THE TOWN OF BLANDFORD, MASSACHUSETTS

2016 HAZARD MITIGATION PLAN

MISSION

TO REDUCE OR ELIMINATE THE LOSS OF LIFE, PROPERTY AND GOVERNMENT DISRUPTION TO ALL NATURAL HAZARDS.

2016 Hazard Mitigation Plan

Prepared by:

Blandford Hazard Mitigation Planning Committee

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ACKNOWLEDGEMENTS

BLANDFORD HAZARD MITIGATION COMMITTEE

Tom Ackley, Deputy Fire Chief, Emergency Manager

Brad Curry, Highway Department Supervisor

Adam Dolby, Selectboard

Ed Harvey, Fire Chief

Kevin Hennessey, Police Chief

David Hopson, Superintendent for Gateway School District

Bill Levakis, Water Commissioner

Judy MacKinnon, Council on Aging

Margit Mikusi, Council on Aging

The Blandford Select Board offers thanks to the thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Commonwealth of Massachusetts 2013 State Hazard Mitigation Plan which served as a model for this plan.

CERTIFICATE OF ADOPTION

TOWN OF BLANDFORD, MASSACHUSETTS

BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE

TOWN OF BLANDFORD 2016 HAZARD MITIGATION PLAN

WHEREAS, the Town of Blandford established a Committee to prepare the **2016 Hazard Mitigation Plan**; and

WHEREAS, the Town of Blandford participated in the development of the Town of Blandford **2016 Hazard Mitigation Plan**;

and WHEREAS, the Town of Blandford **2016 Hazard Mitigation Plan** contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Blandford, and

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

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

NOW, THEREFORE BE IT RESOLVED that the Town of Blandford Board of Selectmen formally approves and adopts the Town of Blandford **2016 Hazard Mitigation Plan**, in accordance with M.G.L. c. 40.

ADOPTED AND SIGNED this

ATTEST

LIST OF ACRONYMS

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

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CHAPTER 1. PLANNING PROCESS

INTRODUCTION

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

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

Preparing, and updating every five years, a local natural hazards mitigation plan before a disaster happens can save the community money and will facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the Plan. FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding. For example, the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation Program are programs with this requirement.

PLANNING PROCESS

In 2016, the Town of Blandford completed their first Local Natural Hazards Mitigation Plan, in collaboration with the Pioneer Valley Planning Commission. Planning for hazard mitigation involved a Hazard Mitigation Committee comprised of members of the Town. The table below shows a list of Hazard Mitigation Committee members.

Table 1 Hazard Mitigation Committee

Name	Position
Tom Ackley	Deputy Fire Chief, Emergency Manager
Brad Curry	Highway Department Supervisor
Adam Dolby	Selectboard
Ed Harvey	Fire Chief
Kevin Hennessey	Police Chief

Name	Position
David Hopson	Superintendent for Gateway School District
Bill Levakis	Water Commissioner
Judy MacKinnon	Council on Aging
Margit Mikusi	Council on Aging

The hazard mitigation planning process for the Town included the following tasks:

- Reviewing and incorporating existing plans and other information.
- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding.
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages.
- Identifying deficiencies in the current strategies and establishing goals for updating, revising or adopting new strategies.
- Adopting and implementing the final Hazard Mitigation Plan.

The key product of this process is a list of hazard mitigation actions in order of priority.

The planning process began with Jamie Caplan, Jamie Caplan Consulting LLC meeting with the Hazard Mitigation Committee. Ms. Caplan was hired by the Pioneer Valley Planning Commission to assist them and the Town of Blandford with the planning process.

HAZARD MITIGATION COMMITTEE MEETINGS

Meetings of the Hazard Mitigation Planning Committee, all of which took place at the Blandford Town Offices, were held on the dates listed below. Sign-in sheets for each meeting are included in Appendix B. While not all members of the Hazard Mitigation Committee were able to attend each meeting, all members collaborated on the plan and were updated on progress by fellow Committee members after meetings occurred as necessary.

FEBRUARY 11, 2016

The Hazard Mitigation Committee met for the first time on February 11, 2016. Eight people were in attendance which represented the majority of the committee. Ms. Caplan briefed the group on the process of developing a hazard mitigation plan since this is their first. The majority of the meeting focused on identifying critical facilities and discussion information related to the capability assessment. It became clear during the meeting that the committee is quite interested in the level of disaster

preparedness conducted by town residents. For that reason, the committee decided they would like to distribute a Preparedness Survey.

FEBRUARY 24, 2016

The second Hazard Mitigation Committee meeting was extremely productive. The group reviewed a draft Preparedness Survey for distribution at the Public Meeting, scheduled for March 7, 2016. They made some changes to the initial critical facility list, adding the MassPike rest areas going east and west bound. They discussed the list of hazards to focus on by comparing their needs to the State Mitigation Plan list of hazards. Then as a group they ranked the hazards by completing a table, shown in Chapter Z, used to combine qualitative and quantitative data. Not surprisingly, the Town is most at risk to High Winds, Ice Storms, Winter Storms, Thunderstorms and Tornados. The meeting concluded with a discussion regarding the mitigation strategy. The Committee agreed that the highest priority is to retrofit the Town Offices to function as a shelter and an emergency operation center (EOC). Details regarding these mitigation actions and others may be found in Chapter 6.

MARCH 24, 2016

The Hazard Mitigation Committee met on March 24, 2016 in the Town Offices building. The Hazard Mitigation Committee discussed mitigation actions as well as Town capabilities during the meeting. During the Public Meeting it was recommended that a mitigation action be added to the plan regarding maintaining and protecting town historical documents and records. The Committee agreed that this is a worthwhile action and added it to the plan. They also added tree trimming to the list of mitigation actions as a method to protect power lines.

One of the biggest challenges the Fire Department faces is their inadequate firehouse facility and the age of the trucks. All of their trucks are beyond the date recommended for service. In fact, the main truck did not start while the fire fighters were attempting to respond to a car fire on the Masspike. The fire house sits on such a small land footprint that the utilities sitting behind the firehouse are in fact on a neighbor's land. The bay doors are not automatic and need to be held up by a pole. The width of the bay doors is literally inches bigger than the width of the trucks. The fire house does not have sufficient heat or bathroom facilities. The Highway Garage is located in town while the Salt Shed is located outside of downtown. The Highway Department struggles with having their equipment and supplies in multiple locations. The most cost effective remedy is to expand the Salt Shed with a Butler Building and utilities and use it to house all Highway Department vehicles and equipment. The current Highway Garage could become the Fire Station. These mitigation actions were added to this plan.

APRIL 18, 2016

The Hazard Mitigation Committee met for the final time on April 18, 2016 in the Town Offices. This meeting was held prior to the second Public Meeting. It gave the Committee an opportunity for a final review of the mitigation actions and to discuss the implementation plan. The Committee decided to give the public two weeks to review the plan by making it available in digital form on the Town website and the PVPC website. They will make a hard copy available at the Town Offices, the Council on Aging, and

the General Store. The majority of the meeting was used to discuss funding opportunities and to delegate grant writing responsibilities. A couple of minor changes were made to the mitigation actions.

PARTICIPATION BY PUBLIC & ENTITIES IN SURROUNDING COMMUNITIES

Outreach for the first and second meetings included a press release and a flyer, each can be found in Appendix D. Each document was emailed to the Berkshire Chiefs, Hampden Chiefs and Western Mass Fire Chief's association. They were also posted on the Town website. The Council on Aging sent them to the Southern Hilltown Consortium, a group comprised of the Council on Aging in six communities. The outreach effort was extensive because Blandford is interested in closely working with their neighbors on matters related to emergency management.

MARCH 7, 2016

The first public meeting was held in conjunction with a Selectboard Meeting whose agenda drew standing room only. The Selectboard held a caucus and then turned the floor to Ms. Caplan for the Hazard Mitigation Plan presentation. The presentation served to educate the attendees on the benefits of mitigation planning and the process of developing the plan. Participants were actively involved asking questions and contributing information. The Selectboard is specifically interested in protecting town records and wonders if mitigation funding is available for this. In addition to the presentation, Ms. Caplan distributed a Preparedness Survey developed in collaboration with the Hazard Mitigation Committee. Distribution of the survey will continue through the second public meeting. Outreach for the survey will include emphasis to Council on Aging participants because some of the mitigation actions, including sheltering-in-place education will target this group.

APRIL 18, 2016

The second public meeting was also held in conjunction with a Selectboard Meeting. Thirteen people were in attendance. Ms. Caplan presented a PowerPoint presentation showing the value of a hazard mitigation plan, the thirteen mitigation actions identified, and the next steps. Participants asked several questions including when is funding available, pre- or post-disaster and how to secure funding. They also asked about the order of the mitigation actions. Interest was high among participants and they appreciated the emphasis in the plan to better prepare residents to shelter-in-place through education and the Council on Ageing disaster supply kits outreach.

NATURAL HAZARDS PREPAREDNESS SURVEY

A natural hazards preparedness survey was distributed in the early months of the planning process. Nineteen surveys were completed. Interestingly, sixteen respondents reported they are prepared to shelter-in-place which is a priority for Blandford residents. The most valuable community assets are the Town Offices, Fire Station and Electric Substation. Respondents were mixed on how they like to receive

information on disaster resilience. Some common answers were the internet, mail and phone calls. A blank survey is included in Appendix B.

PARTICIPATION BY STAKEHOLDERS

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

LOCAL AND REGIONAL AGENCIES INVOLVED IN HAZARD MITIGATION ACTIVITIES AND SURROUNDING COMMUNITY ENGAGEMENT AND INPUT

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

- Developing the Pioneer Valley Regional Land Use Plan, Valley Vision 2, which advocates for sustainable land use throughout the region and consideration for the impact of flooding and other natural hazards on development.

- Developing the Pioneer Valley Climate Action and Clean Energy Plan, which assesses the impact that climate change will have on the region and recommends strategies for mitigation that can be implemented by local municipalities and businesses.

- Collaborating with state agencies, such as the Department of Conservation and Recreation, to maintain inventories of critical infrastructure throughout the region.

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

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

For the update of this Hazard Mitigation Plan, PVPC provided feedback from WRHSAC on regional mitigation activities and natural hazards pertaining to Ware. This was the method through which WRHSAC was engaged in the planning process.

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

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

DRAFT PLAN REVIEW

Citizens from adjacent municipalities were encouraged to comment on Blandford's plan.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all meetings in accordance with Massachusetts open meeting laws.

PLAN ADOPTION

Once the plan was provisionally approved by FEMA, the Select Board held a public hearing on the plan and adopted it on _____.

AUTHORITY AND ASSURANCES

The Town of Blandford will continue to comply with all applicable federal laws and regulations during the periods for which it receives grant funding in compliance with 44 CFR 201.6 and will amend its plan whenever necessary to reflect changes in Town, State or Federal laws and regulations as required in 44 CFR 201.6.

CHAPTER 2. LOCAL PROFILE

COMMUNITY SETTING[1]

Established in 1741, the Town of Blandford is situated in the Berkshire Hills of western Hampden County, overlooking the Connecticut River valley. During the founding era of the country, Blandford was along an important transportation corridor between Albany and Springfield. Topographically rolling, the town is composed of both shallow and steep hills, as well as thin, rocky soil deposited by historic glacial formations. Numerous small tributaries flow through Blandford, such as Pebbles Brook and Bedlam Brook, which empty into the Cobble Mountain Reservoir and its settling basin in the south eastern corner of the town. Towards the west, Blair Pond and Long Pond are the sizeable bodies of water, with Borden Brook directly adjacent to the southern boundary of town. Although the mountainous soil posed initial challenges for raising crops, Blandford possesses a rich agricultural history, with dairy production and orchards the prominent forms of farming.

The center of Blandford, adjacent to Interstate-90, is comprised of a mix of residential homes, commercial buildings, and retail establishments. Many of these buildings are well-preserved examples of historic architectural styles, including many colonial structures and a notable Greek Revivalist church. With a population of 1,240 people, settlement is clustered around the center of town, anchored by east-west Route 23. Outside of this area, the land is sparsely settled, with agricultural operations and undisturbed, forested open space creating a traditional rural New England environment. To the west, East Otis falls just beyond the town line on Route 23. Russell, to the east, Granville, to the south, and Chester and Huntington, to the north, border Blandford.

Other than the agricultural industry, tourism and recreational assets are well-defined throughout the town. Historically, families from Springfield and Westfield would ascend to wooded summer resorts here. Today, the town continues to attract visitors who visit the farms and partake in hiking, boating, and fishing on the Mountain Laurel Trail and Cobble Mountain Reservoir. Additionally, the town encompasses the Blandford Ski Area, a regional destination for winter sport enthusiasts. The annual Blandford Fair, occurring every weekend in the summer, also draws visitors from throughout western Massachusetts.

[1] The majority of the information for this section was obtained from various websites including: (http://www.mass.gov/dhcd/iprofile/316.pdf - October 19, 2006; and Blandford's Open Space and Recreation Plan

SCHOOLS

Chester Elementary School in Chester and Littleville Elementary School in Huntington serve Blandford's K-4 students. Students in grades 5 and up attend the Gateway Regional School District, which serves 1,300 youths from Blandford, Chester, Huntington, Middlefield, Montgomery, Russell and Worthington.[4]

INFRASTRUCTURE

ROADS AND HIGHWAYS

Although Blandford is transected by Interstate 90, it falls between Exit 2 (Lee) and Exit 3 (Westfield) and does not have an exit of its own, although a service plaza is maintained within town boundaries. The primary east-to-west route in through town is Route 23, the historic path of General Henry Knox. This road links Blandford to Great Barrington and Russell. Over the border in Russell, Route 23 converges with Route 20, which travels into Westfield. In total, Blandford has 90 miles of roads,[2] primarily winding rural paths with varying grades.

RAIL

Blandford does not have any active rail lines or carriers. The closest active carrier, CSX, operates through neighboring Russell on its route to Selkrik, NY. Blandford does have abandoned rights of way, mainly in forested areas, that were constructed as part of the historic Berkshire Street Railway trolley line.

PUBLIC TRANSPORTATION

Due to Blandford's location, it is not served by an active public transportation line. The Council on Aging operates transportation modes for senior residents in town.

PUBLIC DRINKING WATER SUPPLY

According to the 2013 Annual Drinking Water Quality Report from the Blandford Water Department, the town draws its water from one source, the Long Pond Reservoir. Located in the western part of the town, Long Pond Reservoir is comprised of a surface area stretching 81 acres, with a hydraulic grade elevation of 1,544 feet. Water from the reservoir is processed at the Long Pond Water Treatment Facility, which has a maximum capacity of 250,000 gallons per day.[3] Private wells may be in use on some properties in town.

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[2] U.S. Census 2012 American Community Survey 5-Year Estimates

[3] Town of Blandford Water Department, 2013 Annual Drinking Water Quality Report

SEWER SERVICE

Blandford does not operate a public sewer service or wastewater treatment facility. Properties in Blandford utilize on-site septic systems to store and process sewage. While the town employs a Plumbing and Gas Inspector, it does not have a Stormwater Management Bylaw to address the construction of these systems.

NATURAL RESOURCES

Blandford is located in the western most part of Hampden County, stretching 34,184 acres (53.50 square miles). The maximum elevation areas reach 1,700 feet in the hilltops, with elevation climbing westward. This is juxtaposed by low elevations, between 400 and 500 ft., unfolding towards the streams and tributaries in town. As the town is made up of rolling hills, elevations range widely.

The topography of much of Western Massachusetts was radically changed by glaciation during the Pleistocene period nearly one million years ago. The retreat of the last glacier, about 10,000 years ago, removed 10 to 15 feet of bedrock from the most exposed ledges, rounded the hills, deposited debris and created new land forms. The Muddy Brook valley, which is a glacial flute (small valley), is an example of this geologic phenomenon, and a considerable percentage of the soils in the Blandford area were formed from glacial till and alluvial deposits. The large stones and boulders left as glacial debris often create serious problems for agricultural use, and the slow permeability of the soils is a severe limitation for septic systems.

Most of Blandford's lands are severely limited by slope for small scale commercial sites, and large rocks, shallow depth to bedrock, droughtiness or occasionally high water table conditions pose serious problems for forest or agriculture development. Primarily an agricultural community, commercial orchards reside and dairy farms operate throughout the hills of Blandford. These entities are economically dependent on an uninterrupted water supply.

Slope is an important factor to consider in determining the development potential of an area. Areas with a slope of 15% or greater are considered to have limitations for building due to the significantly increased physical or financial requirements of such a project.

SURFACE WATER

Blandford contains numerous water resources, as it is intersected by many streams which flow into the Westfield River and down into the Connecticut River Valley. The Long Pond Reservoir, the town's water supply, is located in the western part of Blandford. To the south, Bedlam Brook and Peebles Brook snake through the terrain and empty into the Cobble Mountain Reservoir. Continuing south, Henry Brook, a small pocket of water, can be found just prior to the town's southern boundary. Cochran Pond, Dunlap Pond, and Black Brook Reservoir are situated in the northern section of town. The Town of Russell utilizes the Black Brook Reservoir for its municipal water supply. Towards the center of town, Blair Pond

connects to Watson Brook and Case Brook. On the eastern border with Russell, Wigwam Brook flows near the Bradley Brook Conservation Land, with Freeland Brook transecting the area.

WETLANDS

The Town of Blandford operates a Conservation Commission that encourages environmental stewardship and oversees the town's wetlands and conservation areas. The typical wetland plants (high bush blueberry, ferns, red maple, quaking aspen, birches, junipers, dogwoods) are popular foraging plants for many birds and other wildlife. Development limitations and strict legislation concerning wetland areas prevent these ecosystems from being used for anything more than conservation and recreation use. Recreation opportunities in and around include bird watching and hiking.

There are approximately 1135.90 acres of wetlands in Blandford. Wetland habitats in town occur primarily along the streams and tributaries as well as in lands adjacent to the major ponds in Blandford. If open waters are included in this accounting, the total acreage of wetlands in Blandford rises to 4,117. These wetlands and flood areas in are shown on Blandford's Water Resources Map. Currently, development of some wetland areas in Blandford is limited by the Massachusetts Wetlands Protection Act. However, Blandford currently has no local wetlands bylaw, and as a result, protection of these critical natural areas is not guaranteed.

Wetlands include rivers, ponds, swamps, wet meadows, beaver ponds, and land within the FEMA-defined 100-year flood area. Wetland areas are home to frogs, fish, freshwater clams and mussels, beaver, muskrats, great blue herons, waterfowl, and bitterns.

BEAVER DAMS

Beaver activity has been increasing over the past decade. Several wetland areas have been flooded by beaver dam construction. As a result, their vegetation has changed from forested wetland to marshy habitat. Sometimes beaver activity is detrimental to property, causing problems for local land owners (e.g., flooding of wells, septic systems, lawns, out-buildings, and roadways). Affected individuals must contact the Board of Health and Conservation Commission for advice and permission to alleviate the beaver problem.

AQUIFERS

There are a number of aquifer recharge areas in Blandford, all of which are located around the major bodies of water.

FLOODWAYS

The major floodplain areas in Blandford are located primarily along the multitude of streams, ponds, and reservoirs in the town. This includes Cobble Mountain Reservoir, Black Brook Reservoir, Blair Pond, Long Pond Reservoir, Cochran Pond, Dunlap Pond, Russell Brook, Wigwam Brook, Peebles Brook, and

Freeland Brook. Furthermore, floodways are present around the minor streams and tributaries that traverse the town and also envelop part of Tolland State Forest. protect the community against resource degradation when unsuitable uses occur along these waterways, and also to prevent an increase in the extent and severity of flooding.

FORESTS

As of 1985, sixty-four percent of Blandford's land was covered with forest. The major forest types in Blandford are the Appalachian-Oak (Northern Red Oak, White Oak, Chestnut Oak, American Chestnut) and the Northern Hardwood (Sugar Maple, Beech, Yellow Birch, White Birch, Paper Birch, Hemlock). Many of these species may be harvested for furniture, flooring, and fuel. These mature forests are excellent places for recreation trails, because of the lack of substantial undergrowth. A maturing forest has less recreation opportunities, but is a more popular habitat for wildlife, and provides game for hunting. Over one thousand acres of forested lands are already in conservation, including 89 acres of Town Forest, 268 acres of the State-owned Swift River Wildlife Area, and over 700 acres of privately-owned Chapter 61 forests.

The majority of the land in Blandford remains undeveloped, with 31,230 acres remaining in its natural state. Forest comprises most of this land. Although timber operations have slowed in Blandford, a small number of them continue to harvest. Also, converting former agricultural fields to recreation fields means that little or no forest cutting is needed. However, much of Blandford's undeveloped, un-forested land is still in private ownership, and liability issues make it difficult for owners to permit recreational use by the town. Currently, over 800 acres of privately owned open lands are protected for agricultural use under Chapter 61A.

CHAPTER 3. HAZARD IDENTIFICATION & RISK ASSESSMENT

The Hazard Identification & Analysis chapter provides details regarding all of the natural hazards that may impact the Town of Blandford. Gathering this information included historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases.

NATURAL HAZARDS IN BLANDFORD

The Hazard Mitigation Committee referred to the 2013 Massachusetts Hazard Mitigation list of hazards to develop a list of the development of this mitigation plan. Table 2 below illustrates a comparison between the relevant hazards in the state plan and those in Blandford.

Table 2 MA State Plan Hazards and Hazards Relevant to Blandford

2013 Massachusetts Hazard Mitigation Plan	Town of Blandford Relevance
Coastal Hazards	The Town of Blandford is not located on the coast.
Dam Failure	Dam Failure is a risk to Blandford, they have lost bridges and roadways in the past.
Drought	Drought is a risk to Blandford.
Earthquake	Earthquake is a risk to Blandford.
Extreme Temperatures	Extreme Temperature is a risk to Blandford.
Flood (including Ice Jams)	Flooding is a risk to Blandford especially in North Blandford.
High Wind	High Wind is a risk to Blandford.
Hurricane/Tropical Storm	Hurricane is a risk to Blandford.
Ice Storms	Ice Storm is a risk to Blandford and included in the category Severe Snowstorms/Ice Storms..
Landslide	Landslide is considered a risk in Blandford.
Major Urban Fires	Major Urban Fires are not considered a risk to Blandford. However, wildfires and brush fires are considered a risk.

2013 Massachusetts Hazard Mitigation Plan	Town of Blandford Relevance
Nor'easter	Nor'easter is a risk to Blandford and included in the category Severe Snowstorms/Ice Storms.
Snow & Blizzard (Severe Winter Weather)	Snow & Blizzard is a risk to Blandford and included in the category Severe Snowstorms/Ice Storms.
Thunderstorm (Severe Weather)	Thunderstorm is a risk to Blandford and included in the category Severe Thunderstorms/Wind/Tornadoes.
Tornado (Severe Weather)	Tornado is a risk to Blandford and included in the category Severe Thunderstorms/Wind/Tornadoes.
Tsunami	The Town of Blandford is not located on the coast or near the coast for tsunami to be a risk.
Wildland Fire	Wildland Fire is considered a risk to the Town of Blandford.

The Hazard Mitigation Committee and PVPC categories the above list of hazards slightly differently than the 2013 Massachusetts Hazard Mitigation Plan. For example, the State refers to High Winds and this plan refers to Severe Thunderstorms/Wind/Tornado. The full list is in the table below.

Table 3 Hazard Categories in Blandford Plan

State Plan	Blandford Plan
Dam Failure	Dam Failure
Drought	Drought
Earthquake	Earthquake
Extreme Temperatures	Extreme Temperatures
Flooding	Flooding
High Wind	Severe Thunderstorm/Wind/Tornado
Hurricane/Tropical Storm	Hurricane
Ice Storms	Severe Snow/Ice Storm

State Plan	Blandford Plan
Landslide	Landslide
Nor'easter	Severe Snow/Ice Storm
Snow/Blizzard	Severe Snow/Ice Storm
Thunderstorm	Severe Thunderstorm/Wind/Tornado
Tornado	Severe Thunderstorm/Wind/Tornado
Wildfire	Wildfire/Brushfire

Climate Change was added not as a hazard category but as a factor that may impact natural hazards. This chapter includes historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases to develop a full hazard description and vulnerability assessment for each identified hazard.

NATURAL HAZARD ANALYSIS METHODOLOGY

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

HAZARD DESCRIPTION

The natural hazards identified for Blandford are: Dam Failure, Drought, Earthquake, Extreme Temperatures, Flooding, Hurricane, Landslide, Severe Snow/Ice Storm, Severe Thunderstorm/Wind/Tornado, and Wildfire/Brushfire. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

LOCATION

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

Table 4 Location of Occurrence Scale

Location of Occurrence	Percentage of Town Impacted
Large	More than 50% of the town affected
Medium	10 to 50% of the town affected
Small	Less than 10% of the town affected

EXTENT

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

PREVIOUS OCCURRENCES

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

PROBABILITY OF FUTURE EVENTS

The likelihood of a future event for each natural hazard was classified according to the following scale shown in the table below.

Table 5 Frequency of Occurrence and Annual Probability

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

IMPACT

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

Table 6 Extent of Impact

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

VULNERABILITY

Based on the above metrics, a hazard index rating was determined for each hazard. The hazard index ratings are based on a scale of 1 (highest risk) through 5 (lowest risk). The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable. However; many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability.

Table 7 Hazard Identification and Analysis Worksheet

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Vulnerability
Dam Failure	Small	Low	Critical	3
Drought	Large	High	Minor	4
Earthquake	Large	Very low	Minor	5
Extreme Temperatures	Large	Very high	Limited	3
Flood (including Ice Jam)	Medium	Moderate	Critical	3
High Wind	Large	High	Critical	1
Hurricane/Tropical Storm	Large	Moderate	Critical	2
Ice Storm	Large	Very high	Catastrophic	1
Nor'easter	Large	Very high	Critical	1
Snow & Blizzard	Large	Very high	Critical	1
Thunderstorm	Large	Very high	Critical	1
Tornado	Large	Moderate	catastrophic	1
Wildland Fire	Large	Moderate	Critical	2

Summarizing the hazard analysis worksheet, the Hazard Mitigation Committee developed the following table that groups the hazard by risk level.

Table 8 Hazard Risk Ranking

Description	Hazard	Risk Ranking
Very High Risk	High Winds Ice Storms Nor'easter Snow & Blizzard Thunderstorm Tornado	1
High Risk	Hurricane Wildland Fire	2
Moderate Risk	Dam Failure Extreme Temperatures Flood	3
Low Risk	Drought	4
Very Low Risk	Earthquake	5

DAM FAILURE

HAZARD DESCRIPTION

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

Many dams in Massachusetts were built during the 19th Century without the benefit of modern engineering design and construction oversight. Dams of this age can fail because of structural problems due to age and/or lack of proper maintenance, as well as from structural damage caused by an earthquake or flooding.

The Massachusetts Department of Conservation and Recreation Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of

storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

LOCATION

Blandford has seventeen dams located within its boundaries, each of which is a legacy of Blandford's industrial heritage. Most dams are located on the Blandford River.

EXTENT

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

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

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

PREVIOUS OCCURRENCES

Blandford lost a bridge because of a dam failure that broke a beaver dam and everything let go.

PROBABILITY OF FUTURE EVENTS

As Blandford's dams age, and if maintenance is deferred, the likelihood of a dam failure will increase, but, currently the frequency of dam failures is very low with a less than 1 percent chance of a dam failing in any given year.

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

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

IMPACT

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, $930,657,600 is used.

An estimated 100 percent of damage would occur to 20 percent of structures, resulting in a total of $x worth of damage and 2108 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on this analysis, Blandford faces a Moderate Risk from dam failure.

DROUGHT

HAZARD DESCRIPTION

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

LOCATION

Because of this hazard's regional nature, a drought would impact the entire town.

EXTENT

The severity of a drought would determine the scale of the event and would vary among town residents depending on whether the residents' water supply is derived from a private well or the public water

system. Blandford's Public Water Supply is supplied by six wells; these six wells supply 70% of the town's water needs. Massachusetts' wells are permitted according to their ability to meet demand for 180 days at maximum capacity with no recharge; if these conditions extended beyond the thresholds that determine supply capacity the damage from a drought could be widespread due to depleted groundwater supplies.

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

Figure 1 U.S. Drought Monitor

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

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

PREVIOUS OCCURRENCES

In Massachusetts, six major droughts have occurred statewide since 1930.[3] They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the US Drought Monitor:

Table 9 Annual Drought Status

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

[3] US Geological Survey Water-Supply Paper 2375. "National Water Summary 1989 – Floods and Droughts: Massachusetts." Prepared by S. William Wandle, Jr., US Geological Survey.

Annual Drought Status	
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state

Source: US Drought Monitor

PROBABILITY OF FUTURE EVENTS

In Blandford, as in the rest of the state, drought occurs at a rate of between 1 percent and 10 percent in a single given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event.

When evaluating the region's risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought.[4] However, global warming and climate change may have an effect on drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts.

[4] National Drought Mitigation Center – http://drought.unl.edu

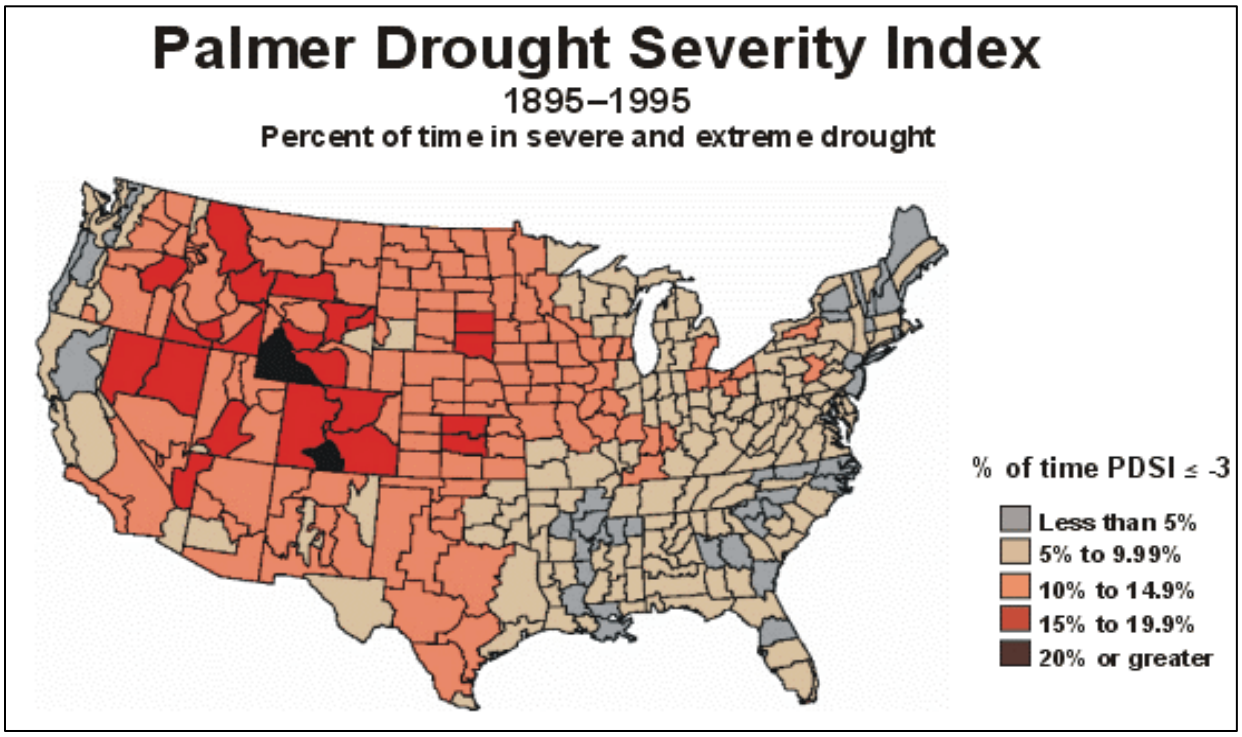


Figure 2 Palmer Drought Severity Index

IMPACT

Due to the water richness of western Massachusetts, Blandford is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard.

VULNERABILITY

Based on the above assessment, there is a Low Risk of drought.

EARTHQUAKES

HAZARD DESCRIPTION

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not

noticed by people.[5] Ground shaking from earthquakes can rupture gas mains and disrupt other utility service, damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods (dam failure) and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable soil, and mobile homes not tied to their foundations are at risk during an earthquake.[6]

LOCATION

Because of the regional nature of the hazard, the entire town is equally susceptible to earthquakes. There is moderate potential for serious damage in village portions of town Routes 9 and 32.

EXTENT

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

Table 10 Richter Scale

Richter Scale Magnitudes and Effects	
Magnitude	**Effects**
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.

[5] Northeast States Emergency Consortium Web site: *www.nesec.org/hazards/earthquakes.cfm.*

[6] Federal Emergency Management Agency Web site: *www.fema.gov/hazards/earthquakes/quake.shtm.*

Richter Scale Magnitudes and Effects	
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Table 11 Modified Mercalli Intensity Scale

Modified Mercalli Intensity Scale			
Scale	**Intensity**	**Description Of Effects**	**Corresponding Richter Scale Magnitude**
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	< 6.1

Modified Mercalli Intensity Scale			
Scale	**Intensity**	**Description Of Effects**	**Corresponding Richter Scale Magnitude**
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: US Federal Emergency Management Agency

PREVIOUS OCCURRENCES

The most recent earthquakes to affect New England are shown in the table below.

Table 12 New England Earthquakes with Magnitude of 4.2 or more, 1924-2012

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

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

Table 13 New England Historic Earthquakes

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

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

PROBABILITY OF FUTURE EVENTS

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

Table 14 Earthquake Index for Hampshire County

Earthquake Index for Hampshire County	
Hampshire County	0.17
Massachusetts	0.70
United States	1.81

Based upon existing records, there is a low frequency of earthquakes in Blandford with between a 1 percent and 2 percent chance of an earthquake occurring in any given year.

IMPACT

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

Because engineering studies have determined that the greatest threat to the Quabbin Reservoir's dam system is from an earthquake, the committee decided to rank earthquakes as a high-risk category, as an earthquake could result in the devastation of Blandford's town center if the Quabbin Reservoir's dams were to fail as a result of an earthquake.

VULNERABILITY

Based on this analysis, Blandford faces a Very Low Risk from earthquakes.

EXTREME TEMPERATURES

HAZARD DESCRIPTION

As per the Massachusetts Hazard Mitigation Plan, extreme cold is a dangerous situation that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat. There is no universal definition for extreme

temperatures, with the term relative to local weather conditions. For Massachusetts, extreme temperatures can be defined as those that are far outside the normal ranges. The average temperatures for Massachusetts are:

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

Criteria for issuing alerts for Massachusetts are provided on National Weather Service web pages: http://www.erh.noaa.gov/box/warningcriteria.shtml.

EXTENT

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

Extreme temperatures would affect the whole community.

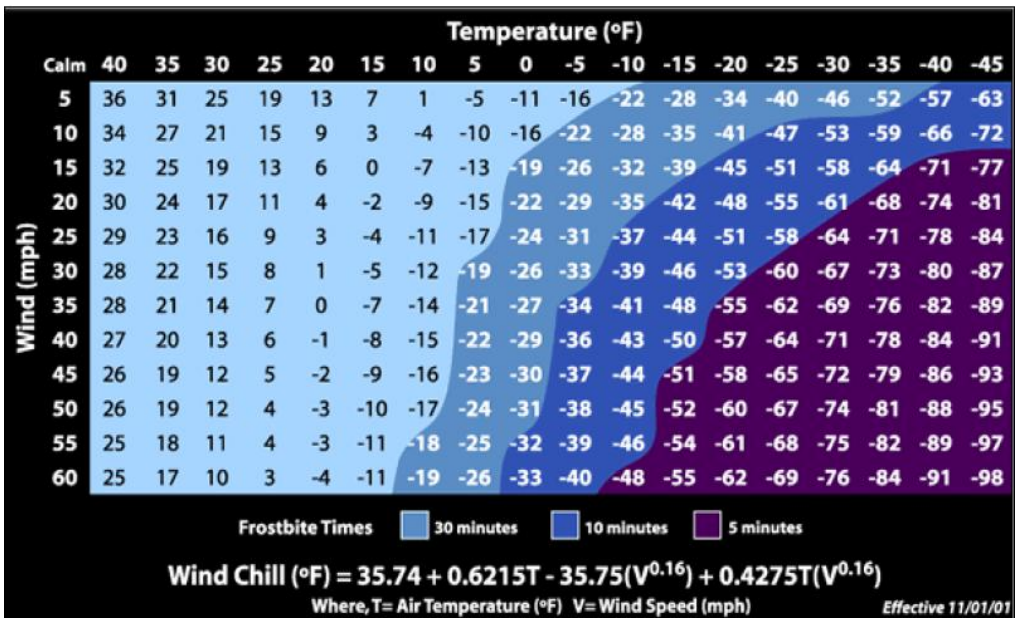


Figure 3 Wind Chills

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

Warning if the Heat Index is forecast to reach 105+ degrees F for 2 or more hours. The following chart indicates the relationship between heat index and relative humidity:

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke or Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.
Caution	80 °F – 90 °F	Fatigue possible with prolonged exposure and/or physical activity.

Figure 4 Heat Index

PREVIOUS OCCURRENCES

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

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

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

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

PROBABILITY OF FUTURE EVENTS

The probability of future extreme heat and extreme cold is considered to be "low," or between 1 and 10 percent in any given year.

IMPACT

The impact of extreme heat or cold in Blandford is considered to be "minor," with no property damage and very limited affect on humans.

VULNERABILITY

Blandford's vulnerability from extreme temperatures is rated a Moderate Risk.

FLOOD

HAZARD DESCRIPTION

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

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

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

LOCATION

There are approximately X acres of land within the FEMA mapped 100-year floodplain and 246 acres of land within the 500-year floodplain within the Town of Blandford. The narrow bands of level floodplain land along the Cobble Mountain Reservoir, Black Brook Reservoir, Blair Pond, Long Pond Reservoir, Cochran Pond, Dunlap Pond, Russel Brook, Wigwam Brook, Peebles Brook, and Freeland Brook are all within the 100-year or 500-year floodplain.

North Blandford Village is prone to flooding more than any other area of Blandford.

EXTENT

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

- **Flash floods** are the product of heavy, localized precipitation in a short time period over a given location. Flash flooding events typically occur within minutes or hours after a period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).

- **General floods** may last for several days or weeks and are caused by precipitation over a longer time period in a particular river basin. Excessive precipitation within a watershed of a stream or river can result in flooding particularly when development in the floodplain has obstructed the natural flow of the water and/or decreased the natural ability of the groundcover to absorb and retain surface water runoff (e.g., the loss of wetlands and the higher amounts of impervious surface area in urban areas).

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

PREVIOUS OCCURRENCES

The major floods recorded in Blandford have been the result of rainfall alone or rainfall combined with snowmelt. Since 1954, there have been six FEMA flood declared disasters in Hampshire County, as shown in the map below.

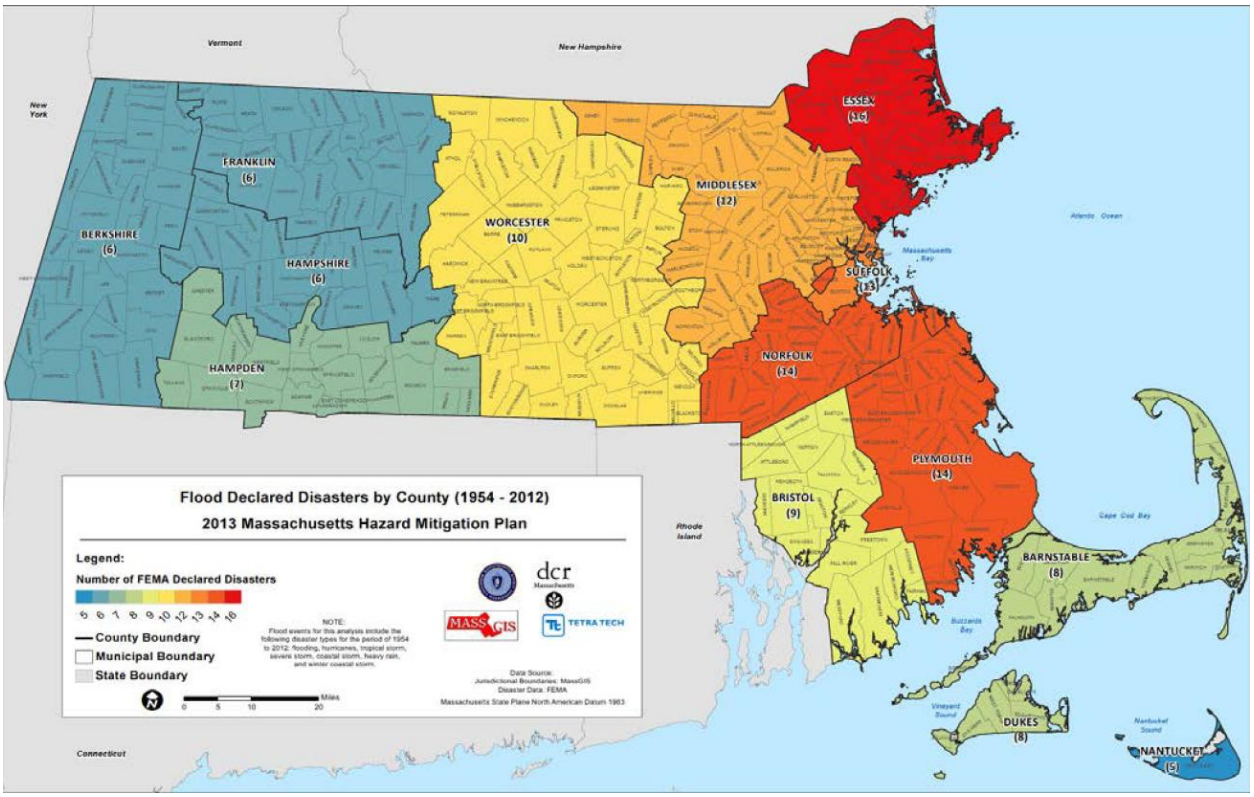


Figure 5 FEMA Flood Declared Disasters by County, 1954-2012

Source: Massachusetts Hazard Mitigation Plan

PROBABILITY OF FUTURE EVENTS

The area within the 100-year flood plain has a 1 percent chance of flooding in any given year.

Based on previous occurrences there is an approximately 7 percent chance a year of localized, flash flooding.

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

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

IMPACT

According to the Community Information System (CIS) of FEMA, there were X 1-4 family structures and 0 "other" structures located within the Special Flood Hazard Area (SFHA) in Blandford as of 2014, the most current records in the CIS for the Town of Blandford. To approximate the potential impact to property and people that could be affected by this hazard, the Town's median home value of $256,000, as of 2012, and average household size of 2.27 is used.[7]

An estimated 20 percent of damage would occur to each structure in the 100-year flood plain, resulting in a total of $12,104,160 worth of damage and 686 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on the above analysis, Blandford faces a Moderate Risk of a 100-year base flood and annual flooding due to the community's topography and waterways. Blandford faces a low risk of localized flooding in locations outside of FEMA's Flood Insurance Rate Maps for the town.

HURRICANE

HAZARD DESCRIPTION

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

[7] Figures courtesy of 2008-2012 American Community Survey Estimates, U.S. Census

LOCATION

Because of the hazard's regional nature, all of Blandford is at risk from hurricanes. Ridge tops are more susceptible to wind damage.

EXTENT

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

Table 15 Saffir-Simpson Scale

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

Source: National Hurricane Center, 2012

PREVIOUS OCCURRENCES

Hurricanes that have affected the Pioneer Valley are shown in the following table.

Table 16 Major Hurricanes in the Pioneer Valley

Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Hurricane of 1938	1938	3

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

PROBABILITY OF FUTURE EVENTS

Blandford's location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a low probability of hurricanes in Blandford in any given year.

IMPACT

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

Table 17 Hurricane Damage Classifications

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

5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	157+
	Catastrophic damage will occur		

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, $X is used. Wind damage of 5 percent with 10 percent of structures damaged would result in an estimated $X of damage. Estimated flood damage to 10 percent of the structures with 20 percent damage to each structure would result in $18,613,152 of damage and 1,054 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on the above analysis, Blandford faces a High Risk from hurricanes.

SEVERE SNOWSTORMS/ICE STORMS

HAZARD DESCRIPTION

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

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

LOCATION

The entire Town of Blandford is susceptible to severe snowstorms. Because these storms occur regionally, they impact the entire town.

The following areas have been identified by the Hazard Mitigation Committee as areas where snow drifts form during winter storm events:

- Portions of the west side of Fisherdick Road
- Northwest corner of the west side of Old Gilbertville Road

EXTENT

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

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

Table 18 Northeast Snowfall Impact Scale Categories

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

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

PREVIOUS OCCURRENCES

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

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

Table 19 Winter Storms Producing Over 10 Inches of Snow in the Pioneer Valley, 1958-2013

Date	NESIS Value	NASIS Category	NESIS Classification
3/12/1993	13.2	5	Extreme
3/2/1960	8.77	4	Crippling
2/15/2003	7.5	4	Crippling
2/2/1961	7.06	4	Crippling
1/21/2005	6.8	4	Crippling
1/19/1978	6.53	4	Crippling
12/25/1969	6.29	4	Crippling
2/10/1983	6.25	4	Crippling
2/14/1958	6.25	4	Crippling
2/5/1978	5.78	3	Major
2/23/2010	5.46	3	Major
2/8/1994	5.39	3	Major

Date	NESIS Value	NASIS Category	NESIS Classification
1/9/2011	5.31	3	Major
2/18/1972	4.77	3	Major
12/11/1960	4.53	3	Major
2/7/2013	4.35	3	Major
2/22/1969	4.29	3	Major
1/18/1961	4.04	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.5	2	Significant
4/6/1982	3.35	2	Significant
3/4/2013	3.05	2	Significant
3/15/2007	2.54	2	Significant
3/31/1997	2.29	1	Notable
2/2/1995	1.43	1	Notable
1/25/1987	1.19	1	Notable

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

PROBABILITY OF FUTURE EVENTS

Based upon the availability of records for Hampshire County, the likelihood that a severe snow storm will hit Blandford in any given year is greater than 50 percent.

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

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

IMPACT

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all residential property in town, $930,657,600, is used.

An estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of $X worth of damage and X people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on the above assessment, Blandford faces a Very High Risk to Severe Snowstorm and Ice Storms.

SEVERE THUNDERSTORM/WIND/TORNADO

HAZARD DESCRIPTION

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

Wind is air in motion relative to surface of the earth. For non-tropical events over land, the NWS issues a Wind Advisory (sustained winds of 31 to 39 mph for at least 1 hour or any gusts 46 to 57 mph) or a High Wind Warning (sustained winds 40+ mph or any gusts 58+ mph). For non-tropical events over water, the NWS issues a small craft advisory (sustained winds 25-33 knots), a gale warning (sustained winds 34-47 knots), a storm warning (sustained winds 48 to 63 knots), or a hurricane force wind warning (sustained winds 64+ knots). For tropical systems, the NWS issues a tropical storm warning for any areas (inland or

coastal) that are expecting sustained winds from 39 to 73 mph. A hurricane warning is issued for any areas (inland or coastal) that are expecting sustained winds of 74 mph. Effects from high winds can include downed trees and/or power lines and damage to roofs, windows, etc. High winds can cause scattered power outages. High winds are also a hazard for the boating, shipping, and aviation industry sectors.

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

LOCATION

As per the Massachusetts Hazard Mitigation Plan, the entire town is at risk of high winds, severe thunderstorms, and tornadoes.

EXTENT

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

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

Table 20 Enhanced Fujita Scale

Enhanced Fujita Scale Levels and Descriptions of Damage			
EF-Scale Number	**Intensity Phrase**	**3-Second Gust (MPH)**	**Type of Damage Done**
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.

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

PREVIOUS OCCURRENCES

Because thunderstorms and wind affect the town regularly on an annual basis, there are not significant records available for these events. For tornadoes, there are typically 1 to 3 tornadoes somewhere in southern New England per year. Most occur in the late afternoon and evening hours, when the heating is the greatest. The most common months are June, July, and August, but the Great Barrington, MA tornado (1995) occurred in May and the Windsor Locks, CT tornado (1979) occurred in October.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester. In 2011, a tornado ranked F3 (Severe Damage) on the Fujita Scale of Tornado Intensity, blew through the towns of West Springfield, Westfield, Springfield, Monson, Wilbraham, Brimfield, Sturbridge, and Southbridge. The tornado and related storm killed 3 people and resulted in hundreds of injuries across the state. Nine incidents of tornado activity (F3 or less) have occurred in Hampshire County since 1954 and one known tornado has touched down in Blandford.

PROBABILITY OF FUTURE EVENTS

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

Table 21 Tornado Index for Hampshire County

Tornado Index for Hampshire County	
Hampshire County	125.73
Massachusetts	87.60
United States	136.45

Source: USA.com, http://www.usa.com/hampshire-county-ma-natural-disasters-extremes.htm

Based upon the available historical record, as well as Blandford' location in a high-density cluster of state-wide tornado activity, it is reasonable to estimate that there is a low frequency of tornado occurrence in Blandford in any given year.

As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year.

IMPACT

The potential for locally catastrophic damage is a factor in any severe weather event. In Blandford, a tornado that hit residential areas would leave much more damage than a tornado with a travel path that ran along the town's forested areas, where little settlement has occurred. Most buildings in town have not been built to Zone 1, Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, with most of the town's housing built before this date.

To approximate the potential impact to property and people that could be affected by severe weather, tornado, or wind, the total value of all residential property in town, $X is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of $x worth of damage and 105 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on the above assessment, Blandford faces a Very High Risk to thunderstorm,wind, and tornado.

WILDFIRE/BRUSHFIRE

HAZARD DESCRIPTION

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

FEMA has classifications for 3 different classes of wildland fires:

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

LOCATION

Hampden and Hampshire County have approximately 469,587 acres of forested land, which accounts for 62 percent of total land area. In Blandford, 62 percent of the land is forested, and is therefore at risk of fire. A large wildfire could damage almost all of the town's land mass in a short period of time. However, Massachusetts receives more than 40 inches of rain per year and much of the landscape is fragmented, and together these two traits make wildfires uncommon in Massachusetts. Nevertheless, in drought conditions, a brushfire or wildfire would be a matter of concern.

Blandford might have a well-defined downtown, but it still contains several thousand acres of largely undeveloped space. The rural-urban interface is most pronounced in those sections of town that are experiencing development, most notably Beaver Lake and West Blandford.

There is a significant amount of logging in Blandford and 33% of the town belongs to Springfield or the Russell Watershed, roads are not maintained by the Town and in some instances are not maintained, both of these circumstances make fighting fires very difficult

EXTENT

Wildfires can cause widespread damage to the areas that they affect. They can spread very rapidly, depending on local wind speeds and be very difficult to get under control. Fires can last for several hours up to several days.

PREVIOUS OCCURRENCES

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

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

Table 22 Fire Incidents in Blandford 2008-2012

Total Fire Incidents in Blandford	
2008	67
2009	51
2010	56
2011	45
2012	70

Source: Massachusetts Fire Incidence Reporting System, County Profiles, 2012 Fire Data Analysis

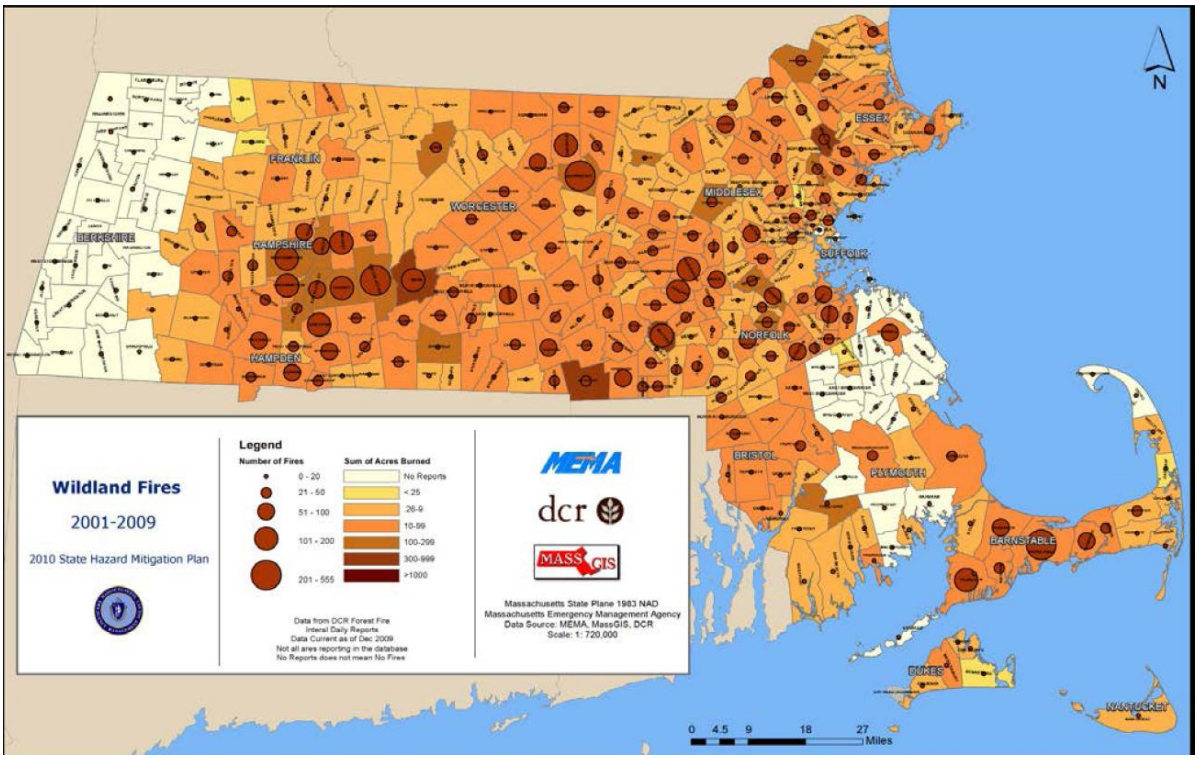


Figure 6 Wildland Fires in Massachusetts, 2001-2009

Source: Massachusetts Hazard Mitigation Plan

PROBABILITY OF FUTURE EVENTS

In accordance with the Massachusetts Hazard Mitigation Plan, the Town Hazard Mitigation Committee found it is difficult to predict the likelihood of wildfires in a probabilistic manner because the number of variables involved. However, given the proximity of previous wildfires, and their proximity to the Town, the likelihood of a future wildfire is determined to be medium.

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

IMPACT

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, $930,657,600 is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of $9,306,576 worth of damage and 105 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

VULNERABILITY

Based on the above assessment, Blandford faces a High Risk from wildfires. The logging done by the Department of Transportation and the Springfield Water Department may cause an increase in the risk of wildfire. Unfortunately, the roads to remote areas owned by DOT and the Springfield Water Department are not always well maintained which makes fighting fires in these areas more difficult. In addition, the Blandford Fire Department wildfire truck is outdated.

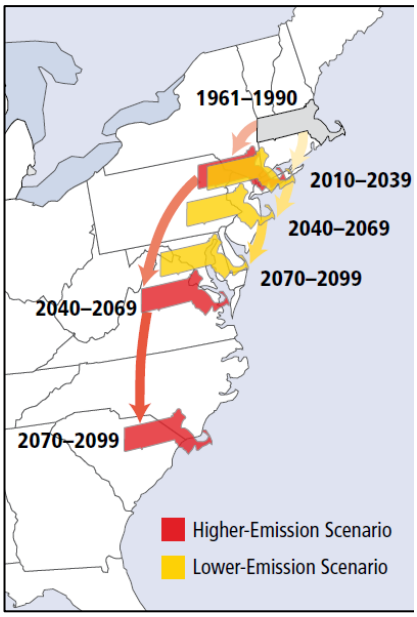
IMPACTS OF CLIMATE CHANGE

Climate change is already causing natural hazards to have more of an impact on Northampton, with hotter summers, wetter winters, more severe storms, and more frequent flooding. In the future, general climatic changes are projected to result in Northampton experiencing higher temperatures and more precipitation. There will also be wider variability in weather extreme and more days of extreme heat above 90 degrees, more heat waves, more floods, more droughts, and more tornados, hurricanes and heavy storms.

This change in climate will expand the area of Blandford that is within the 100-year and 500-year floodplain, affect critical resources and vulnerable populations, alter local food production, increase the risk of wildfires, and result in increased damage to people and property.

This section identifies the impacts that climate change will have to the various identified hazards affecting Blandford. The information included is derived from several accepted sources:

- The 2007 report of the Northeast Climate Impacts Assessment (NECIA)
- The Pioneer Valley Planning Commission's *Our Next Future: An Action Plan for Building a Smart, Resilient Pioneer Valley*, which includes climate change projections
- The Massachusetts Climate Change Adaptation Report



At current rates of greenhouse gas accumulation and temperature increases, the climate of Massachusetts will become similar to those of present-day New Jersey or Virginia by 2040-2069, depending on future GHG emissions.

- The Massachusetts Multi-Hazard Mitigation Plan

The mitigation strategies included in Chapter 5 also take into account the impacts of climate change and provide adaptation strategies where appropriate.

While the exact extent is still uncertain, it is clear that climate change is occurring and will greatly affect Northampton in the upcoming decades. In order to prepare for changes in severe weather and flooding, the Town of Blandford has adopted the 500-year floodplain standard in place of a 100-year floodplain, since it is expected that storms currently considered to be 500-year floods will occur more frequently in the future. As additional climate change research is completed, the City will continue to refine its flooding estimates.

INCREASED FLOODING

By the end of the 21st century, annual precipitation is expected to increase by 14 percent – however, this increase will be a result of more winter precipitation – an increase of 30 percent– while summer precipitation will actually slightly decrease. Additionally, most of this winter precipitation is projected to be in the form of rain rather than snow. This will result in a continuation of the current trend of an overall decrease in total snowfall, as well as the number of days that have snow cover. The increased amount of strong precipitation events and overall increase in rainfall will likely result in more flooding in the region.

Table 23 Expected Climatic Variations Due to Climate Change

Category	Current (1961-1990 avg.)	Predicted Change 2040-2069	Predicted Change 2070-2099
Average Annual Temperature (°F)	46°	50°to 51°	51° to 56°
Average Winter Temperature (°F)	23°	25.5° to 27°	31° to 35°
Average Summer Temperature (°F)	68°	69.5° to 71.5°	74° to 82°
Days over 90 °F	5 to 20 days	-	30 to 60 days
Days over 100 °F	0 to 2 days	-	3 to 28 days
Annual Precipitation	41 inches	43 to 44 inches	44 to 47 inches
Winter Precipitation	8 inches	8.5 to 9 inches	9 to 10.4 inches

Summer Precipitation	11 inches	10.9 to 10.7 inches	10.9 to 11 inches

Sources: Massachusetts Climate Adaptation Report 2011, NECIA

Increased flooding will have the following projected impacts to people and property:

- Currently designated 10-year, 25-year, 100-year and 500-year floodplains of the Mill River and Connecticut River will flood more frequently. Currently 573 people live in the 100-year flood plain and 132 people live in the 500-year flood plain. The City of Northampton believes this to be a severe risk.
- More damage to areas too small to have FEMA floodplain designation and not already zoned floodplain, such as Roberts Meadows Brook. Currently 284 people live in this area and could be affected. Many of these areas already flood consistently, and so climate change will be potentially very damaging to these areas. The City of Northampton believes this to be a severe risk.
- Increased occurrences of localized flooding, in areas designated on the Hazard Identification map. The City of Northampton believes this to be a minor risk.
- Increased stress on the City's flood pumps and levee system.
- Increased instances of standing water will lead to increased mosquito populations and greater risk of disease vectors.

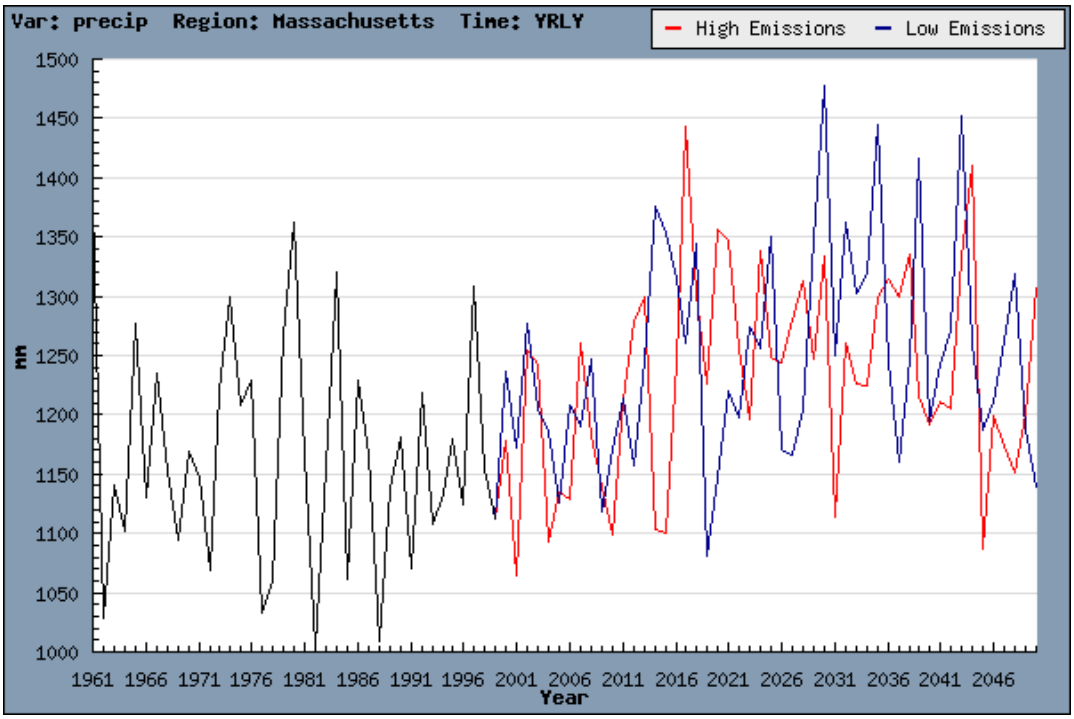


Figure 7 Massachusetts Rainfall 1961-2050

Rainfall has increased approximately 10% during the past 50 years, and is expected to continue to increase. *Source: NECIA*

INCREASED TEMPERATURES

Average temperatures in the Pioneer Valley have been increasing over time in the Pioneer Valley due to climate change, and this trend is likely to continue in the future. Higher temperatures due to climate change will likely have an effect on future drought risk in Town of Blandford. The climate of the Pioneer Valley is strongly influenced by the weather patterns of the larger Northeast United States, a region ranging from Pennsylvania to Maine. Average temperatures in the Northeast have been increasing since the late 1800s. The overall average annual temperature increase in this area has been approximately .9 degrees C (1.5°F) since approximately 1900.

According to records of the United States Historical Climatology Network, most of this temperature increase has occurred recently, with an average increase of about 0.2 degrees C (0.5°F) per decade since 1970. These higher average temperatures have primarily been the result of warmer winters (December through March), during which there has been an increase of 1.3°F per decade since 1970. In addition to average temperature increases, the number of extremely hot and record heat days has also increased: the number of days with temperatures of 90°F and higher throughout the Northeast has doubled during the past 45 years. The northern portion of the Northeast currently sees about 5 days per year with temperatures over 90°F and no days over 100°F, while the southern portion sees up to 20 days over 90°F and 2 days over 100°F.

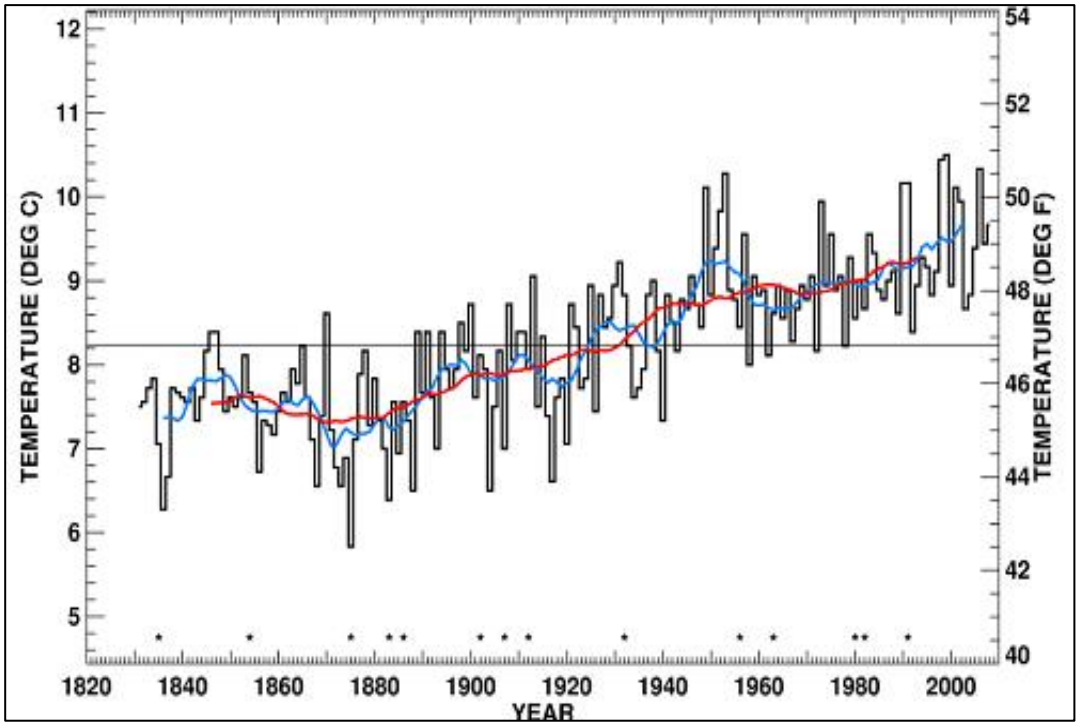


Figure 8 Northeast U.S. Region Annual Average Temperatures 1831-2008

From 1831 to 2008, there was a trend in temperatures steadily increasing at the National Weather Service's Blue Hill Observatory, the home of the oldest continuously recorded weather records in the U.S. *Source: Michael J. Iacono, Atmospheric and Environmental Research, Inc./ Blue Hill Observatory, MA. Plot includes temperature data for 1831–1884 from Milton and Canton that were adjusted to the Blue Hill summit location.*

Increased temperatures will have the following projected impacts to people and property:

- Increased temperatures will put stress on current food production and require farming operations to adjust by planting new varieties of crops.
- Changes are also likely to introduce new insect species, pests, and invasive plant species to the region, which will result in further threats to food production and also aversely affect natural systems and biodiversity. Additional prominence of ticks may potentially also lead to more occurrence of Lyme disease.
- Increased energy usage in order to cool buildings in the summer and long-term electrical needs will increase. The City of Northampton commissioned a study by Rivermoor Systems detailing ways in which critical facilities can be made more resilient, including the installation of backup generators.
- Greater stress on special populations, such as senior citizens, without access to air conditioning during heat waves.

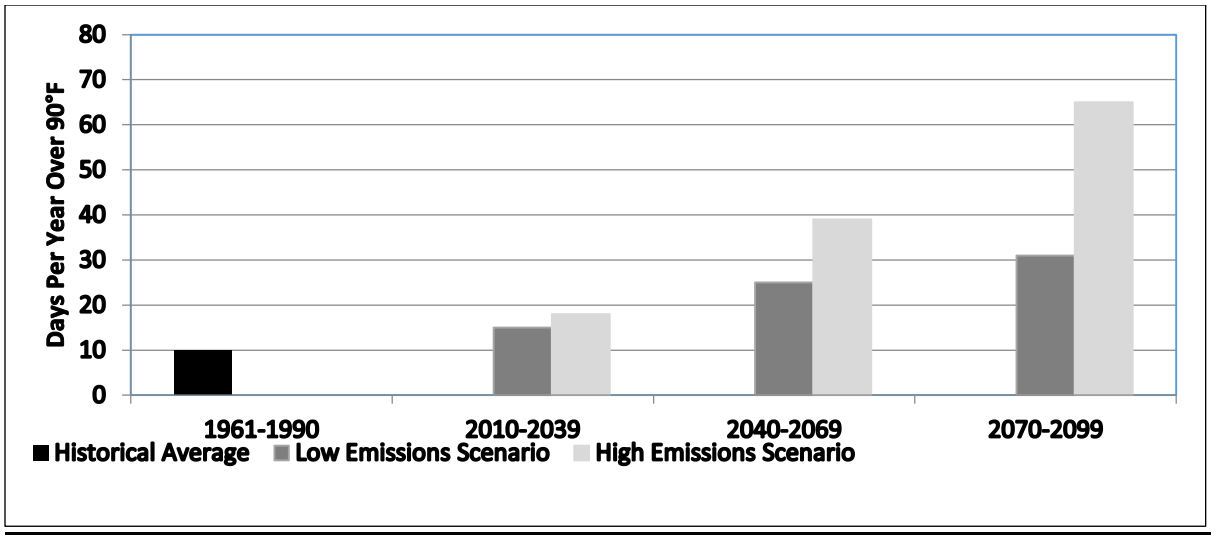


Figure 9 Predicted Days Over 90F in Concord/Manchester, NH

SEVERE WEATHER

Temperature and precipitation changes in the region will lead to increased severe and extreme weather events, including:

- Slight decrease in summer precipitation that will result in an increase in the number of droughts. Short-term (1 to 3 month) droughts are likely to increase in their frequency in the Northeast to the level of once per year. According to the Connecticut Climate Adaptation Report, "Facing Our Future," the occurrence of drought in that state is already increasing, with shallower lakes drying up.[8]
- Decreased rainfalls will potentially create more occurrences of wildfires.
- Less dependable rainfall will also impact the Pioneer Valley's food systems, in the form of less dependable rainfall and require the region's farming operations to evolve.
- Increased occurrences of major snowstorms, especially during times previously considered unseasonably warm. Should storms occur when there are still leaves on trees, there could be great damage due to broken limbs, as happened during the snowstorm of 2011.

[8] State of Connecticut Department of Environmental Protection. Facing Our Future: Adapting to Connecticut's Changing Climate. March 2009.

- Increased occurrences of severe thunderstorms and hurricanes, which will result in more wind damage from major storms and greater flooding.

SECONDARY EFFECTS

- Disruption of communications services due to damage to cellular phone towers and other communications devices.
- Increased costs of home ownership due to higher flood insurance premiums, which will disproportionally affect low income residents.
- Higher difficulty in the ability of residents to obtain basic services that are heavily reliant on electricity after severe weather events, including gasoline and perishable food items.

CHAPTER 5. CRITICAL FACILITIES

FACILITY CLASSIFICATION

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

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

The Blandford Hazard Mitigation Committee identified the structures named in the table below as critical. The map on the following page shows their location.

Table 24 Blandford Critical Facility List

Facility Name/Category	Purpose/Notes	Generator?
Emergency Operation Center (EOC)	Fire House functions as Emergency Operation Center (EOC), however, the facility is in very poor condition.	no
Police Station	Police are located within the Town Offices building	no
Fire Station	Building in poor condition and unsafe.	yes
Town Facilities	Former school building functions as bus hub, town offices, Council on Aging and Police Station. This facility could become an EOC and a shelter.	yes (but it's only for fire suppression)
Post Office/Training Annex attached	Annex includes three office spaces.	no
Library	Small stand alone building.	no
Highway Garage	Houses all highway equipment.	no Do have an 800 kw portable

Facility Name/Category	Purpose/Notes	Generator?
		generator
Salt Storage Building	This building has a repeater on it for communications and a generator for the repeater. Some Town residents would like to see this building become the EOC. However, the building does not have plumbing or heat.	yes
Water Pump house		yes
Water Treatment Plant		yes
Transfer Station		no
First Congregational Church	This facility is directly across from the Town Offices and could function as a warming station.	no
Blandford Club	Founded 100 years ago, this historic golf and tennis club is perfectly right for today's active people.	no
Blandford Ski Area	Over 75 years of New England style skiing and riding. Operated by the Springfield Ski Club.	no
Blandford Fair Grounds	http://theblandfordfair.com/inet/index.htm	no
Blandford Animal Hospital	This veterinary clinic is the only medical facility in town.	no
Mass Pike Rest Area East	Blandford first responders are responsible for people in the rest area or in accidents along the MassPike in Blandford. However, Blandford is not responsible for implementing mitigation measures along the roadway.	yes
Mass Pike Rest Area West	Blandford first responders are responsible for people in the rest area or in accidents along	yes

Facility Name/Category	Purpose/Notes	Generator?
	the MassPike in Blandford. However, Blandford is not responsible for implementing mitigation measures along the roadway.	
Shepard Farm	Historical building.	no
Historical Society	This building is not used frequently.	no
The White Church	This historic building is owned and operated by the Historical Society of Blandford and is maintained by community volunteers. It is open by appointment in the summer and is a beautiful setting for weddings and concerts.	no
Cobble Mountain	Water Supply Area for Springfield, MA	no

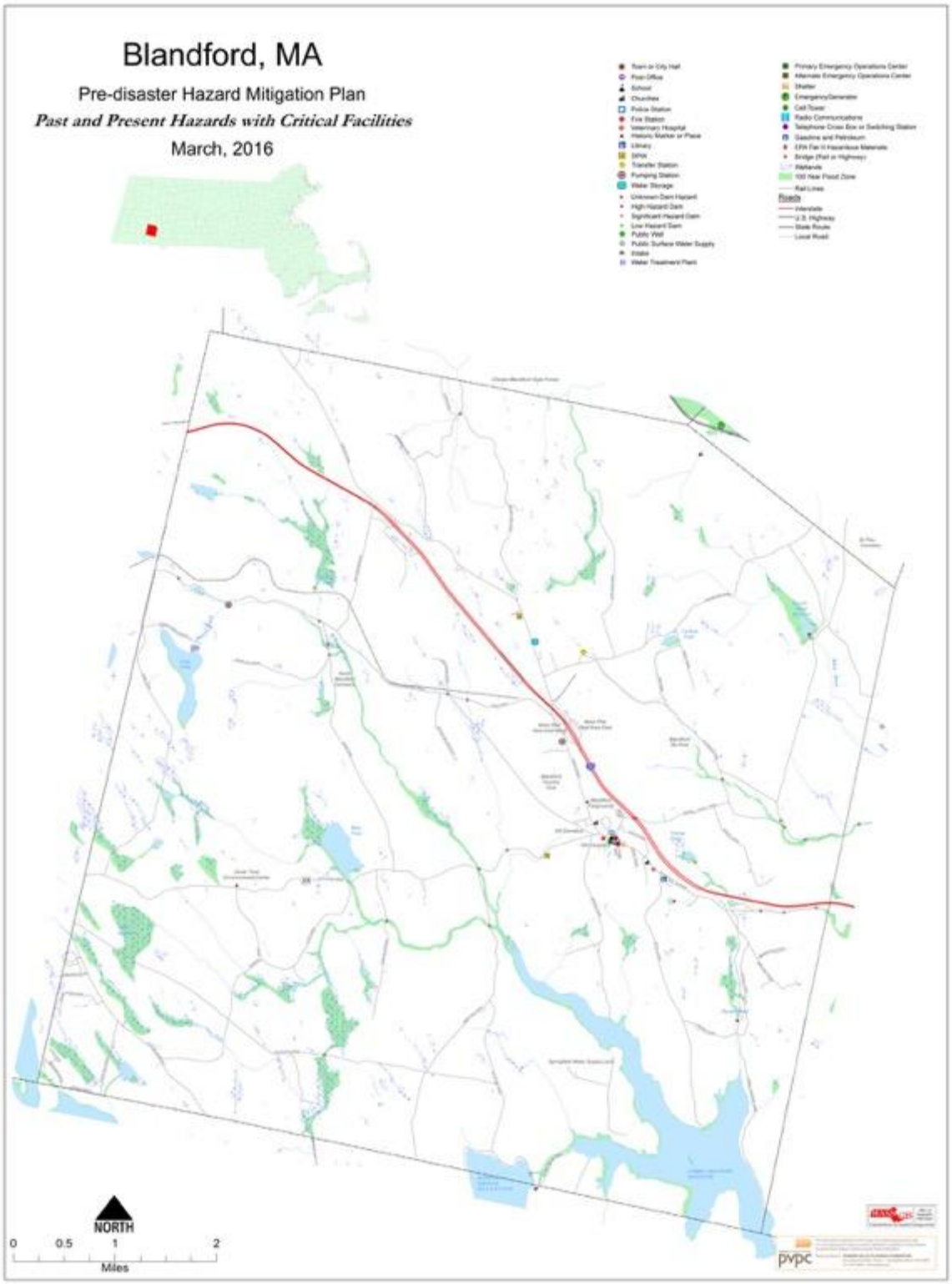


Figure 10 Critical Facility Map

CRITICAL FACILITIES IN HAZARD AREAS

The critical facilities are primarily in high hazard areas because the majority of hazards are atmospheric and impact the town equally.

CHAPTER 6. MITIGATION STRATEGIES

The hazard mitigation strategy is the culmination of work presented in the previous sections of this plan. It is also the result of multiple Hazard Mitigation Committee meetings and public outreach.

CAPABILITY ASSESSMENT

The first step in the mitigation strategy portion of the 2016 Hazard Mitigation Plan Update process was to evaluate all of the Town's existing policies and practices related to natural hazards and identify potential gaps in protection. Blandford's local Hazard Mitigation Committee worked with Ms. Caplan to complete the FEMA Capability Assessment worksheet. A summary of those findings is below.

PLANNING AND REGULATORY

Flood-related regulations and strategies are included in the Town's general bylaws, zoning by-law, and subdivision regulations. Infrastructure like dams and culverts are in place to manage the flow of water. The Town participates in a Local Emergency Planning Committee and they maintain a current disaster response plan.

ADMINISTRATIVE AND TECHNICAL

The Town has Memorandums of Understanding (MOU) in place with surrounding towns for fire response. The Fire Department also have an MOU with the State for response on the Masspike. The Police Department participates in the Western Mass Mutual Aid Agreement. The Town does have a reverse 911 system and they do have cases of emergency blankets. The Fire Department has two engines that are out of date, a brush truck and a rescue truck. Ambulance service for the town is from Huntington and it can take almost thirty minutes for an ambulance to arrive on scene in Blandford. The Fire Department rescue truck does not have the ability to transport patients. The disrepair of the Fire House is significant. The building is so small that a regular size fire truck would not fit and the small Blandford trucks have only inches of room to back-in. The Fire House does not have adequate heat, it has a combination of bathroom-kitchen, and the ceiling is falling down. The Department of Public Works has two small trucks, a loader, six large trucks, a backhoe, a grader and a mini-excavator.

FINANCIAL

The Town is not on strong financial footing. They maintain a low tax rate but are having a difficult time funding necessary mitigation measures.

EDUCATION AND OUTREACH

The Hazard Mitigation Committee agreed unanimously that the priority for education and outreach has to focus around sheltering-in-place. The Council on Aging has been the most active in educating their

members about disaster preparedness and mitigation. They are currently assembling disaster kits which they hope to deliver to their members with a personal demonstration and introduction.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The Town of Blandford participates in the National Flood Insurance Program. Blandford entered the NFIP in **7/26/1974**, their current NFIP map showing all Zone A, C and X is dated **7/16/13**.[9]

The town is not a member of the Community Rating System (CRS), which entitles policyholders to a discount on flood insurance premiums. The CRS reduces flood insurance premiums to reflect what a community does above and beyond the National Flood Insurance Program's (NFIP) minimum standards for floodplain regulation. The objective of the CRS is to reward communities for what they are doing, as well as to provide an incentive for new flood protection activities. To participate in the CRS, a community must fill out an application and submit documentation that shows what it is doing and that its activities deserve at least 500 points. More information including instructions and applications is available at *http://training.fema.gov/EMIWeb/CRS/m3s1main.html* The Town of Blandford has added a mitigation action to this plan that they would participate in a regional CRS effort.

DEVELOPMENT IN BLANDFORD

With 31,230 acres of undeveloped land, Blandford faces less development pressure than its neighbors in the Pioneer Valley. This is compounded by its rugged terrain, with many land areas in the town unsuitable for development without extensive excavation, which is regulated through the town's zoning ordinances. Moreover, the town's zoning bylaws limit where development may occur. The town currently has approximately 484 acres of residentially-zoned land and 5 acres of land used for commercial and industrial purposes. Additionally, with 892 acres of land for agricultural uses and 174 acres of open space, the town actively pursues conservation, guided by the zoning framework. During 2013-2014, there were only two new single-family residences built in the town.

DEVELOPMENT TRENDS

Route 23 is the spine of Blandford and, as the town center, envelops a cluster of well-preserved and refined examples of historic architecture and construction. Newer development, primarily suburban-style homes, has materialized in recent years, juxtaposing the character of the town. Only a handful of commercial buildings were constructed in Blandford, within the district zoned as Business. While the logging industry descended upon swaths of forest in the town, operations soon receded. Now, species of plants and animals, absent for over two centuries, have reappeared as the forests regain their health. Agricultural uses, by-right, are augmented by expansive conservation land, such as the Knittel Conservation Area.

[9] http://www.fema.gov/cis/MA.html

Zoning and other land use regulations constitute a town's "blueprint" for its future. Land use patterns over time will continue to look more and more like the town's zoning map until the Town is finally "built out"—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the Town focus not on the current use and physical build-out today, but on the potential future uses and build-out that are allowed under the Town's zoning map and zoning bylaws. Zoning is the primary land use tool that the Town may use to manage development and direct growth to suitable and desired areas while also protecting critical resources and ensuring that development is in keeping with the Town's character.

RESIDENTIAL

The residential district restricts development to one or two family homes, agriculture, home offices, and religious and institutional uses (as prescribed by the Dover Amendment, M.G.L. 40a Sec. 3). Lots are limited to one building, with a special permit required for accessory structures. Frontage must be a minimum of 150 ft. and buildings are required to be setback a minimum of 30 ft. Additionally, the minimum lot area of a residential lot must be 30,000 ft^2 or greater.

BUSINESS

Due to Blandford's small population and limited new development, the traditional zoning model of separating industrial and commercial/retail uses is not present in the town's zoning ordinances. Instead, these uses are categorized collectively in the business district. Here, uses pertaining to offices, retail, entertainment, and industry are permissible, although there are numerous special permit requirements. Moreover, agricultural and religious/institutional uses may occur in this district. Physical requirements that govern the district include a minimum frontage of 100 ft. and a minimum setback of 30 ft., or aligned with adjacent properties if they are setback further.

AGRICULTURAL

With agriculture a by-right use in all districts, the agricultural district ensures that fertile lands and invaluable farming operations are preserved. Any uses not directly related to agriculture are forbidden. Conservation, recreation, and open-space uses are permitted in the district, as well.

AGENCIES THAT HAVE THE AUTHORITY TO REGULATE DEVELOPMENT

The Planning Board is the primary Town agency responsible for regulating development in town. Feedback to the Planning Board was ensured through Adam Dolby on the Selectboard. In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Blandford, including the municipal entities listed above and state agencies, such as Department of Conservation and Recreation and MassDOT. This regular involvement ensured that during the development of the 2016 Hazard Mitigation Plan Update, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the 2016 Hazard Mitigation Plan Update.

For the extent of this analysis, PVPC and the Hazard Mitigation Committee reviewed the following Town documents:

- Zoning Bylaws
- Subdivision Rules and Regulations
- Comprehensive Emergency Management Plan
- Town Open Space and Recreation Plan

DEVELOPMENT DISTRICTS AND BYLAWS

WIRELESS COMMUNICATION FACILITY BYLAW

The Wireless Communication Facility Bylaw regulates the site selection, placement, design, and development of cellular and radio communication infrastructure.

LONG POND WATER PROTECTION DISTRICT

As the sole public water source for Blandford, the Long Pond Reservoir is an invaluable asset. As such, it is preserved through this overlay district which protects the water supply and groundwater from contamination by restricting development that may impinge on this resource.

FLOODPLAIN OVERLAY DISTRICT

Newly-established district which prohibits development in flood-prone areas, as defined as hazard areas on the FIRM maps, established by FEMA.

HAZARD MITIGATION INCLUDED IN BLANDFORD PLANS AND/OR BYLAWS

DAM FAILURES

The only mitigation measures in place are the state regulations that control the construction and inspection of dams.

The Blandford CEM plan states that there are three categories of dam failure or overspill and that action should be taken according to hazard rating:

Type 1: Slowly developing condition

- Activate EOC
- Activate all communication networks
  - Establish communications with Command Post
  - On a 24-hour basis.
- Release public information

- Notify
  - MEMA Region Headquarters
  - American Red Cross
  - Downstream communities

- Review Plans for evacuation and sheltering
  - Evacuation
    - Routes
    - Notification
  - Sheltering
    - Availability and capacity
    - Food, supplies and equipment
    - Shelter owners and managers
    - Other communities (if out of town sheltering is required)

- Require "Stand By" status of designated emergency response forces.

Type 2: Rapidly developing condition

- Establish a 24-hour communications from dam site to EOC.

- Assemble, brief and assign specific responsibilities to emergency response forces.

- Release public information.

- Obtain and prepare required vehicles/equipment for movement.

- Prepare to issue warning.

Type 3: Practically instantaneous failure

- Issue warning

- Commence immediate evacuation.

- Commit required resources to support evacuation.

- Activate shelters or coordinate activation of shelters located outside the community.

- Notify:

  - MEMA Region Headquarters

  - Red Cross

- Initiate other measures as required to protect lives and property.

MANAGEMENT PLANS AND REGULATORY MEASURES

The Blandford CEM Plan contains the following generic mitigation measures for dam failure:

- Develop and conduct public education programs concerning dam hazards.
- Maintain up-to-date plans to deal with threat and actual occurrence of dam over-spill or failure.
- Emergency Management and other local government agencies should familiarize themselves with technical data and other information pertinent to the dams, which impact Blandford. This should include determining the probable extent and seriousness of the effect to downstream areas.
- Dams should be inspected periodically and monitored regularly.
- Repairs should be attended to promptly.
- As much as is possible burdens on faulty dams should be lessened through stream re-channeling.
- Identify dam owners.
- Determine minimum notification time for downstream areas.

The Blandford CEM Plan contains the following generic preparedness and response measures for dam failure:

- Pre-place adequate warning/notification systems in areas potentially vulnerable to dam failure impact.
- Pre-place procedures for monitoring dam site conditions at first sign of any irregularity that could precipitate dam failure.
- Identify special needs populations, evacuations routes, and shelters for dam failure response.
- Have sandbags, sand, and other items to reinforce dam structure or flood proof flood prone areas.
- Disseminate warning/notification of imminent or occurring dam failure.
- Coordinate evacuation and sheltering of affected populations.
- Dispatch search and rescue teams.
- Coordinate evacuation and sheltering of affected populations.
- Activate mutual aid if needed.
- Acquire additional needed supplies not already in place, such as earth moving machinery.

- Establish incident command post as close to affected area as safely possible.
- Provide security for evacuated public and private property.

EVACUATION OPTIONS

The Blandford CEM Plan identifies the XXXXX as local High Hazard dams with the greatest potential impact on persons and property in town

PERMITS REQUIRED FOR NEW DAM CONSTRUCTION

Massachusetts State Law (M.G.L. Chapter 253 Section 45) regulates the construction of new dams. A permit must be obtained from the Department of Conservation and Recreation (DCR) before construction can begin. One of the permit requirements is that all local approvals or permits must be obtained.

DAM INSPECTIONS

The DCR requires that dams rated as Low Hazards are inspected every ten (10) years; that dams rated as Medium/Significant Hazards are inspected every five (5) years; and that dams rated as High Hazards be inspected every two (2) years. As of 2005, it is the responsibility of the dam owner to make sure he or she is in compliance with DCR's rules and regulations for inspecting their property. For this reason, the town must work with landowners and DCR to ensure that inspections are occurring in a timely, efficient and safe manner.

ZONING

There is no mention made regarding the construction of new dams in the Town of Blandford zoning or subdivision regulations.

RESTRICTIONS ON DEVELOPMENT

There are no town restrictions on dam locations. The DCR issues permits for new dams and does have the authority to deny a permit if it is determined that the design and/or location of the dam is not acceptable.

EXISTING STRATEGIES

The Hazard Mitigation Committee has identified the following mitigation strategies that were in place prior to the creation of this Hazard Mitigation Plan. Several of the recommended mitigation measures have multiple benefits because, if implemented, they will mitigate or prevent damages from more than one type of natural hazard. These do not fall under one hazard type, but could be put into place for facilitation of better hazard protection generally.

EARTHQUAKES

Based upon historical evidence, one earthquake was recorded in Blandford in 1941 and that is the only time an earthquake has struck the town in recent history. To the south, Palmer recorded an earthquake in 1854 and, on the other side of the known fault line, several towns along the Connecticut River Valley floor have recorded earthquakes.

Although there are five mapped seismological faults in Massachusetts and none in Blandford (a known fault line does pass through the abutting town of Belchertown), there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard to plan for. Most buildings and structures in the state were constructed without specific earthquake resistant design features.

Earthquakes can involve several potentially devastating secondary effects including:

- The collapse of buildings, bridges, roads, dams, and other vital structures;
- Rupture of utility pipelines;
- Flooding caused by dam failure;
- Landslides;
- Major transportation accidents, (railroad, chain highway crashes, aircraft, and marine);
- Extended power outage;
- Fire and/or explosion;
- HAZMAT accident; and,
- Water contamination.

MANAGEMENT PLANS

The Blandford CEM Plan lists the following generic mitigation measures for earthquakes:

- Community leaders in cooperation with Emergency Management Personnel should obtain local geological information and identify and assess structures and land areas that are especially vulnerable to earthquake impact and define methods to minimize the risk.

- Strict adherence should be paid to land use and earthquake resistant building codes for all new construction.

- Periodic evaluation, repair, and/or improvement should be made to older public structures.

- Emergency earthquake public information and instructions should be developed and disseminated.

- Earthquake drills should be held in schools, businesses, special care facilities, and other public gathering places.

The Blandford CEM Plan lists the following generic preparedness and response measures for earthquakes:

- Earthquake response plans should be maintained and ready for immediate use.

- All equipment, supplies and facilities that would be needed for management of an earthquake occurrence should be maintained for readiness.
- Emergency Management personnel should receive periodic training in earthquake response.
- If the designated Emergency Operations Center (EOC) is in a building that would probably not withstand earthquake impact, another building should be chosen for an earthquake EOC.
- Mass Care shelters for earthquake victims should be pre-designated in structures that would be most likely to withstand earthquake impact.
- EOC will be activated and response will immediately be engaged to address any and all earthquake effects listed.
- Emergency warning/notification information and instructions will be broadcast to the public.
- Search and rescue teams will be dispatched.
- Emergency medical teams will be dispatched.
- Firefighters will address fires/explosions, and HAZMAT incidents.
- Law enforcement personnel will coordinate evacuation and traffic control.
- Reception centers and shelters will be opened and staffed.
- Animal control measures will be taken.
- Law enforcement personnel will protect critical facilities and conduct surveillance against criminal activities.
- Immediate life-threatening hazards will be addressed such as broken gas lines, downed utility wires, and fire control resources.
- Emergency food, water, and fuel will be acquired.
- Activate mutual aid.
- Measures will be taken relating to identification and disposition of remains of deceased by the Chief Medical Examiner.

EVACUATION OPTIONS

The Blandford CEM lists two shelters for victims of earthquakes. They are the Blandford Middle School and the Blandford High School.

The maximum peak population affected by an earthquake is estimated at 6,174 people.

STATE BUILDING CODE

State and local building inspectors are guided by regulations put forth in the Massachusetts State Building Code. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975 and included specific earthquake resistant design standards. These seismic requirements for new construction have been revised and updated over the years and are part of the current, 6th Edition of the Massachusetts State Building Code. Given that most structures in Massachusetts were built before 1975, of many buildings and structures do not have specific earthquake resistant design features. According to the 2000 U.S. Census, 63.8 percent of the housing in Blandford was built before 1970. In addition, built areas underlain by artificial fill, sandy or clay soils are particularly vulnerable to damage during an earthquake.

RESTRICTIONS ON DEVELOPMENT

There are no seismic-related restrictions on development.

FLOODS

The Critical Facilities, Infrastructure, 2014 Land Use & Natural Hazards Map for the Town of Blandford shows the 100-year flood zone identified by FEMA flood maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. The 100-year flood zone covers mostly narrow bands of level floodplain land along the Swift River, Beaver Brook, Penny Brook, Blandford River, and Muddy Brook.

The major floods recorded in Blandford during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. One of the goals of this Natural Hazards Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection.

MANAGEMENT PLANS

The Comprehensive Emergency Management (CEM) Plan for Blandford lists the following generic mitigation measures for flood planning:

- Identify areas in the community that are flood prone and define methods to minimize the risk. Review National Flood Insurance Maps.
- Disseminate emergency public information and instructions concerning flood preparedness and safety.
- Community leaders should ensure that Blandford is enrolled in the National Flood Insurance Program.
- Strict adherence should be paid to land use and building codes, (e.g. Wetlands Protection Act), and new construction should not be built in flood prone areas.
- Ensure that flood control works are in good operating condition at all times.
- Natural water storage areas should be preserved.
- Maintain plans for managing all flood emergency response activities including addressing potentially hazardous dams.

The Comprehensive Emergency Management (CEM) Plan for Blandford lists the following generic preparedness and response measures for floods:

- Place EOC personnel on standby during stage of flood 'watch' and monitor NWS/New England River Forecast Center reports.
- Ensure that public warning systems are working properly and broadcast any information that is needed at this time.
- Review mutual aid agreements.
- Monitor levels of local bodies of water.
- Arrange for all evacuation and sheltering procedures to be ready for activation when needed.
- Carry out, or assist in carrying out needed flood-proofing measures such as sand bag placement, etc.
- Regulate operation of flood control works such as floodgates.
- Notify all Emergency Management related groups that will assist with flood response activities to be ready in case flood 'warning'.
- Broadcast warning/notification of flood emergency.
- Coordinate traffic control and proceed with evacuation of affected populations as appropriate.
- Open and staff shelters and reception centers.
- Undertake, or continue to carry out, flood proofing measures.
- Dispatch search and rescue teams.
- Dispatch emergency medical teams

EVACUATION OPTIONS

The majority of land subject to the 100-year floodplain in town, which is located along the Swift River, Beaver Brook, Penny Brook, the Blandford River and Muddy Brook. According to the Blandford CEM Plan, local officials have stated that there are local shelters available for flooding victims, including people with Special, non-institutional needs. In that case, the shelter is the Koziol Elementary School. Emergency management personnel should assess existing floodplain and dam failure data to determine an appropriate evacuation plan.

In addition, Blandford has eight bridges situated either in or near the 100-year floodplain, which could make evacuation efforts as a result of dam failure more difficult. Some of the roads that residents would most likely take to reach safety travel through flood-affected areas.

FLOOD CONTROL STRUCTURES

FEMA has identified no flood control structures within the Town of Blandford.

LAND USE REGULATIONS THAT MITIGATE IMPACTS FROM FLOODING[10]

The Town of Blandford has adopted several land use regulations that serve to limit or regulate development in floodplains, to manage stormwater runoff, and to protect groundwater and wetland resources, the latter of which often provide important flood storage capacity. These regulations are summarized below.

BLANDFORD ZONING BY-LAWS

The Town of Blandford has established a set of bylaws designed in part to "to promote the general welfare, ***health***, safety and convenience of the inhabitants of Blandford, to protect the community and its natural resources, to promote sound growth, to conserve the value of land and buildings, to preserve and increase the ***town***'s Amenities, to encourage housing for all income levels, to encourage economic activity, to encourage the most appropriate use of land within the town, and to provide the Town of Blandford the protection authorized by the General Law, Chapter 40A, as amended." The Zoning By-Laws include several provisions that mitigate the potential for flooding.

Residential and Business Districts contain premises which limit by-right development to one structure per parcel with frontage and setback requirements that maintain a natural, vegetated buffer and other rural features.

Agriculture District restricts development unless it relates explicitly to agricultural production, thus protecting lands that serve as natural flood mitigation infrastructure. In Blandford, the majority of the town is zoned agriculture.

Long Pond Watershed Protection District ensures development does not impinge on the town's sole water supply, as encroachment can be of detriment to this natural resource. Additionally, this ensures that structures are not constructed around the Long Pond Watershed, which would inhibit the lands natural ability to absorb storm water runoff as much of it is in a floodplain.

Flood Plain Overlay District prohibits new development, or substantial additions and modifications to existing structures, within the flood plains in Blandford. This simultaneously reduces the risk of future damages and loss of life while preserving the floodplains natural function of mitigating runoff.

Wireless Communication Facility Bylaw requires the submission of a landscape plain, delineating topography and modifications to the natural environment, during the planning and design of wireless communication infrastructure. While reducing the environmental impact of the facilities, this also ensures that critical communication infrastructure is placed outside of a high-risk area, reducing the probability of future damage and loss of communications.

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[10] All bulleted items and direct quotes in the Blandford Local Natural Hazards Mitigation Plan are taken from the Town of Blandford's zoning bylaw and subdivision regulations. Other references to those documents contained herein are paraphrases of the same.

For Blandford's Zoning Ordinances in-full, please refer to Appendix F for complete text excerpted from relevant sections.

RIVER AND STREAM PROTECTION

The Town of Blandford follows the standards established by the Wetlands Protection Act, which protects water bodies and wetlands through the town Conservation Commission. The Town also has instituted its Floodplain/Wetland Overlay District, an overlay district that provides restrictions and standards regarding the types of development that can be located within the town's floodplains, as well as restrictions on negative impacts to the flood storage capacity of the land. The Water Supply Protection District also limits development within the watersheds of the town's drinking water supplies.

BLANDFORD OPEN SPACE AND RECREATION PLAN

Recent efforts by the Town of Blandford Conservation Commission and others have resulted in the creation of municipal plans that are useful for flood hazard mitigation purposes. In 2007, the town completed its Open Space and Recreation Plan. The intent of the document is not to address hazard mitigation or flood control in a direct or comprehensive way; however, it inventories the natural features and environments in the town, many of which, such as wetlands, aquifer recharge areas, farms, rivers, streams, and brooks, contain floodplain, dam failure inundation or localized flooding areas.

The current plan highlights the importance of balancing future development with the preservation of the community's natural and scenic resources. The preservation of open space and farmland will provide flood storage capacity, which reduces the amount of impervious surfaces in an area, as well as other benefits not directly related to natural hazard mitigation.

HURRICANES

Of all the natural disasters that could potentially impact Blandford, hurricanes provide the most lead warning time because of the relative ease in predicting the storm's track and potential landfall. MEMA assumes "standby status" when a hurricane's location is 35 degrees North Latitude (Cape Hatteras) and "alert status" when the storm reaches 40 degrees north Latitude (Long Island).[11] The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Therefore, all of the flood protection mitigation measures described can also be considered hurricane mitigation measures. High winds that oftentimes accompany hurricanes can also damage buildings and infrastructure. Blandford has a 500-year wind probability rating of 120 m.p.h. The climatic record for Massachusetts indicates that Blandford has never been the direct recipient of a hurricane-force event, but that a tropical storm has passed through Belchertown to the east and Palmer to the south; and that three hurricanes (two Category 2 and one Category 1) have hit Hampshire and Hampden Counties.

[11] Comprehensive Emergency Management Plan for the Town of Leverett, August 1999.

MANAGEMENT PLANS

The CEM Plan for Blandford includes the following generic mitigation measures for hurricane planning and response:

- Develop and disseminate emergency public information and instructions concerning hurricane preparedness and safety.
- Community leaders should ensure that Blandford is enrolled in the National Flood Insurance Program.
- Develop and enforce local building codes to enhance structural resistance to high winds and flooding. Build new construction in areas that are not vulnerable to direct hurricane effects.
- Maintain plans for managing all hurricane emergency response activities.

The CEM Plan for Blandford includes the following generic preparedness and response measures for hurricanes:

- Ensure that warning/notification systems and equipment is ready for use at the 'hurricane warning' stage.
- Review mutual aid agreements.
- Designate suitable wind and flood resistant shelters in the community and make their locations known to the public.
- Prepare for coordination of evacuation from potentially impacted areas including alternate transportation systems and locations of special needs facilities.
- Activate warning/notification systems to inform public of protective measures to be taken including evacuation where appropriate.
- Conduct evacuation of affected populations.
- Open and staff shelters and reception centers.
- Dispatch search and rescue teams.
- Dispatch emergency medical teams.
- Activate mutual aid activities.
- Take measures to guard against further danger from downed trees and utility lines, debris, etc.

EVACUATION OPTIONS

According to the Blandford CEM plan, local officials have stated that the Blandford High School and the Blandford Middle School Elementary School are the appropriate shelter for residents in the case of a hurricane.

RESTRICTIONS ON DEVELOPMENT

The only restrictions on development that are wind-related are the provisions in the zoning bylaw related to telecommunications facilities.

MOBILE HOMES

According to the Town of Blandford Zoning Bylaws, 4.22, Mobile homes are prohibited in all districts unless located in a mobile home park; and According to Section 4.430, "A mobile home may be placed on the site of a residence which has been rendered uninhabitable by accident provided it is used for a period not to exceed 12 months as the primary residence of the owners of the residence which has been rendered uninhabitable."

STATE BUILDING CODE

For new or recently built structures, the primary protection against wind-related damage is construction that adheres to the State Building Code, which, when followed, results in buildings that withstand high winds. The Town of Blandford provides building inspection services.

SEVERE SNOWSTORMS/ICE STORMS

Winter storms can be especially challenging for emergency management personnel even though the storm has usually been forecast. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected.[12] The average snowfall in Blandford falls between the range of 48.1 to 72 inches per year, making it more like to receive snow than the Connecticut River Valley Towns and less likely to receive snow than towns located in the Berkshire Hills.

MANAGEMENT PLANS

The CEM Plan for Blandford lists the following generic mitigation measures for severe winter storms:

[12] Comprehensive Emergency Management Plan for the Town of Leverett, August1999.

- Develop and disseminate emergency public information concerning winter storms, especially material which instructs individuals and families how to stock their homes, prepare their vehicles, and take care of themselves during a severe winter storm.

- As it is almost guaranteed that winter storms will occur annually in Massachusetts, local government bodies should give special consideration to budgeting fiscal resources with snow management in mind.

- Maintain plans for managing all winter storm emergency response activities.

To the extent that some of the damages from a winter storm can be caused by flooding, all of the flood protection mitigation measures described in Table 4-1 can also be considered as mitigation measures for severe snowstorms/ice storms.

The CEM Plan for Blandford lists the following generic preparedness and response measures for severe winter storms:

- Ensure that warning/notification, and communications systems are in readiness.

- Ensure that appropriate equipment and supplies, (especially snow removal equipment), are in place and in good working order.

- Review mutual aid agreements.

- Designate suitable shelters throughout the community and make their locations known to the public.

- Implement public information procedures during storm 'warning' stage.

- Prepare for possible evacuation and sheltering of some populations impacted by the storm (especially the elderly and special needs).

- Broadcast storm warning/notification information and instructions.

- Conduct evacuation, reception and sheltering activities.

- If appropriate, activate media center. Refer to Resource Manual for media center information.

- Dispatch search and rescue teams.

- Dispatch emergency medical teams.

- Take measures to guard against further danger from power failure, downed trees and utility lines, ice, traffic problems, etc.

- Close roads, and/or limit access to certain areas if appropriate.
- Provide assistance to homebound populations needing heat, food, and other necessities.
- Provide rescue and sheltering for stranded/lost individuals.

RESTRICTIONS ON DEVELOPMENT

There are no restrictions on development that are directly related to severe winter storms. The Town of Blandford Subdivision Rules and Regulations set grade limits on streets that are included in an Alternative Procedures Plan (Section 2300) and as part of its Section 4000 Required Improvements, and restrictions on utility placement (Section 4400. Municipal Services), which, although not specified as weather hazard mitigation, can serve to minimize accident potential and power loss from severe winter.

For Details on how the Town Of Blandford uses its Subdivision Regulations to protect the Town from winter storms, please refer to Appendix.

TORNADOES

Worcester County and areas just to its west, including portions of Hampshire County, have been dubbed the "tornado alley" of the state because the majority of significant tornadoes in Massachusetts's weather history have occurred in that region.[13] According to the Institute for Business and Home Safety, the wind speeds in most tornadoes are at or below design speeds that are used in current building codes.[14] Like earthquakes, the location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes comes from high winds that can fell trees and electrical wires, generate hurtling debris and, possibly, hail.

MANAGEMENT PLANS

The CEM Plan for Blandford includes the following generic mitigation measures for tornado planning and response:

- Develop and disseminate emergency public information and instructions concerning tornado safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.
- Strict adherence should be paid to building code regulations for all new construction.
- Maintain plans for managing tornado response activities. Refer to the non-institutionalized, special needs and transportation resources listed in the Resource Manual.

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21 National Weather Service Storm Prediction Center

[14] *www.ibhs.org.*

The CEM Plan for Blandford includes the following generic preparedness and response measures for tornadoes:

- Designate appropriate shelter space in the community that could potentially withstand tornado impact.
- Periodically test and exercise tornado response plans.
- Put Emergency Management on standby at tornado 'watch' stage.
- At tornado 'warning' stage, broadcast public warning/notification safety instructions and status reports.
- Conduct evacuation, reception, and sheltering services to victims.
- Dispatch search and rescue teams.
- Dispatch emergency medical teams.
- Activate mutual aid agreements.
- Take measures to guard against further injury from such dangers as ruptured gas lines, downed trees and utility lines, debris, etc.
- Acquire needed emergency food, water, fuel, and medical supplies.
- Take measures relating to the identification and disposition of remains of the deceased.

WILDFIRES/BRUSHFIRES

Hampshire and Hampden Counties have approximately 469,587 acres of forested land, which accounts for 62 percent of total land area. Forest fires are therefore a potentially significant issue. In Blandford approximately 62 percent of the town's total land area is in forest, or about 15,789 acres, and is therefore at risk of fire. Below are a list of regulatory measures that relate to wildfire.

- **Burn Permits***:* The Blandford Fire Department is the sole agency responsible for issuing burn permits in Blandford.
- **Mobile Home Site Plan Review:** The Blandford Fire Department reviews site plans for Mobile Home site plans to guarantee adequate provision of water and fire fighting capacity.
- **Subdivision Review**: Once a subdivision has been approved, no lot shall be built upon without adequate provision of on-site water and fire fighting supplies. Furthermore, the Board of Health may require on-site provision of water and fire fighting supplies to the extent required by the Fire Chief.

- **Public Education/Outreach**: The Blandford Fire Department has an outreach program in place that allows the Blandford Fire Department to partner with the senior center to inspect and replace smoke detectors. Furthermore, the Blandford Fire Department has an active Triad program.

- **Restrictions on Development:** All industrial development (as per Section 5.6) must have fire-fighting and fire-suppression located on-premise when the use has storage facilities for inflammable and explosive materials

In summary, Blandford has proven they are aware of potential risks to natural hazards and they do currently mitigate them with multiple planning and land use systems. The Hazard Mitigation Committee actively participated in the development of this plan as did the public. As a small Town they rely on Mutual Aid Agreements with MEMA and with surrounding communities to respond to disasters. They actively participate with the PVPC and take advantage of their no cost technical assistance by PVPC's professional planning staff.

Blandford needs financial resources to implement their prioritized mitigation actions. The Town is fiscally sound but they lack the resources to purchase generators or rebuild the fire station. Blandford is not a wealthy community and with state constraints on municipalities raising their own funds, Blandford has very limited financial resources to invest in costly hazard mitigation measures. Blandford is, however, committed to locally matching all HMGP grants received.

MITIGATION STRATEGY

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

The Hazard Mitigation Committee developed the following goal statement.

To reduce or eliminate the loss of life, property and government disruption to all natural hazards.

MITIGATION MEASURES FOR HAZARDS THAT CAN IMPACT BLANDFORD

DAM FAILURE

Dam failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has nowhere to flow. The only mitigation measures currently in place are the state regulations governing the construction, inspection, and maintenance of dams. This is managed through the Office of Dam Safety at the Department of Conservation and Recreation.

DROUGHT

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. Drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place, such as ensuring that groundwater is recharged.

EARTHQUAKES

Although there are five mapped seismological faults in Massachusetts, there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard for which to plan.

Most buildings and structures in the state were constructed without specific earthquake resistant design features. In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the Town's recovery from an earthquake.

EXTREME TEMPERATURES

Extreme temperatures include extreme heat as well as extreme cold and each poses threats to the population. The best way to mitigate the risk of extreme temperatures is to prepare buildings to withstand the extreme. In terms of heat this means air conditioning, in terms of cold this means building insulation and heating. Each may require generators to insure an improved environment can be maintained. Increasing awareness of temperature extremes and their safety risks may improve public health. Educating homeowners about property maintenance and freezing pipes may reduce the impact of extreme cold. Vulnerable populations must be considered due to their susceptibility to succumb to extreme temperatures.

FLOODING

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways. The Town currently addresses this problem with a variety of mitigation tools and strategies.

The Critical Facilities, Infrastructure, 2014 Land Use & Natural Hazards Map for the Town of Blandford shows the 100-year flood zone identified by FEMA flood maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. The 100-year flood zone covers mostly narrow bands of level floodplain land along the Swift River, Beaver Brook, Penny Brook, Blandford River, and Muddy Brook.

The major floods recorded in Blandford during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. One of the goals of this Natural Hazards Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection.

HURRICANES

Hurricanes provide the most lead warning time of all identified hazards, because of the relative ease in predicting the storm's track and potential landfall. MEMA assumes "standby status" when a hurricane's location is 35 degrees North Latitude (Cape Hatteras) and "alert status" when the storm reaches 40 degrees North Latitude (Long Island). Even with significant warning, hurricanes can do significant damage – both due to flooding and severe wind.

The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Flood protection measures can thus also be considered hurricane mitigation measures. The high winds that often accompany hurricanes can also damage buildings and infrastructure, similar to tornadoes and other strong wind events.

SEVERE SNOWSTORMS / ICE STORMS

Winter storms can be especially challenging for emergency management personnel. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected. Even though the storm has usually been forecast, there is no certain way for predicting its length, size or severity. Therefore, mitigation strategies must focus on preparedness prior to a severe snow/ice storm.

The Town's current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. To the extent that some of the damages from a winter storm can be caused by flooding, flood protection mitigation measures also assist with severe snowstorms and ice storms.

SEVERE THUNDERSTORMS / WINDS / TORNADOES

Most damage from tornadoes and severe thunderstorms come from high winds that can fell trees and electrical wires, generate hurtling debris and, possibly, hail. According to the Institute for Business and Home Safety, the wind speeds in most tornadoes are at or below design speeds that are used in current building codes, making strict adherence to building codes a primary mitigation strategy. In addition, current land development regulations, such as restrictions on the height of telecommunications towers, can also help prevent wind damages.

WILDFIRES / BRUSHFIRES

Wildfire and brushfire mitigation strategies involve educating people about how to prevent fires from starting, as well as controlling burns within the town.

STRATEGY PRIORITIZATION METHODOLOGY

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

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

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

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

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

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

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

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

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

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

COST ESTIMATES

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

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

Cost estimates take into account the following resources:

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

PROJECT TIMELINE

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

PRIORITY ORDER	MITIGATION ACTION	HAZARDS ADDRESSED	RESPONSIBLE DEPARTMENT BOARD	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST	PROPOSED START AND END DATES
1	Purchase and install backup generator at Town Offices so building can function as an EOC and government continuity is protected.	All Hazards	Fire Chief	HMGP	High	March 2016 – April 2018
2 these happen simultane-ously	Highway Garage – turn this space into the Fire House	All Hazards	Selectboard Fire Chief Highway Department	HMGP	High	March 2016 – April 2018
	Salt Shed – retrofit this space and add a Butler Building so it can accommodate all highway equipment	All Hazards	Selectboard Fire Chief Highway Department	HMGP	High	March 2016 – April 2018
3	Develop a plan to oversee the quality of roads throughout town and to identify areas that need improved drainage.	Flooding Hurricane Landslide Severe Snow Ice Storms Severe Thunderstorm Wind Tornado	Highway Department	Town HMGP	Low	April 2016 – March 2021
4	Develop and implement a shelter-in-place education program for town residents.	All Hazards	Fire Chief Council on Aging	HMGP	Low	April 2017 – March 2021

PRIORITY ORDER	MITIGATION ACTION	HAZARDS ADDRESSED	RESPONSIBLE DEPARTMENT BOARD	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST	PROPOSED START AND END DATES
5	Develop an ongoing schedule and implementation plan for tree trimming along roadways.	Flooding Hurricane Landslide Severe Snow Ice Storms Severe Thunderstorm Wind Tornado	Tree Warden	Eversource	Medium	May 2016 – March 2021
6	Work with Eversource to identify power lines in the center of Town that may be moved underground to mitigate the risk of power outages.	Hurricane Severe Thunderstorm Wind Tornado Severe Snow Ice Storm	Highway Department	Town Eversource	Low	April 2017 – March 2021
7	Improve collaboration with City of Springfield regarding Cobble Mountain by hosting quarterly meetings to develop a plan to maintain roadways and mitigate the risk of wildfires in the area.	Wildfire Brushfire	Fire Chief Selectboard	Town	Low	April 2016 – March 2021
8	Retrofit a space in the Town Offices to function as an EOC.	All Hazards	Fire Chief	HMGP	Low	April 2016 – April 2018

PRIORITY ORDER	MITIGATION ACTION	HAZARDS ADDRESSED	RESPONSIBLE DEPARTMENT BOARD	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST	PROPOSED START AND END DATES
9	Continue to collaborate with the REPC.	All Hazards	Fire Chief Highway Department	Town	Low	April 2016 – April 2021
10	Install showers and shelter supplies so the Town Offices may be used as a shelter.	All Hazards	Fire Chief	HMGP	Medium	April 2018 – April 2021
11	Maintain beaver deceivers to mitigate the risk of flooding.	Flooding	Highway Department Conservation Commission	Town	Low	April 2016 – March 2021
12	Purchase a secure cabinet for protecting town records.	All Hazards	Selectboard Town Clerk	HMGP	Low	January 2017 – March 2019
13	If a regional effort becomes available, join the effort to become part of FEMA's Community Rating System	Flooding	Selectboard REPC	State	Low	April 2020 - March 2021

CHAPTER 7. PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

PLAN ADOPTION

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

PLAN IMPLEMENTATION

The implementation of this plan began upon its formal adoption by the Town Select Board and approval by MEMA and FEMA. Those town departments and boards responsible for ensuring the development of policies, bylaw revisions, and programs as described in Sections 5 and 6 of this plan will be notified of their responsibilities immediately following approval. The Town's Hazard Mitigation Committee will oversee the implementation of the plan.

INCORPORATION WITH OTHER PLANNING DOCUMENTS

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

1. ***Comprehensive Emergency Management Plan*** (particularly the Critical Infrastructure Section) – the Critical Infrastructure section was used to identify those infrastructure components in Ware that have been identified as crucial to the function of the Ware; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
2. ***Open Space, Recreation Plan*** this Plan was used to identify the natural context within which the Ware mitigation planning would take place. This proved useful insofar as it identified water bodies, rivers, streams, infrastructure components (i.e. water and sewer, or the lack thereof), as well as population trends. This was incorporated to ensure that the City's mitigation efforts would be sensitive to the surrounding environment.
3. ***Zoning Ordinance*** – Ware's Zoning was used to gather identify those actions that the town is already taking that are reducing the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts.
4. ***Massachusetts' State Hazard Mitigation Plan*** - This plan was used to insure that the town's HMP was consistent with the State's Plan.

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

In addition to integrating existing plans into the development of this Hazard Mitigation Plan, The Town is integrating this plan into their Master Planning process.

PLAN MONITORING AND EVALUATION

The Town's Fire Chief will call meetings of all responsible parties to review plan progress an annual basis in each of the following years: 2017, 2018, 2019, 2020, and as needed (*i.e.*, following a natural disaster). The public will be notified of these meetings in advance through a posting of the agenda at Town Offices. Responsible parties identified for specific mitigation actions will be asked to submit their reports in advance of the meeting. Meetings will entail the following actions:

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

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. The committee will review and update the Hazard Mitigation Plan every five years. The next updated plan will be submitted to MEMA and FEMA in the spring of 2021.

The Town's Fire Chief will call meetings of all responsible parties to review plan progress as needed, based on occurrence of hazard events. The public will be notified of these meetings in advance through a posting of the agenda at Town Hall. Responsible parties identified for specific mitigation actions will be asked to submit their reports in advance of the meeting.

Meetings will involve evaluation and assessment of the plan, regarding its effectiveness at achieving the plan's goals and stated purpose. The following questions will serve as the criteria that is used to evaluate the plan:

Plan Mission and Goal

- Is the Plan's stated goal and mission still accurate and up to date, reflecting any changes to local hazard mitigation activities?

- Are there any changes or improvements that can be made to the goal and mission?

Hazard Identification and Risk Assessment

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.

- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.

- Is there any new data available from local, state, or Federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the plan.

Existing Mitigation Strategies

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

Proposed Mitigation Strategies

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

Review of the Plan and Integration with Other Planning Documents

- Is the current process for reviewing the Hazard Mitigation Plan effective? Could it be improved?
- Are there any Town plans in the process of being updated that should have the content of this Hazard Mitigation Plan incorporated into them?
- How can the current Hazard Mitigation Plan be better integrated with other Town planning tools and operational procedures, including the zoning bylaw, the Comprehensive Emergency Management Plan, and the Capital Improvement Plan?

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. The committee will review and update the Hazard Mitigation Plan every five years.

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

APPENDICES

APPENDIX A – TECHNICAL RESOURCES

AGENCIES

Massachusetts Emergency Management Agency (MEMA)..... .....508/820-2000

Hazard Mitigation Section 617/626-1356

Federal Emergency Management Agency (FEMA) 617/223-4175

MA Regional Planning Commissions:

Berkshire Regional Planning Commission (BRPC).....413/442-1521

Cape Cod Commission (CCC).....508/362-3828

Central Massachusetts Regional Planning Commission (CMRPC)..... 508/693-3453

Franklin Regional Council of Governments (FRCOG).....413/774-3167

Martha's Vineyard Commission (MVC).....508/693-3453

Merrimack Valley Planning Commission (MVPC).....978/374-0519

Metropolitan Area Planning Council (MAPC).....617/451-2770

Montachusett Regional Planning Commission (MRPC).....978/345-7376

Nantucket Planning and Economic Development Commission (NP&EDC).....508/228-7236

Northern Middlesex Council of Governments (NMCOG).....978/454-8021

Old Colony Planning Council (OCPC).....508/583-1833

Pioneer Valley Planning Commission (PVPC).....413/781-6045

Southeastern Regional Planning and Economic Development District (SRPED.....508/823-1803

MA Board of Building Regulations & Standards (BBRS).....617/227-1754

MA Coastal Zone Management (CZM).....617/626-1200

DCR Water Supply Protection.....617/626-1379

DCR Waterways.....617/626-1371

DCR Office of Dam Safety.....508/792-7716

DFW Riverways……617/626-1540

MA Dept. of Housing & Community Development……617/573-1100

Woods Hole Oceanographic Institute……508/457-2180

UMass-Amherst Cooperative Extension……413/545-4800

National Fire Protection Association (NFPA)……617/770-3000

New England Disaster Recovery Information X-Change (NEDRIX –

an association of private companies & industries involved in disaster recovery planning)……781/485-0279

MA Board of Library Commissioners……617/725-1860

MA Highway Dept, District 2……413/582-0599

MA Division of Marine Fisheries……617/626-1520

MA Division of Capital & Asset Management (DCAM)……617/727-4050

University of Massachusetts/Amherst……413/545-0111

Natural Resources Conservation Services (NRCS)……413/253-4350

MA Historical Commission……617/727-8470

U.S. Army Corps of Engineers……978/318-8502

Northeast States Emergency Consortium, Inc. (NESEC)……781/224-9876

National Oceanic and Atmospheric Administration: National Weather Service……508/824-5116

US Department of the Interior: US Fish and Wildlife Service ……413/253-8200

US Geological Survey……508/490-5000

MITIGATION FUNDING RESOURCES

404 Hazard Mitigation Grant Program (HMGP) ……MA Emergency Management Agency

406 Public Assistance and Hazard Mitigation ……MA Emergency Management Agency

Community Development Block Grant (CDBG)……DHCD, also refer to RPC

Dam Safety Program……MA Division of Conservation and Recreation

Disaster Preparedness Improvement Grant (DPIG) ……MA Emergency Management Agency

Emergency Generators Program by NESEC‡ .....MA Emergency Management Agency

Emergency Watershed Protection (EWP) Program.....USDA, Natural Resources Conservation Service Flood Mitigation Assistance Program (FMAP)……..MA Emergency Management Agency

Flood Plain Management Services (FPMS).....US Army Corps of Engineers

Mitigation Assistance Planning (MAP).....MA Emergency Management Agency

Mutual Aid for Public Work.....Western Massachusetts Regional Homeland Security Advisory Council

National Flood Insurance Program (NFIP) † ……..MA Emergency Management Agency

Power of Prevention Grant by NESEC‡ .....MA Emergency Management Agency

Roadway Repair & Maintenance Program(s).....Massachusetts Highway Department

Section 14 Emergency Stream Bank Erosion & Shoreline Protection .....US Army Corps of Engineers

Section 103 Beach Erosion…… ..US Army Corps of Engineers

Section 205 Flood Damage Reduction……..US Army Corps of Engineers

Section 208 Snagging and Clearing ……..……US Army Corps of Engineers

Shoreline Protection Program……..MA Department of Conservation and Recreation

Various Forest and Lands Program(s).....MA Department of Environmental Protection

Wetlands Programs .....MA Department of Environmental Protection

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

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

INTERNET RESOURCES

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center "Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/dis aster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated

Sponsor	Internet Address	Summary of Contents
		every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/g eog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	http://www.fema.gov/fema/csb.html	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links
The Tornado Project Online	http://www.tornadoroject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster	http://www.iiaa.iix.com/ndcmap.html	A multi-disaster risk map.

Sponsor	Internet Address	Summary of Contents
Risk Map		
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

APPENDIX B – DOCUMENTATION OF THE PLANNING PROCESS

HAZARD MITIGATION COMMITTEE MEETINGS

HAZARD MITIGATION COMMITTEE MEETING SIGN-IN SHEET

Project:	Blandford	Meeting Date:	2/11/16
Facilitator:	Jamie Caplan	Place/Room:	Town Offices

Name	Title	Organization	Phone	E-Mail
Ed Harvey	FIRE CHIEF	BLANDFORD FIRE	413 429 1608	BLANDFORDFD@GMAIL.COM
Tom Ashley	Emer. Manager Dep. Fire Chief	"	413-447-2086	TJ[illegible]ASHLEY@GMAIL.COM
Adam Dolby	Selectboard	Town of Blandford	413-358-3147	adolby@townofblandford.com
David Hopson	Superintendent	GRSD	413 685-1011	DHOPSON@GRSD.ORG
Judy MacKinnon	COA representative	Council on Aging	413-427-0983	mackinnon.judith@gmail.com
[illegible]	Highway Dept Super	Highway Dept Water Dept	413 579 [illegible] 1949	Highway@TownofBlandford.Com
[illegible] Hennessey	Police Chief	Police Dept	413 313-2757	Chief.hennessey@Blandfordpolice.com
[illegible] Levakis	WATER COMM	WATER	4135794586	BILL.LEVAKIS@TOWNOFBLANDFORD.Com

HAZARD MITIGATION COMMITTEE MEETING SIGN-IN SHEET

Project:	Blandford	Meeting Date:	2/24/16
Facilitator:	Jamie Caplan	Place/Room:	Town offices

Name	Title	Organization	Phone	E-Mail
MARGIT MIKUSKI	COA CHAIR	COA	413-427-2711	MMIKUSKI@TOWNOFBLANDFORD.COM
Adam Dolby	Selectboard Chair	Town Admin	413.358.3147	adolby@townofblandford.com
Ed Harvey	FIRE CHIEF	FD	413 439 1601	Blandfordfd@yahoo.com
DAVID HORTON	SUPERINTENDENT	GRSD	413 685 1011	DHORTON@GRSD.ORG

HAZARD MITIGATION COMMITTEE MEETING SIGN-IN SHEET

Project: Blandford Mitigation	Meeting Date: 3/24/16
Facilitator: Jamie Caplan	Place/Room: Town Offices

Name	Title	Organization	Phone	E-Mail
MARGIT J, MIKUSKI	CHAIR, COA	COUNCIL ON AGING	848-2776	MMIKUSKI@TOWNOF BLANDFORD.COM
DAVID HUBON	SUPERINTENDENT	GATEWAY REG	665-1011	DHUBON@GRSD.ORG
Adam Dolby	Selectboard Chair	Selectboard	358-3147	adolby@townofblandford.com

HAZARD MITIGATION COMMITTEE MEETING SIGN-IN SHEET

Project: Blandford Mitigation Plan	Meeting Date: 4/18/16
Facilitator: Jamie Caplan	Place/Room: Town offices

Name	Title	Organization	Phone	E-Mail
Adam Dolby	Selectboard + Blandford FD	Selectboard Chair	413. 358. 3147	adolbye townofblandford.com
[signature]	COA CHAIR	BLANDFORD COA	413-- 427-2761	MMIKUSKI@TOWNOF BLANDFORD. COM
Mary Kroulik	Town Clerk	Town	848-4279 x203	blandford1@yahoo.com

Blandford, Massachusetts

MEDIA RELEASE

For Immediate Release
February 22, 2016

Contact: Adam Dolby
413-848-4279

Disaster Planning Public Meeting
March 7, 2016, 7:00pm

This meeting is held in conjunction with the Select Board Meeting.

The Town of Blandford is currently engaged in a planning process to become less vulnerable to disasters caused by natural hazards, and public participation is essential!

Join the Hazard Mitigation Committee at the Select Board Meeting on March 7, 2016 from 7:00 pm – 8:00 pm to share your ideas for reducing risk and becoming less vulnerable to natural hazards such as floods, hurricanes and winter storms. The meeting will be held at the Blandford Town Offices, 1 Russell Stage Road, Blandford.

The meeting provides an opportunity for you to share your opinions and participate in the mitigation planning process.

The purpose of the 2016 Hazard Mitigation Plan is to identify and assess the community's natural hazard risks and determine how to best minimize and manage those risks. Upon completion, the plan will be presented to the Town of Blandford for adoption and submitted to Massachusetts Emergency Management Agency (MEMA) and Federal Emergency Management Agency (FEMA) for review and approval. A FEMA approved plan makes the community eligible for federal and state mitigation grant funding.

The Pioneer Valley Planning Commission (PVPC) was awarded a grant from MEMA to develop the 2016 Hazard Mitigation Plan. The PVPC hired Jamie Caplan Consulting LLC to work with them and the Town to develop the 2016 Hazard Mitigation Plan.

If you have any questions regarding the meeting, or would like to learn about more ways you can participate in the development of the Hazard Mitigation Plan, please contact Adam Dolby, Selectboard Chair, 413-848-4279 or adolby@townofblandford.com.

MARCH 7, 2016 DISASTER PLANNING MEETING

March 7, 2016

7:00 pm

Blandford Town Offices, 1 Russell Stage Road

Fires, Floods and Winter Storms

Share Your Ideas for Reducing Risk

Preparing a Hazard Mitigation Plan for FEMA Approval

Public Input is Needed

The Town of Blandford is currently in the process of updating their FEMA Approved Hazard Mitigation Plan. This plan details how the Town may become less vulnerable to disasters caused by natural hazards such as flooding, winter storms and hurricanes. Your participation is important.

FOR MORE INFORMATION

Adam Dolby
Selectboard Chair

413-848-4279
adolby@townofblandford.com

PUBLIC MEETING SIGN-IN SHEET

Project: Blandford		Meeting Date: 3/7/16	
Facilitator:		Place/Room: Town Offices	

Name	Title	Organization	Phone	E-Mail
Pamela Rideout			8482296	PAMELARIDEOUT@AOL.COM
Michael Brennan			8483161	brennanfam2@aol.com
Cindy Montanaro			848-2271	cindymontanaro@gmail.com
Laurie Kline (Boucher)			626-7413	Rukdogme570@gmail.com
Bryan Young			2321857	Don't Have
William S. [illegible]			2794556	[illegible]
C. O'Brien			848-1410	chuckrus@yahoo.com
Linda Barnard			848-0154	l.barnard46@gmail.com
Richard Rick Barnard			"	"
Adam Dolby			848-2198	addby@townofblandford.com
MARGIT MIKUSKI			848-2776	MMIKUSKI@TOWNOFBLANDFORD.COM
[illegible]			848-2873	

Janet Zimbardo — 848-0941 — accountant@townofblandford.com

Jerald Reinford — 413-297-6037 — jerald@creamofthecroptemp.net

Jon Hollingshead — 413-961-9001

PUBLIC MEETING SIGN-IN SHEET

Project: Blandford	Meeting Date: 3/7/16
Facilitator:	Place/Room: Town Offices

Name	Title	Organization	Phone	E-Mail
[illegible signature] Cousineau		Planning	848-2815	TEDCOUSINEAU@YAHOO.COM
Co Cousineau		Assessor	"	cocousineau@gmail.com
E. McVey		Finance	2142	ebmcvey@att.net
Chris Smith		BOH	8482298	Smithbhf@GMAIL.com
Linda Smith		FINANCE	"	"
ROBERT TWYMAN			8492087	
ANDREW MONTANARO		SELECT BOARD	5466271	AMONTANARO@TOWNOFBLANDFORD.COM
Jeffrey Bacon		Finance	537-6727	Jeff@evritetool.com
Michael LaFrance			478-6355	mchl_lafrance@yahoo.com
DAVID HUPSON		MODERATOR	848-2273	DBHUPSON@verizon.net
Stephen Murray		ACTION AMBULANCE	484-7162 5052	smurray@actionambulance.com
Jim Seaton		ACTION AMBULANCE	441-7611	JSeaton@actionems.com

Blandford, Massachusetts

MEDIA RELEASE

For Immediate Release
April 8, 2016

Contact: Adam Dolby
413-848-4279

Disaster Planning Public Meeting
April 18, 2016, 7:00pm

This meeting is held in conjunction with the Select Board Meeting.

The Town of Blandford is currently engaged in a planning process to become less vulnerable to disasters caused by natural hazards, and public participation is essential!

Join the Hazard Mitigation Committee at the Select Board Meeting on April 18, 2016 from 7:00 pm – 8:00 pm to share your ideas for reducing risk and becoming less vulnerable to natural hazards such as floods, hurricanes and winter storms. The meeting will be held at the Blandford Town Offices, 1 Russell Stage Road, Blandford.

The meeting provides an opportunity for you to share your opinions and participate in the mitigation planning process.

The purpose of the 2016 Hazard Mitigation Plan is to identify and assess the community's natural hazard risks and determine how to best minimize and manage those risks. Upon completion, the plan will be presented to the Town of Blandford for adoption and submitted to Massachusetts Emergency Management Agency (MEMA) and Federal Emergency Management Agency (FEMA) for review and approval. A FEMA approved plan makes the community eligible for federal and state mitigation grant funding.

The Pioneer Valley Planning Commission (PVPC) was awarded a grant from MEMA to develop the 2016 Hazard Mitigation Plan. The PVPC hired Jamie Caplan Consulting LLC to work with them and the Town to develop the 2016 Hazard Mitigation Plan.

If you have any questions regarding the meeting, or would like to learn about more ways you can participate in the development of the Hazard Mitigation Plan, please contact Adam Dolby, Selectboard Chair, 413-848-4279 or adolby@townofblandford.com.

APRIL 18, 2016 7:00PM DISASTER PLANNING MEETING

April 18, 2016

7:00 pm

Blandford Town Offices, 1 E Russell Stage Road

Fires, Floods and Winter Storms

Share Your Ideas for Reducing Risk

Preparing a Hazard Mitigation Plan for FEMA Approval

Public Input is Needed

The Town of Blandford is currently in the process of updating their FEMA Approved Hazard Mitigation Plan. This plan details how the Town may become less vulnerable to disasters caused by natural hazards such as flooding, winter storms and hurricanes. Your participation is important.

FOR MORE INFORMATION

Adam Dolby
Selectboard Chair

413-848-4279
adolby@townofblandford.com

PUBLIC MEETING SIGN-IN SHEET – HAZARD MITIGATION PLAN

Project:	Hazard Mitigation	Meeting Date:	4/18/16
Facilitator:	Jamie Caplan	Place/Room:	Town Offices / Selectboard

Name	Title	Organization	Phone	E-Mail
Cara Lemire	Selectmen Sec			Selectmensecretary@townofblandford.com
JIM DRAWE	V. CHAIR SELECTMAN	MBI CUMMINGTON		JIM@WIREDWEST.NET
Peter Langmore	WW Dereliction			plangmore@hotmail.com
BOB TWYMAN				SLTWYMAN@VERIZON.NET
MARGIT MIKUSKI	COACHAIR	COUNCIL ON AGING	413-427-2261	MMIKUSKI@TOWNOFBLANDFORD.COM
T.J. COUSINEAU	CEMETERY AGENT	BLANDFORD		TJDCOUSINEAU@YAHOO.COM
Jeffrey Bacon	FM. Com	Blandford	413-537-6[illegible]	Jeff@evolitetool.com
BILL LEVARIS	SELECTMEN	BLANDFORD	413-[illegible]79-4536	BILL.LEVARIS@TOWNOFBLAND.COM
Alan Dolby	Selectboard	"	413.358.3147	adolby@townofblandford.ca
ANDY MONTANARO	SELECT-BOARD	BLANDFORD	848-2271	AMONTANARO@TOWNOFBLANDFORD.COM
Linda Smith	Finance Com	Blandford	848-2278	smithbhf@gmail.com
Tony VanWerkhooven	"	"	848-2773	toryvanw2@gmail.com
Barbara Langmore	COA	"	848-2816	

Town of Blandford, MA — Natural Hazards Preparedness Survey

The Town of Blandford is currently engaged in a planning process to become less vulnerable to disasters caused by natural hazards, and your participation is important to us!

The Hazard Mitigation Committee is working on developing a Hazard Mitigation Plan. The purpose of this plan is to identify and assess the Town's natural hazard risks (such as flooding, winter storms, hurricanes and earthquakes) and determine how to best minimize or manage those risks. Upon completion, this plan will be presented to the Town for adoption and submitted to the Massachusetts Emergency Management Agency (MEMA) and Federal Emergency Management Agency (FEMA) for review and approval.

This survey provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future disasters. Participation in this survey is voluntary and none of the information you provide will be attributed to you directly.

If you have any questions regarding this survey, or would like to learn about more ways you can participate in the development of the Hazard Mitigation Plan, please contact Adam Dolby, Town of Blandford Selectboard, 413-848-4279 or adolby@townofblandford.com.

1. **Have you ever been impacted physically, financially or emotionally by a natural disaster?**
   - ○ Yes
   - ○ No

2. **Are you prepared to shelter-in-place (stay home) during a local or regional disaster?**
   - ○ Yes
   - ○ No

3. **Is your home at risk to any of the following hazards? (Check all that apply.)**
   - ○ Floods
   - ○ Hurricanes or Tornadoes
   - ○ Wildfires
   - ○ Earthquakes
   - ○ Landslides
   - ○ I don't know

4. **Where do you live?**
   - ○ Town of Blandford
   - ○ Other

1

5. **Do you have flood insurance?**

- ○ Yes
- ○ No
- ○ I don't know

6. **If you don't have flood insurance, why not?**

- ○ I don't live in a floodplain
- ○ It's too expensive
- ○ It never floods here
- ○ My house is elevated
- ○ I never considered it

7. **Which of these disasters have you experienced? How concerned are you about each of them.**

I have experienced	Hazard	I am Very concerned	I am Neutral	I am Not concerned
	Dam Failure			
	Drought			
	Earthquake			
	Extreme Temperatures			
	Flooding			
	Hail			
	Hurricanes			
	Ice Jams			
	Invasive Species			
	Landslides/Rockslides			
	Severe Thunderstorm			
	Severe Winter Storm, Ice Storm			
	Tornadoes			
	Wildfires			

8. What is the most effective way for you to receive information about how to make your home and town more resilient to natural hazards?

- ○ Phone Call
- ○ Text Message
- ○ Mail
- ○ Public Workshop
- ○ Newspaper
- ○ Television
- ○ Radio
- ○ Internet (websites)
- ○ Internet (social media)

	Very Important	Neutral	Not Important
9. How important are each of the following community assets to you?			
Town Offices			
Fire Station			
Post Office			
Library			
Highway Garage			
Salt Storage Building			
Water Pump House			
Water Treatment Plant			
NEDT Household Hazardous Products Collection Center			
Electric Substation			
Churches			
Blandford Club			
The White Church			
Blandford Ski Area			
Amelia Park Ice Arena			
Blandford Fair Grounds			

	Very Important	Neutral	Not Important
10. Let us know your priorities regarding planning for natural hazards in your community?			
Protecting private property			
Preventing new development in high hazard areas			
Enhancing the natural environment			
Protecting historical properties			
Protecting and reducing damage to utilities			
Protecting emergency services			
Promoting cooperation among public and private agencies			
	Have done	Plan to	Not done
11. What have you done to prepare for a disaster?			
Gathered information on natural disasters or emergency			
Developed a "Household/Family Emergency Plan?			
Prepared a disaster supply kit			
Been trained in first aid and CPR in the last year			
Installed smoke detectors and carbon monoxide detectors in			
Discussed utility shutoff procedure in the event of a disaster			
Have a generator for temporary power			

12. Would you like information regarding hazard preparedness?

- ○ Yes – Please contact me with information hazard preparedness.
- ○ No thank you

Contact Information

Name
Email
Phone

APPENDIX C -ZONING BYLAWS

4.1 RESIDENTIAL DISTRICT
4.1.1 Uses Permitted (see Table 1- Schedule of Uses)
No building or land shall be used except for the following purposes:
4.1.1.1 One and two-family dwellings.
No more than one (1) building designated or available for use for dwelling purposes shall be erected or placed or converted to use as such on any lot without first obtaining a permit from the Building Inspector.
The Zoning Board of Appeals shall grant a special permit for the erection of an additional building or a conversion of an additional building, on any one lot, to be used for dwelling purposes provided:
(a) The minimum frontage of a lot in the district and the minimum area of the district for each dwelling are met.
(b) All minimum distances between buildings and setback requirements are met.
(c) The building Inspector obtains approval of the Planning Board prior to issuing permit.

4.1.2 Frontage and Area of Lots
4.1.2.1 The minimum frontage of lots in this district shall be 150 contiguous feet, and the minimum area shall be 30,000 square feet.
4.1.2.2 The minimum distance between a dwelling or accessory building and a street line shall be 30 feet.
4.1.2.3 The minimum distance between a dwelling or accessory building, a driveway or road or other structure such as a swimming pool or tennis court and any abutting property shall be 15 feet.

4.2 BUSINESS DISTRICT
4.2.1 Uses Permitted
No building or land shall be used except for the following purposes:
4.2.1.1 Any purpose authorized in the Residential District.
4.2.1.2 Offices, banks, and places of assembly.TOWN OF BLANDFORD, MA ZONING BY-LAW Page 5 of 18
4.2.1.3 Retail stores, salesrooms, shops for Custom work; or the making of articles to be sold at retail on the promises.
4.2.1.4 Restaurants excluding drive-ins or businesses using curb service.
4.2.1.5 Theaters, halls, and clubs.
4.2.1.6 Public or semipublic buildings.
4.2.1.7 Places of business of a barber and similar public service, baker blacksmith, builder, carpenter, caterer, clothes cleaner, confectioner, decorator dressmaker, dyer, electrician, florists furrier, and laundry, Laundromat, lumber, mail-order business, milliner, motor vehicle salesroom, milk bottling and distributing, news dealers, optician, pointer, paper hanger, pastry shop, photographer, plumber, printer, publisher, radio broadcasting studio, shoemaker, shoe repair, tailor, telegraph office, tinsmith, undertaker, upholsterer, and other similar uses.
4.2.1.8 Gasoline and oil stations and garages for storage and repair.
4.2.1.9 Any additional use for which the Board of Selectmen may grant permission, after a public hearing as outlined in Section V, in a specific case after the

determination by the Board that the proposed use is similar to one or more of the uses specifically authorized by this section.

4.2.2 Front Yards

In the Business District there shall be provided in the front of every building or structure a front yard extending the full width a the lot and equal in depth to the average of the depths of yards on adjoining lots, and no-building or structure shall be erected moved, or altered, reconstructed, or enlarged so that a front yard less in clear depth shall result. Projecting eaves and uncovered steps shall not be considered as coming within the meaning of this section. Where there are not sufficient buildings in the vicinity to determine an average, the minimum depth of front yards shall be thirty (30) feet.

4.2.3 Frontage and Area of Lots

4.2.3.1 The minimum frontage of lots in this district shall be 100 contiguous feet.

4.2.3.2 The minimum distance between buildings or structures such as swimming pools or tennis courts, driveways or roads and any abutting property shall be 10 feet

4.3 AGRICULTURAL DISTRICT

4.3.1 Uses Permitted

No building or land shall be used except for the following purposes:

4.3.1.1 Any purpose authorized in the Residential District.

4.3.1.2 Agriculture.TOWN OF BLANDFORD, MA ZONING BY-LAW

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4.3.1.3 Lumbering, portable sawmills, and portable planing mills.

4.3.1.4 In appropriate cases and with appropriate safeguards the Board of Appeals may grant special permits for the following uses. A performance bond shall be required.

(a) Convalescent homes - retirement homes.

(b) Commercial kennels or stables, riding schools, provided they are on lots not less than three (3) acres and provided no dogs are kept in any building or enclosures within 150 feet of a property line. Plans must be submitted to the Planning Board.

(c) None of these shall create offensive odors, noise or unsightly appearance noticeable off the promises.

4.3.2 Frontage and Area of Lots

4.3.2.1 The minimum frontage of lots in this district shall be 300 contiguous feet, and the minimum area shall be 87,120 square feet.

4.3.2.2 The minimum distance between a dwelling or accessory building, a road or driveway or other structure such as swimming pool or tennis court and any abutting property shall be 15 feet.

4.3.2.3 The minimum distance between a dwelling or accessory building and a street line shall be 30 feet.

4.4 LONG POND WATERSHED PROTECTION DISTRICT

4.4.1 Purpose of District

A Watershed Protection District is established in the Town of Blandford for the watershed of Long Pond for the following purposes:

4.4.1.1 To protect, preserve and maintain the water table and water recharge areas within the Town, so as to preserve present sources of water supply for the public health and safety;

4.4.1.2 To protect the community from the detrimental use and development of land and

water within the watershed protection district; and
4.4.1.3 To conserve the watershed area of the Town of Blandford for the health, safety, welfare and enjoyment of its people.
4.4.2 Intent of District
The intent of the Watershed Protection District is to include lands lying adjacent to water courses and surface water bodies which create the catchment or drainage areas of such water courses and bodies, as part of their natural drainage system. The district includes all areas designated on the Watershed Protection District Maps for the Town of Blandford,TOWN OF BLANDFORD, MA ZONING BY-LAW
Page 7 of 18
on file in the Office of the Town Clerk, which are hereby made part of the Town Zoning Map(s).
4.4.3 Boundaries of District
Following is a description of the boundaries of the Watershed Protection District:
BEGINNING at a point on the Blandford and Otis town line, approximately 1,300 feet southerly from the center of North Blandford Road;
THENCE southeasterly about 3,600 feet to the intersection of Wheeler Brook with Negro Hill Road;
THENCE continue southeasterly along the center of Negro Hill Road about 1,100 feet to a point;
THENCE in a general southerly direction about 1,800 feet to an angle;
THENCE continue in a general southerly direction about 1,900 feet to the center of an old road;
THENCE westerly and southwesterly along the center of said old road about 2,300 feet to its intersection with Gibbs Road;
THENCE northwesterly about 1,200 feet to a point on the Blandford and Otis town line, at the southwest corner of parcel three as shown on Map 403 of the Town of Blandford Assessors maps;
THENCE northerly along the Blandford and Otis town line about 4,150 feet to the place of beginning.
4.4.4 Permitted Uses
The following uses are permitted within the Watershed Protection District, subject to Section IV, provided that all necessary permit orders, or approvals required by local, state, or federal low shall also be obtained:
4.4.4.1 Conservation of soil, water, plants, and wildlife.
4.4.4.2 Outdoor recreation, nature study, fishing, and hunting where otherwise legally permitted.
4.4.4.3 Proper operation and maintenance of existing dams, splash boards, and other water control, supply and conservation devices.
4.4.4.4 Repair, maintenance and reconstruction of structures and uses lawfully existing prior to adoption hereof may be continued as permitted under the Zoning Act, M.G.L. Chapter 40A.
4.4.4.5 Farming, gardening, nursery, conservation and harvesting.TOWN OF BLANDFORD, MA ZONING BY-LAW
Page 8 of 18
4.4.4.6 Forestry, i.e. the cutting and removal of trees for the purpose of selling said trees or any products derived there from, when carried out in the following manner.
(a) Every reasonable effort shall be made to gain access without constructing

new access ways including, but not limited to maintaining and improving (but not substantially enlarging) existing access ways, and operations shall be conducted when the soil is dry or otherwise stable, as determined by the Board of Health or an agent appointed by them.
(b) Where access is determined impracticable without constructing now access ways, said access ways shall be designed, constructed and maintained in accordance with U.S. Forest Service logging road standards, and shall be removed and the site returned to previously existing conditions within one year.
(c) To ensure the faithful completion of the construction under (b) above, any person desiring to perform construction thereunder shall file with the Planning Board, in a form satisfactory to the Board, a performance bond in an amount determined by the Board or its authorized agent. Said performance bond shall be held by the Planning Board until all work required under paragraph (b) is completed in a manner satisfactory to the Board or its authorized agent.
(d) All channel crossings shall be stabilized to prevent erosion, using standard U. S. Forest Service methods. When crossings involve fill or other closed or semi-closed structures which will obstruct flow, they shall be designed, constructed and maintained in accordance with U.S. Forest Service standards, shall allow the unobstructed Passage Of existing flows for at least the 10-year storm, and shall be removed and the site returned to existing conditions within one year of construction.
(e) All operations shall be conducted in accordance with a cutting plan approved by the Massachusetts Department of Environmental Management District Forester; and a written notice describing the proposed cutting and removal of trees shall be submitted to the Conservation Commission not less than ten days prior to the commencement of operations.
(f) The removal of the selectively cut trees shall occur only during those periods when the ground is sufficiently dry or otherwise stable to support the equipment used, as determined by the Board of Health or an agent appointed by them.
(g) The placement of such, branches and limbs resulting from the cutting and removal operations shall not occur within 25 feet of the bank of a water body; and there shall occur no filling, excavation or other change in the existing topography. After the cutting, the crown area of the remaining trees shall be evenly distributed throughout the site and shall cover no less than 50 percent of the surface area of the site.
4.4.5 Prohibited Uses
The following uses are prohibited within the Watershed Protection District:TOWN OF BLANDFORD, MA ZONING BY-LAW
Page 9 of 18
4.4.5.1 Forestry, i.e., the cutting or removal of trees within 100 yards of the shore of Long Pond from the mean high water line and 25 feet from the bank of all brooks and streams flowing into Long Pond.
4.4.5.2 The location of landfills and the storage of salt and road de-icing chemicals.
4.4.5.3 Any new buildings, structures, land-disturbing activities, or excavations within the Watershed Protection District.

4.4.5.4 Any animal feedlots.
4.4.5.5 The disposal of solid waste, other than brush.
4.4.5.6 The storage and/or sale of petroleum (or any other refined petroleum product) except within the buildings which it will heat.
4.4.5.7 The dumping of snow contaminated by de-icing chemicals which is brought in from outside the district.
4.4.5.8 The storage or disposal of hazardous materials, as defined by the Hazardous Waste Regulations promulgated by the Hazardous Waste Board, the Water Resources Commission, and the Division of Water Pollution Control under the provisions of Chapter 21C of Massachusetts General Laws as amended.
4.4.5.9 The storage and use of herbicides and pesticides for any purpose and the storage of fertilizers and manure or other leachable materials.

SECTION V - WIRELESS COMMUNICATIONS FACILITIES
5.1 PURPOSE
The Town of Blandford seeks to allow telecommunications and wireless services with minimal effect to the public health, safety and general welfare, and to minimize the visual impact of such facilities.
5.2 DEFINITIONS
5.2.1 ABOVE GROUND LEVEL (AGL): A measurement of height from the natural grade of a site to the highest point of a structure.
5.2.2 CO-LOCATE: A term meaning that more than one wireless communications facility can be installed and operated on a single tower.
5.2.3 ELEVATION: The measurement of height above sea level.
5.2.4 MONOPOLE: A style of tower characterized by a single round pole having the general configuration of a flag pole. The monopole does not appear significantly larger at its base than at the point of maximum height.TOWN OF BLANDFORD, MA ZONING BY-LAW
Page 10 of 18
5.2.5 S.P.G.A.: Special Permit Granting Authority. In Blandford, the Zoning Board of Appeals serves in this role.
5.2.6 TELECOMMUNICATIONS TOWER: A monopole structure with antennas, if any, designed to facilitate the following types of services: cellular telephone service, personal communications services, and/or enhanced specialized mobile radio service.
5.2.7 WIRELESS COMMUNICATION FACILITY: Any tower (including antennas, if any), or antenna placed on existing building or structure, or any device, wiring or equipment designed to facilitate or be utilized in connection with the provision of the following types of specialized mobile radio service as well as any structures, buildings and/or appurtenances utilized primarily for the installation and operation of equipment necessary for the provision of such services. This definition does not include an antenna used by a federally licensed amateur radio operator or television antennas or satellite dishes which are accessory to a residential use.