merrimack, New Hampshire.

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