

The City of Westfield Hazard Mitigation Plan Update



Adopted by the City Council of the City of Westfield on January 5, 2017

The Westfield Hazard Mitigation Committee

and

Pioneer Valley Planning Commission

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This project was funded by a grant received from the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA).

Acknowledgements

The Westfield City Council extends special thanks to the Westfield Hazard Mitigation Planning Committee as follows:

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Jay Hastings, Police Lieutenant- Westfield State University

The Westfield City Council offers thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Massachusetts Hazard Mitigation Plan which served as a model for this plan update. In addition, special thanks are extended to the staff of the Pioneer Valley Planning Commission for professional services, process facilitation and preparation of this document.

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1: PLANNING PROCESS

Introduction

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

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

Preparing, and updating every five years, a hazard mitigation plan before a disaster, can save the community money and 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.

Hazard Mitigation Committee

Updating the City of Westfield's Hazard Mitigation plan involved the following individuals and departments:

- Jim Wiggs, Emergency Management Director
- David Billips, DPW Superintendent
- Francis Cain, Assistant DPW Director
- Casey Berube, DPW Deputy Superintendent
- Heather Miller, Systems Engineer-DPW
- Joe Rouse, Department of Public Health Director
- Steve Cipriani, Code Enforcement Inspector
- Tom Hibert, Code Enforcement Inspector
- Mark Cressotti, Engineering
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- Jay Hastings, Police Lieutenant- Westfield State University

The Hazard Mitigation Planning process update for the City included the following tasks:

- Reviewing and incorporating existing plans and other information including changes in development in the last five years since the City's first Hazard Mitigation planning process
- Updating the natural hazards that may impact the community from the previous plan
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages
- Identifying deficiencies in the current Hazard Mitigation strategies and establishing goals for updating, revising or adopting new strategies
- Adopting and implementing the final updated Hazard Mitigation Plan

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

Committee Meetings

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

August 5, 2016

Work group meeting included hazard mitigation planning overview, identify and organizing of the planning team, and an initial discussion of hazard identification and risk assessment.

August 17, 2016

Work group completed the hazard identification risk assessment process, discussed existing hazard mitigation strategies and worked through FEMA's Capability Assessment Worksheet to understand what mitigation measures were already in place. The work group also reviewed previous mitigation strategies to document progress made since initial plan was adopted.

August 31, 2016

Work group updated the critical facilities section of the plan to reflect changes since the last plan was adopted. Also reviewed a map of critical facilities locations and natural hazard occurrences for accuracy and discussed potential vulnerabilities.

September 14, 2016

Work group selected and prioritized mitigation strategies they hope to pursue after this planning process. The committee also discussed the strategy that will be used to monitor the plan's progress.

While not all members of the Hazard Mitigation Committee were able to attend each meeting, all members collaborated on the plan and were updated on progress by fellow Committee members after meetings occurred.

Participation by Stakeholders

A variety of stakeholders were provided with an opportunity to be involved in the update of the Westfield 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 City of Westfield 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 Westfield 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). WRHSAC, which includes representatives from Western Massachusetts municipalities, Fire Departments, Public Works Departments, Police Departments, area hospitals and regional transit from throughout the four counties of western Massachusetts, is responsible for allocating emergency preparedness funding from the US Department of Homeland Security. The representatives of these disciplines who serve on the WRHSAC are charged with sharing the information discussed at meetings with their colleagues at their regular meetings. PVPC attends all WRHSAC meetings and all WRHSAC members are aware of the fact that Westfield 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 Westfield. 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 Westfield's Hazard Mitigation Plan update process and encouraged to comment.

Agencies that have the authority to regulate development

Westfield's Planning Board administers subdivision regulations and all developments requiring site plan review and special permits. Feedback to the Planning Board was ensured through the participation of staff from the City' Planning Department on the Hazard Mitigation Committee. In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Westfield, 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 Westfield Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan. Additionally, code enforcement inspectors and the Flood Control Commission were engaged in this plan update.

Participation by the Public, Businesses, and Neighboring Communities

Two public planning sessions were held as part of the development of the Westfield plan – on August 31, 2016 and September 21, 2016. Both meetings occurred after the Hazard Mitigation Committee had provided input on hazards and mitigation strategies relevant to the community. Notice of both public meetings was posted at Westfield City Hall in compliance with the Commonwealth of Massachusetts' open meeting law. Public meeting notices and sign in sheets can be found in Appendix B.

The Hazard Mitigation Committee determined that the most effective outreach strategy for engaging with the public, businesses and neighboring communities was through the media, and so this was the outreach strategy employed for reaching out to all three groups of stakeholders. The press release indicated that residents of Westfield were invited to attend the event, which was also intended to include representatives of businesses in Westfield and residents of neighboring communities.

Businesses and neighboring communities were also provided with an opportunity to provide feedback through the Pioneer Valley Planning Commission. PVPC is regularly involved in land use, transportation, and environmental planning initiatives in Westfield and surrounding communities. Regular feedback received from these other initiatives was incorporated into the hazard mitigation planning process. Neighboring communities that were provided with an opportunity to comment included municipalities that directly border Westfield, which are: Agawam, Granville, Holyoke, Russell, Southampton, Southwick, and West Springfield. These communities were invited to review the plan and attend the public meetings via a press release. Additionally, an email was sent to the surrounding communities (Agawam, Granville, Holyoke, Russell, Southampton, Southwick and West Springfield) Emergency Management Directors, Fire Chiefs, DPW Director/Highway Superintendents and Planning Board contacts inviting them to attend the second public meeting and review the plan.

August 31, 2016- Public Meeting #1

The City posted a press release prepared by the Pioneer Valley Planning Commission on its website on August 18, 2016 to announce that there would be a first public outreach meeting about the plan on August 31, 2016. This press release was also sent to City residents that have signed up for news alerts through the City's news system. The release was picked up by MassLive, which ran an article on August 19th.

The meeting was attended by a City Councilor (not on the hazard mitigation committee), an interested citizen, a reporter from the local newspaper, and the City Planner. Participants had concerns about why unnatural hazards were not included in this plan, what could be done regarding tornadoes in terms of alerts and safe shelters for those living in mobile homes and questions about whether or not existing mitigation infrastructure is maintained adequately in order to allow for proper response. The Williams Riding Way Pumping Station was cited as an example of this. When it was tested before a large storm it was found to be in disrepair and could not do what it was intended for. There was also discussion about the desire for notifications on how to prepare for disasters or what can be done personally to mitigate impacts to be varied in their delivery and be inclusive in regards to language. Participants also expressed frustration that community members were not in attendance to discuss this topic and suggested notification be included on the Channel 15 Community Bulletin Board and local radio station. They also suggested the Flood Control Commission and Location Emergency Planning Commission be invited to the next meeting.

In response to the press release, PVPC also received a call from Jeffrey Auer--Deputy Director of Water from the neighboring Town of West Springfield. The town of West Springfield is concerned about an undersized culvert on the Great Brook Stream near 506 Shaker Road. During storms or heavy rain events the town has observed the brook backing up at this culvert due to it being too small and often blocked with sticks. The town is concerned that this could cause flooding upstream in an area that includes the Town of West Springfield's public drinking water well. Jeff expressed interest in this appearing as an action item in the Westfield plan, as well as in the West Springfield Hazard Mitigation Plan, and is hopeful that there could be a collaboration between the town and city in the future to pursue FEMA HGMP funding to mitigate the risk currently posed on the town's wells by upgrading the culvert to a full stream bank crossing.

A news article appeared in the Westfield News on September 1st recapping the first public meeting and the plan update process. It also outlined upcoming committee and public meetings where residents could come and share their thoughts or concerns.

September 15, 2016- Westfield News Radio Show

On September 15, 2016, PVPC staff and Westfield's Emergency Management Director participated in The Westfield News weekly radio show, which is also broadcasted live on the City's local access television channel. The news show, which ran for two hours, covered the hazard mitigation planning process, Westfield's hazards and efforts that have been implemented to mitigate them and provided listeners with information on the public meeting happening on September 21st.

September 21, 2016- Public Meeting #2

On September 13, 2016, PVPC sent out a press release indicating that a second public outreach meeting would take place on September 21, 2016, and also to inform the public that a draft of the Westfield Hazard Mitigation Plan had been placed on PVPC's website. A list of media organizations that were sent the second press release is included in Appendix B, which are the television stations, radio stations, and newspapers located in western Massachusetts, northern Connecticut, and southern Vermont. The screen capture of PVPC's website showing the link to the press release can be found in Appendix B. The release indicated that all residents, businesses and other concerned parties of Westfield were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or the City or by attending the September 21st meeting. The press was picked up by MassLive, who ran a story about the second public meeting. Notification was also sent out to residents through the City's email alert system.

Members of the Flood Control Commission, as well as City residents and a City Councilor, were in attendance at the second public meeting. Main concerns voiced included enforcement of stormwater regulations with the city's development process, the need for better tree management and a formalized debris management plan. These have been included as action items within the plan's prioritized implementation plan. There were also concerns about the sand and gravel pit near Moose Meadow Brook exacerbating the potential for flooding. Westfield's Emergency Management Director will be looking into this concern further.

A recap of this meeting was covered by the Westfield News and residents were encouraged to submit their feedback to PVPC staff.

Any future input received from the public, as well as any other stakeholders, will be incorporated into the plan during future regular updates. Public participation is a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all future meetings in accordance with Massachusetts open meeting laws. In addition, the public will be invited to provide comments through e-mail. The comments will be reviewed by the Hazard Mitigation Committee and incorporated as appropriate.

City Council Meeting

In 2014, the City Council agreed to begin the process of developing a Hazard Mitigation Plan. Once the plan was provisionally approved by FEMA, the City Council held a public hearing on the plan and then adopted it.

2: LOCAL PROFILE

Community Setting

The City of Westfield is nestled at the foot of the picturesque Berkshires in Western Massachusetts. The city is bordered by West Springfield on the east, Southwick on the south, Granville on the southwest, Russell and Montgomery on the west, Southampton on the north and Holyoke on the northeast. Comprised of over 47 square miles, Westfield is just northwest of the metropolitan area of Springfield, as well as 99 miles from Boston, and 134 miles from New York City.

From the time of its founding in 1669 to 1725, Westfield was the most western town in the Massachusetts Colony. Town meetings were held in a church meeting house until 1839 when Town Hall was erected on Broad Street. This building served as a City Hall from 1920 to 1958. Due to its alluvial lands, the inhabitants of this area were entirely devoted to agricultural pursuits for about 150 years. Early in the 19th century the making of bricks, whips, and cigars became the principal occupations. Other firms engaged in the production of bicycles, paper products, boilers and radiators, textile machinery, abrasives, wood products and precision tools. The establishment of industry in the community changed its character from agricultural to a thriving industrial city during the latter part of the 19th century.

Today, Westfield is a regional commercial and industrial center. Over the past 25 years, the city's economic and employment growth have outpaced the population growth, an uncommon trend in the Pioneer Valley. Manufacturing, education, health and social services and retail trade are the largest sources of employment. Westfield State University is located in the city, as well as two health care facilities, the municipally-owned Barnes Airport, and Stanley Park – one of the region's most outstanding parks. Even with these urban characteristics, the City maintains its rural roots and some agriculture is still carried on in parts of Westfield.

Westfield is a mixture of residential neighborhoods, industrial development, and a commercial downtown. It combines suburban and rural living with the services and amenities of a city.

Population Characteristics

According to the U.S. Census, there are 41,371 residents and a total of 15,941 housing units. The median household income is \$60,845, and 10.9% percent of residents live below the poverty line (American Community Survey 2010-2014). The City of Westfield's population is expected to continue to grow at a steady rate, with approximately 43,280 residents by 2035 (UMass Donahue Institute population projections.)

Development

Westfield's growth was initiated first by farmers, then by industry and commercial development, and more recently commercial and residential redevelopment. But the city's topography, soils, and physiography (lakes, rivers, wetlands and watershed areas) shape and constrain these land use patterns.

Zoning

In addition to other factors, zoning and other land use regulations constitute Westfield's "blueprint" for its future. Land use patterns over time will continue to look more and more like the city's zoning map until the city is finally "built out"—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the city 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 city's zoning map and zoning bylaws. Zoning is the primary land use tool that the city 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 city's character.

The current Bylaw establishes twelve base zones and two overlay zones:

Five residential districts: Rural Residential, Residence A, Residence B, Residence C, Residence C-1 (Project);

Two commercial districts: Commercial A - Neighborhood, Commercial Office Retail Enterprise (CORE);

Two business districts: Business A (General), Business B (Service);

Two industrial districts: Industrial A, Industrial Park;

One airport district: Airport; and

Two overlay districts: Flood Zone, Water Resource Protection.

Although all appropriate zoning is relevant to protecting the health and safety of the City residents, two of Westfield's districts are specifically relevant to natural hazard mitigation:

Flood Zone District - The flood zone overlay applies to those areas within the boundary of the one-hundred-year flood that are considered hazardous according to FEMA. It is derived from the FIRMs. It limits some uses in order to prevent potential flood damage.

Water Resource Protection - The purpose of this overlay district is to protect and preserve Westfield's groundwater resources from potentially damaging pollution or environmental degradation by regulating certain uses within the district. The regulations state specific prohibited and restricted uses, regulates drainage, and details special permit procedures.

The Zoning Bylaw also establishes a Site Plan/Special Permit Approval procedure for specific uses and structures within Westfield. This review allows the Special Permit Granting Authority the ability to review development to ensure that the basic safety and welfare of the people of Westfield are protected, and includes several specific evaluation criteria that are relevant to natural hazards.

Current Development Trends

Because of its developable land, the Westfield area is expected to be a focal point for much of the region's growth. During the 1980s, there was rapid growth in residential development; in the 1990s Westfield's population growth slowed, but continued to increase and continues to do so. Currently there are over 41,000 residents.

Today, the vast majority of Westfield's 47.5 square miles (30,400 acres) is undeveloped land, totaling close to 15,600 acres (51.3%). Residential land is the second most prolific land use, totaling close to 6,800 acres; followed next by agricultural land, totaling about 3,500 acres. Land for industrial uses constitutes a relatively large 1,043 acres; and land for commercial uses totals 558 acres. Westfield also has significant acreage for land characterized as urban open/public land and outdoor recreational land, at 587 acres and 654 acres, respectively. Lastly, land used for transportation totals 1,072 acres and water constitutes another 471 acres.

Currently, Westfield's zoning laws and land use regulations somewhat encourage development where most appropriate, with least impact on the environment, and where public infrastructure already exists.

Following the economic slowdown which spanned into the earlier part of this decade, building development in Westfield has seen steady growth. Since 2009, some large commercial projects have been constructed: a 59,000 SF WalMart SuperCenter addition and three large distribution buildings: Home Depot (657,000 SF), Due Pyle (238,000 SF) and Boise Cascade (79,000 SF). An 87,000 SF indoor soccer facility is under construction. In this time, smaller scale commercial development also continued, including a Cumberland Farms (with gasoline sales), 99 restaurant, Dunkin Donuts, Rocky's Hardware, Downtown Transit Center and Riverbend medical office building (all new construction). Plans for additional commercial and industrial developments have been approved and await construction; these include a shopping center (99 Springfield Road) and 4-story office building (Apremont Way), as well as a new 600-student elementary school.

In the past few years, there appears to be an increase in residential development, including 3 recently permitted subdivisions (for 46 homes total) currently being constructed or built-out (Flynn Meadows, Angelica and Northfield Estates) in addition to single-lot home development throughout the City. The 122-unit ArmBrook senior and assisted living facility was completed in 2011 and development continues within the Liberty Manor senior housing community. Plans have been approved for the conversion of the former Moseley school to 23 dwelling units, and the construction of a 16 unit multifamily development on Lockhouse Road. While the City has seen substantial development in the last few years, the hazard mitigation committee did not believe it was likely to increase the city's risk to natural hazards.

National Flood Insurance Program Status

The City of Westfield participates in the National Flood Insurance Program, and had the following NFIP policy and claim statistics as of January 2016:

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file with the Conservation Commission.
- FIRMs have been effective since May 1, 1978 with the current map in effect since September 17, 2014.
- Westfield has 257 policies in effect for a total of \$55,706,300 worth of insurance.
- There have been 45 claims since 1978, totaling \$1,052,599.
- As of January 2016, there has been one Repetitive Loss Property in Westfield
- According to the Community Information System (CIS) of FEMA, there were 1,910 residential structures and 34 additional structures located within the Special Flood Hazard Area (SFHA) in Westfield as of May 1999, the most current records in the CIS for the City of Westfield.

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

Infrastructure

Westfield's infrastructure reflects its mix of rural and urban roots, coupled with its location along the Westfield River.

Roads and Highways

The Massachusetts Turnpike, Interstate 90, crosses Westfield just north of the central business district, providing excellent east-west access. Exit 3 is located a few minutes from downtown. Route 20 is the major east-west arterial of the city; routes 10 and 202 are the major north-south arterials. These two routes meet in downtown Westfield. Recently (2012) the city completed construction on the Great River Bridge Project, which added a second bridge over the Westfield River in downtown and improved the condition of the existing bridge.

Rail

Rail freight service is provided by Pioneer Valley Railroad and Conrail. More than 35 motor freight carriers with nearby terminals provide competitive freight service locally and to all distant points.

In the last few years the Columbia River Greenway has converted a vacant rail bed running from Southwick through downtown into a rail trail for bicyclists and pedestrians. The trail currently runs from the Westfield/Southwick border to Main Street. Work continues to expand the Greenway through the downtown and across the Westfield River.

Air

Barnes Municipal Airport in Westfield is the third largest commercial airport in New England. Commuter and charter passenger service as well as freight service is available at Barnes. Additionally, the 104th Fighter Wing of the Massachusetts Air National Guard is located at the Barnes Municipal Airport.

Public Transportation

The City is presently served by two Pioneer Valley Transit Authority bus routes to Springfield (R10) and Holyoke (B23). A public transit hub is currently under construction in downtown on the corner Arnold and Elm Street. Transit service is not expected to be expanded when construction is complete.

Public Drinking Water Supply

The Westfield Water Department had its beginnings in 1873 when the Massachusetts Legislature authorized the Town of Westfield to construct a reservoir in Montgomery. The City of Westfield now receives water from several different sources. The main source, the Granville Reservoir, supplies up to 4 million gallons per day of water to the city. The city also receives water from 8 active wells. Westfield is also authorized to withdraw up to 3.2 million gallons per day from the Springfield water system through an interconnection located off Shaker Road. The distribution system loops around the city and includes over 200 miles of water mains. The system includes over 1,600 fire hydrants and 10,300 services, all of which are metered. Approximately one-third of the City relies on private wells for their water.

As of September of 2016, three of the cities eight wells have been pulled off-line due to new allowable limits of Perfluorooctanic Acid (PFOA) and Perfluorooctane released by the EPA. The wells will remain off-line until the city can find away to treat the water in order to remove these contaminants. These wells being pulled offline paired with the extreme drought have strained the city's water supply.

Sewer Service

Since 1973, the City has had its own Wastewater Treatment Plant. The plant was recently upgraded in 2005 to increase its hydraulic capacity from 4 four million gallons per day up to 6.1 million. The plant serves about 75% of the Westfield area. The Wastewater Treatment Plant removes 95% to 99% of the pollutants before being discharged into the Westfield River. Since the last hazard mitigation plan update, small upgrades have been made to the plant to improve efficiency, but no major upgrades that would increase the plant's capacity have been carried out.

Schools

Schools in Westfield include Fort Meadow Early Childhood Center, Abner Gibbs Elementary, Franklin Avenue Elementary, Highland Elementary, Russell Elementary, Munger Hill Elementary, Paper Mill Elementary School, Southampton Road School, Westfield Middle-North, Westfield

Middle-South, Westfield High School, and Westfield Technical Academy. The City also uses an elementary school in Russell.

Westfield State University is also located in Westfield. The campus includes 9 on-campus residence halls, one off-campus residence hall and seven academic buildings. Since the last hazard mitigation plan, the University has expanded its capacity by building a new residence hall on campus with 411 beds, acquiring an apartment building downtown that houses 200 students and a new academic building. Work is currently underway to turn a former elementary school on campus into a new academic building.

Natural Resources

Westfield, at 30,000 acres, is the third largest city in Massachusetts. The northwest, southwest and southeastern areas of the city are characterized by ridges ranging from 1,111 feet along Ball Mountain in the northwest to 100 feet where the Westfield River meets Agawam in the southeast. These ridges are bisected in the western region by the Westfield River which flows easterly. The Little River enters at the southwestern border and joins the Westfield River about a mile west of the city's eastern border. The two rivers form one of the largest floodplains in the Connecticut River system. The floodplain is an asset for farming and recreation but is also a potential flood hazard. Levees have been built previously to mitigate the problem and are also used informally for passive recreation.

Numerous small streams flow through the city and provide a variety of recreation spots and wildlife habitat. A series of kettle holes in the north central part of Westfield is one of the city's most unique features.

Water Resources

Westfield has a wide variety of water resources including rivers and brooks of various sizes, many ponds, some natural and some man-made and a large number of wetlands.

The most significant of Westfield's water resources is the Westfield River, flowing through the heart of the city. It is very shallow most of the time, navigable only by canoes and kayaks. Most of the other waterways in the city drain into the Westfield River either in the city or just outside. The Westfield River is designated as a National Wild and Scenic River the purpose of which is to "protect outstanding rivers from the harmful effects of new Federal projects." To be designated as a National Wild and Scenic River, a river must have at least one "outstandingly remarkable" natural, scenic, or cultural value. The Westfield far surpasses that standard with "outstandingly remarkable" values encompassing scenic, geologic, historic, fishery, and recreational resources, water quality and flow, and rare and endangered species.

Other streams include the Little and Manhan Rivers, Powdernill, Great, Brickyard, Pond, Arm, Ashley, 100 Acre, Jacks, Jim, Cook, Meadow, Sandy Mill, Munn, Barry's, Trask, Bush, and Cooley Brooks. Ponds include the Kettle holes, Pequot, Horse, Long, Doe, Buck, Round, Chapin (collectively the Hammond Ponds), Fuller Reservation, Crane and Spectacle Ponds, the Arm Brook Flood Control Reservoir and the Powdernill Flood Control Reservoir, as well as a number of un-named ponds. Westfield contains approximately 982 acres of wetlands.

These water resources all provide important wildlife habitat, flood storage capacity, and recreation outlets, and in some cases they are water supply sources as well.

Forests

Almost 50% of the total acreage of Westfield remains forested (approximately 15,000 acres). The predominant forest habitat in Westfield is the northern hardwoods hemlock. Species vary with the topography, but consist primarily of hemlock, beech, sugar maple, and yellow birch.

Agricultural

Approximately 2,300 acres of agricultural land (7%) remain which along with various open land in provide additional vegetation types and habitat opportunities. Agricultural land has been threatened recently by the development of subdivisions.

3: HAZARD IDENTIFICATION AND ANALYSIS

The following section includes a summary of disasters that have affected or could affect Westfield. Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to develop this list.

The Hazard Mitigation Committee referred to the 2013 Massachusetts Hazard Mitigation list of hazards as a starting point for determining the relevant hazards in Westfield. The table below illustrates a comparison between the relevant hazards in the state plan and in Westfield's plan

Comparison of Hazard identified in the 2013 Massachusetts Hazard Mitigation Plan and the Westfield Hazard Mitigation Plan Update	
2013 Massachusetts Hazard Mitigation Plan	City of Westfield Relevance
Coastal Hazards	The City of Westfield is not located on the coast and therefore not at risk of coastal hazards.
Dam Failure	Dam Failure is a risk to Westfield.
Drought (Severe Weather)	Drought is a risk to Westfield.
Earthquake	Earthquakes are a risk to Westfield.
Extreme Temperature (Severe Weather)	Extreme Temperature is considered a risk to Westfield.
Flood (including Ice Jam)	Flooding is a risk to Westfield.
High Wind (Severe Weather)	High Wind is a risk to Westfield and is included in the Severe Thunderstorm/Wind/Tornado/Microbursts category.
Hurricane/Tropical Storm	Hurricanes are a risk to Westfield.
Ice Storm (Severe Winter Weather)	Ice Storms are a risk to Westfield and included in the category Severe Snowstorms/Ice Storms.
Landslide	Landslides are not a risk to Westfield.
Major Urban Fires	Major Urban Fires are not considered a risk to Westfield. However, wildfires and brush fires are considered a risk.
Nor'easter	Nor'easters are a risk to Westfield and included in the category Severe Snowstorms/Ice Storms.
Snow & Blizzard (Severe Winter Weather)	Snow & Blizzards are a risk to Westfield and included in the category Severe Snowstorms/Ice Storms.
Thunderstorm (Severe Weather)	Thunderstorms are a risk to Westfield and included in the category Severe Thunderstorms/Wind/Tornadoes/ Microbursts.
Tornado (Severe Weather)	Tornadoes are a risk to Westfield and included in the Severe Thunderstorms/Wind/Tornadoes/ Microbursts category.
Tsunami	The City of Westfield 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 City of Westfield.

Additionally, the hazards identified in Westfield's 2008 plan and this plan update are compared below.

Comparison of Relevant Hazards in Westfield's initial Hazard Mitigation Plan and this plan update	
2008 Natural Hazard List	2016 Natural Hazard List
Dam Failure	Dam Failure
Drought	Drought
Earthquakes	Earthquakes
	Extreme Temperatures
Floods	Floods
Hurricanes/Severe Wind	Hurricanes
Severe Snowstorms/Ice Storms	Severe Snowstorms/Ice Storms
Tornadoes/Microbursts	Severe Thunderstorms/Wind/Tornadoes/ Microbursts
Wildfire/Brush Fire	Wildfire/Brush Fire
Hazardous Materials	
	Impact of Climate Change

Extreme temperatures and the Impacts of Climate Change have been added to this plan based on recent events. Hazardous materials have been removed from this plan update, as they are out of the purview of natural hazards.

Natural Hazard Analysis Methodology

This chapter examines the hazards in the Massachusetts State Hazard Mitigation Plan which are identified as likely to affect Westfield. The 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 Westfield are: floods, severe snowstorms/ice storms, hurricanes, severe thunderstorms / wind / tornadoes, wildfire/brushfire, earthquakes, dam failure / levee breech, extreme temperatures and drought. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

Location

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

Percentage of City Impacted by Natural Hazard	
Land Area Affected by Occurrence	Percentage of City Impacted
Large	More than 50% of the city affected
Medium	10 to 50% of the city affected
Small	Less than 10% of the city affected

Extent

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

Previous Occurrences

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

Probability of Future Events

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

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

Impact

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

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

Vulnerability

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

- 1 – Very high risk
- 2 – High risk
- 3 – Medium risk
- 4 – Low risk
- 5 – Very low 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.

An overview of Westfield's Hazard Identification and Risk Analysis can be found below. A more detailed analysis can be found the pages that follow.

Hazard Identification and Risk Analysis				
Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Hazard Risk Index Rating
Flooding- 100 Year	Medium	Very Low	Critical	2- High
Flooding- Localized	Small	Low	Limited	3- Medium
Severe Snowstorms/Ice Storms	Large	High	Critical	1-Very High
Severe Thunderstorms	Large	Very High	Minor	4-Low
High Wind	Large	High	Limited	4-Low
Tornadoes	Large	Low	Critical	4-Low
Microburst	Large	High	Limited	3-Medium
Hurricanes	Large	Very Low	Minor	4-Low
Wildfire / Brushfire	Large	Moderate	Minor	3-Medium
Earthquakes	Large	Low	Catastrophic	4-Low
Dam Failures	High hazard-Large	Low	Minor/Catastrophic	5-Very Low
Drought	Large	Very High	Minor	5-Very Low

In most instances, the Hazard Mitigation Planning Committee felt that the risk for each hazard that could impact the city stayed the same based on its 2008 plan. The committee only elevated the risk level for microbursts given the increased frequency of them occurring in surrounding communities.

Flooding

Hazard Description

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

- 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.

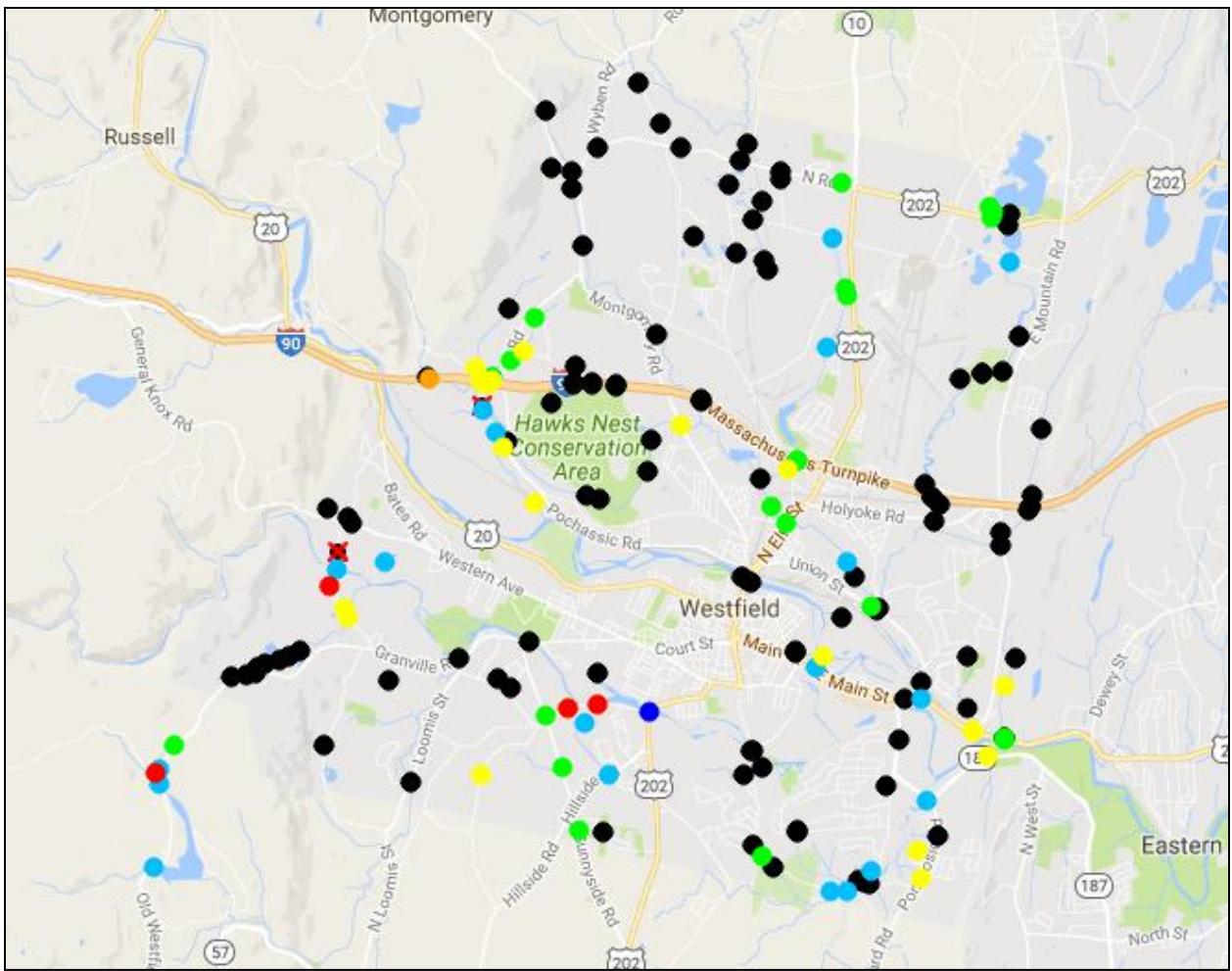
A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into 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 3,558 acres (11.7%) of land within the FEMA mapped Zone A or areas subject to inundation by a 1-percent-annual chance flood, commonly called a 100-year floodplain and 2,065 acres (6.8%) of land within area subject to inundation by a 0.2 percent-annual chance flood, commonly called a 500-year floodplain within the City of Westfield [approximately 18.5% of Westfield's total land area]. According to the Community Information System (CIS) of FEMA, there were 1,910 residential structures and 34 other structures located within the Special Flood Hazard Area (SFHA) in Westfield as of May 1999, the most current records in the CIS for the City of Westfield.

Areas most prone to flooding include areas along the stream and rivers in town. The historic development patterns of the city have resulted in a substantial amount of development occurring in the floodplain. For example, the entirety of downtown Westfield is located within the 500-year floodplain. Shopping centers along Route 20 (Westgate Plaza and Home Depot) are also prone to flooding.

In addition to localized flooding, undersized culverts can cause flooding across the City. Below is a map of the culvert and stream crossings in Westfield.



The colored circles on the map represent surveyed crossings color coded as follows:

- Full Passage: green ●
- Insignificant barrier: blue green ●
- Minor barrier: blue ●
- Moderate barrier: yellow ●
- Significant barrier: orange ●
- Severe barrier: red ●
- Missing data: magenta ●
- No crossing: black circle with bold red X ✘
- New crossing pending approval: black circle with red slash ↗

Source: University of Massachusetts Stream Continuity Project 2015 <<https://streamcontinuity.org/index.htm>

The City has identified that following culverts as problematic:

- Union Street (Frog Hole)
- North Elm Street (where the railroad passes under Route 202-10)
- City View Road
- Shaker Road (On the Great Brook- of particular concern to the Town of West Springfield)

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 Westfield and surrounding areas in western Massachusetts is 46 inches. The worst flooding in Westfield happened on August 19, 1955, when the Westfield River crest at 34.20 feet¹. Major Flood stages for the Westfield River are declared at 20 feet.

Previous Occurrences

The major floods recorded in Westfield have been the result of rainfall alone or rainfall combined with snowmelt. Key floods are:

- **September 1826**-Bridge across the river damaged. Bridges in Russell and Blandford also swept away.
- **May 1, 1854**- Great and Little Rivers overflowed their banks.
- **December 10-11, 1878**- Overnight flooding swept homes of foundations. Damage was estimated to equal \$100,000 in damage- equivalent to approximately \$2million in 2010 dollars.²
- **March 1, 1896**- Neighborhood of Meadow Street flooded.
- **November 4, 1927**- Flooding killed six and caused almost a million dollars in damages.
- **August 1955**- Hurricane Connie and Hurricane Diane dropped over 26 inches of rain in less than a week. City was left without power and communications and major roadways were impassable. A portion of Crane's Pond Dam collapsed and a number of bridges were damaged. Additionally, an emergency release of water the Cobble Mountain Reservoir in Granville caused the Little River to overflow its' banks, with the water channeling into downtown. In total, 76 businesses and homes were condemned and 723 homes, businesses, industrials firms or farms experienced flood damage. Nine bridges

¹ <http://water.weather.gov/ahps2/hydrograph.php?wfo=box&gage=WSFM3>

² <https://pvhn3.wordpress.com/1800s/westfield-flood-of-1878/>

were washed away or damaged. Damages and losses totaled 5-8 million dollars. After the flooding of 1955, the Williams Riding Way Pumping Station and the Little River Levee System were constructed to mitigate future flooding events. It should be noted that this flooding instance was approximately 30% below the 100-year flood event threshold.

- **1987**- Flooding at the Westgate Shops along Route 20. Hazard Mitigation Committee reports that flood waters rose to above the roofs of cars.
- **May 2007**- Westgate Shops and East Silver Street flooded. It was caused by heavy rain combined with seasonal snowmelt.
- **August 2011**- The rainfall from Hurricane Irene caused flooding in Westfield. The Westfield River rose to approximately 20 feet above sea level or seven feet above its flood level. Water crested dams up rivers in Beckett, increasing the flood levels. Stretches of Route 20 that parallel the Westfield River were closed and the park near the Great River Bridge in Downtown Westfield was submerged. Approximately 25 people were sheltered at North Middle School until the flooding receded.

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, Westfield often experiences minor flooding at isolated locations due to drainage problems, or problem culverts. There are many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff. Additionally, the vast majority of culverts throughout the city tend to be impacted by beavers, so localized flooding can potentially occur at any culvert crossing. At this time the City of Westfield has one repetitive loss property.

Probability of Future Events

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

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

Based on previous occurrences, the probability of localized flooding Westfield is "low" with a 1 to 10 percent probability in any given year.

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

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

Impact

The impact of a flood event would fall between “Limited” and “Critical,” dependent on event severity and precise location. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all residential property in the city, \$1,982,069,025, is used.

An estimated 20% percent of damage would occur to 25 percent of structures, resulting in a total of \$39,641,380 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above analysis, Westfield faces a vulnerability of "high" from flooding in the 100-year flood zone and a "medium" vulnerability to localized flooding.

A large portion of the city is located in either a FEMA mapped 100- or 500-year floodplain. Critical facilities located in the 100-year flood plain include the Little River Fire Station and railroad lines. Additionally, Route 20, Route 10-202 and Route 187 would be impacted. City Hall, a number of schools and a large concentration of people and businesses are located in the 500-year floodplain. A severe flood along the Westfield River could represent a major economic loss to businesses in downtown and along Route 20 (East Main Street). Along the Little River, the DPW's fuel depot on Ponder's Hollow Road is cited within the floodplain. While the Little River Levee System was designed to mitigate flooding in this area, the US Army Corp of Engineers recently rated the levee as “unacceptable” suggesting that it may not perform as it was designed to. Flooding of this facility could impact the DPW's ability to operate and could also impact water quality if flooding caused fuel to enter the water system.

Severe Snowstorms / Ice Storms

Hazard Description

Snow is characterized as frozen precipitation in the form of six-sided ice crystal. In order for snow to occur, temperatures in the atmosphere (from ground level to cloud level) must be at or below freezing. The strongest form of a severe snow storm is a blizzard. Blizzards are characterized by frequent wind gusts above 35 miles per hour, limited to no visibility due to falling snow and extreme cold that lasts longer than three hours.

Ice storms are liquid rain that falls and freezes upon contact with cold objects. There must be an ice build-up of greater than $\frac{1}{4}$ inch for it to be considered an ice storm. When more than a $\frac{1}{2}$ inch of ice build-up is forecasted a winter storm warning can be triggered.

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
- Elderly are affected by extreme weather

Location

Severe winter weather occurs regionally and therefore would impact the entire city, although several specific locations are more susceptible to damage. These problem areas include:

Downtown (intersections of Court, Broad, Main and Elm Streets and the various side streets that connect to the main roads)- due to the limited space in the downtown area, a single major snowstorm can create large piles of snows from plowing operations. These can obstruct views at busy intersections resulting in automobile accidents.
Hampden Village- There is a concentration of elderly people here that may require assistance in large ice or snow events.

There are no known areas that are especially prone to snow drifts or ice buildup.

Extent

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and

Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from storms producing heavy snowfall over large areas that include major metropolitan centers.

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

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

The Sperry-Piltz Ice Accumulation (SPIA) Index (below) is a prediction tool (algorithm) that can be used in conjunction with National Weather Service data to predict the impact of winter weather in terms of ice damage. It is currently being tested by the National Weather Service and FEMA in several regions with potential implementation in the future. In the meantime, the index provides an outline of the potential damage impacts of ice storms based on accumulation and wind.

The Sperry-Piltz Ice Accumulation (SPIA) Index	
Ice Damage Index	Damage and Impact Descriptions
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days.
4	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures/ Outages lasting 5-10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Source: <http://www.spia-index.com/images/SPIAIndexDescription.png>

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 58 winter storms since 1958 that have registered on the NESIS scale. Of these, approximately 28 storms resulted in snow falls in the Pioneer Valley of at least 10 inches. These storms are listed in the table on the below, in order of their NESIS severity.

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
1/29/2015	5.42	3	Major
2/8/1994	5.39	3	Major
1/9/2011	5.31	3	Major
2/11/2014	5.28	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>

Westfield's recent history has not recorded any loss of life due to extreme winter weather, but there are usually several incidents of property damage or personal injury each winter. In addition, during heavy snow years, accumulations can reach several feet deep. Westfield's historic road network often creates steep grades, dangerous intersections and narrow highways, sometimes making plowing difficult and causing snow and ice hazards.

Most recently, in October 2011 heavy snow, paired with trees still in full foliage caused widespread damage to Westfield and its surrounding cities and towns. Thousands of trees were downed causing widespread power outages (70% of the city was without power) and trapping people in neighborhoods because roads were impassable. Many were left without power for days during this period of extreme cold. Emergency shelters opened at Juniper Park Elementary School and Westfield State University's Scanlon Hall. The City's Fire Department played a major role in transporting people that couldn't get out of their neighborhoods to shelters.

There is currently no good source of information at the local level about the frequency of ice storms in the past. According to the Massachusetts State Hazard Mitigation Plan, there were 19 major ice storms in Hampden County between 1971 and 2012. This equates to a major ice storm every two years. Areas that are higher in elevation are more likely to experience ice storms.

Probability of Future Events

Based upon the availability of records for Hampden County, the likelihood that a severe snow storm or ice storm will hit Westfield in any given year is "High," or a 40 to 70 percent probability in any given year.

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

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

Impact

The impact of an event would be "Critical," with more than 25% percent of property in the affected area damaged. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all residential property in the city, \$1,982,069,025, is used.

An estimated 25 percent of damage would occur to 10 percent of structures, resulting in a total of \$39,641,380 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Westfield faces a "Very High" vulnerability from severe snow storms and ice storms.

The City's power and communication infrastructure could be vulnerable to the impacts of a severe snow or ice storm. This could cause residents and businesses to lose power and could impact the City's ability operate normally. Additionally, buildings with flat roofs are especially vulnerable to damage, especially when the snow is wet and heavy. In the past, many commercial and industrial buildings have been a concern, but some of the schools and the Boys and Girls Club have also been a concern.

Hurricanes / Tropical Storms

Hazard Description

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

Location

Because of the hazard's regional nature, all of Westfield is at risk from hurricanes and tropical storms, meaning the location of occurrence is "large," with over 50 percent of land area affected. 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.

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

No hurricanes have tracked directly through Westfield, but rainfall associated with hurricanes has caused flooding in the City of Westfield. This includes the Great Hurricane of 1938, which caused widespread flooding across the region and prompted a number of US Army Corps of Engineer flood control projects that are still protecting the region today. The worst flooding that

Westfield has experienced occurred in 1955, as a result of rainfall from Hurricane Connie. More recently, rainfall from hurricane Irene caused flooding in Westfield; the Westfield River crested at 19.2 feet (major flood stage for the Westfield River is 20 feet). Hurricanes that have affected Westfield are shown in the following table:

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

Source: National Hurricane Center, 2012

Probability of Future Events

Westfield'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 "Very Low" probability of hurricanes or tropical storms, or a less than 1 percent probability 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.

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

The City of Westfield faces a “minor” impact from hurricanes, with minimal property damaged.

Vulnerability

Based on the above analysis, Westfield faces a "Low" vulnerability from hurricanes and tropical storms.

The entire city would be vulnerable to the impact of a hurricane. Areas prone to flooding are particularly vulnerable. Additionally high winds could impact the city's communication and energy infrastructure.

Severe Thunderstorms / Wind / Tornadoes/Microburst

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.

Microbursts are sudden down bursts of air that funnel air directly down until it hits the ground and disperses outwards. Microbursts most commonly occur during strong thunderstorms. The scale and suddenness of microbursts make them difficult to predict with certainty, but it is possible to forecast the conditions that make microbursts much more likely. The high winds associated with microbursts can knock over full grown trees, damage buildings and are especially problematic for aircrafts

Location

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

Extent

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

Microbursts are typically less than three miles across. They can last anywhere from a few seconds to several minutes. Microbursts cause damaging winds up to 170 miles per hour in strength and can be accompanied by precipitation.

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

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

The extent of hail that can be present in severe thunderstorms can be found in the table below.

Hail Extent	
Hail Size	Object Analog
.50	Marble, moth ball
.75	Penny
.88	Nickel
1.00	Quarter
1.25	Half dollar
1.50	Walnut, ping pong
1.75	Golf ball
2.00	Hen egg
2.50	Tennis ball
2.75	Baseball
3.00	Tea cup
4.00	Grapefruit
4.50	Softball

Source: <http://www.spc.noaa.gov/misc/tables/hailsize.htm>

Rainfall records for a 24-hour period and per month are listed below:

Rainfall Records for Westfield, MA		
Month	24-Hour Record	Monthly Record
January	2.8"	8.9"
February	3.23"	7.68"
March	2.8"	7.72"
April	3.55"	8.75"
May	3.62"	11.54"
June	3.74"	10.4"
July	4.33"	9.73"
August	7.56"	18.68"
September	3.86"	8.67"
October	3.39"	9.06"
November	2.44"	7.56"
December	2.99"	7.25"

Source: <http://www.myforecast.com/bin/climate.m?city=19522&metric=false>

Previous Occurrences

Because thunderstorms and wind affect the city regularly on an annual basis, there are not significant records available for these events. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Most occur in the late afternoon and evening hours, when the heating is the greatest. On average, since 1993, there have been between 5-6 severe thunderstorms per year (defined as with winds over 50 miles per hour) in the region around Westfield.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities just west of Worcester. Nine incidents of tornado activity (F3 or less) have occurred in Hampshire County since 1954 and one known tornado has touched down in Westfield. In 2011, a tornado ranked F3 (Severe Damage) on the Fujita Scale of Tornado Intensity, blew through West Springfield, Westfield, Springfield, Monson, Wilbraham, Brimfield, Sturbridge, and Southbridge. In Westfield, the tornado did not result in any injuries or fatalities but caused significant property damage. The Munger Hill Elementary School as well as a number of homes were damaged. The tornado and related storm killed 3 people and resulted in hundreds of injuries across the state.

Members of the Hazard Mitigation Committee stated that in 2015, there were reports of a microburst in Hampden Village. A few trees were downed as a result and there was damage to residents' mobile homes. Beyond this local knowledge little information is known about the microburst. In recent history the neighboring town of Easthampton suffered damage from a large microburst, leading the committee to believe that this could be a hazard that is increasing in frequency.

Probability of Future Events

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

Tornado Index for Hampden County	
Hampden County	138.28
Massachusetts	87.60
United States	136.45

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

Based upon the available historical record, the estimated probability of a tornado in Westfield is "low," or between 1 and 10 percent in any given year. Based on local knowledge and the increased prevalence of microbursts in surrounding communities, the estimated probability of a microburst in Westfield is "moderate," or between 10 and 40 percent in any given year.

As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Thus, there is a "Very High" probability 70 to 100 percent chance in any given year) of a severe thunderstorm or winds affecting the city.

Impact

Overall, the City of Westfield faces a "limited" impact from severe thunderstorms, winds, or microbursts, with 10 percent or more of the city affected and a "critical" impact from tornadoes, with 25 percent or more of the city affected. The potential for locally catastrophic damage is a factor in any severe weather event. In Westfield, a tornado that hit residential areas would leave much more damage than a tornado with a travel path that ran along the city's forested

areas, where little settlement has occurred. Most buildings in the city 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 city'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 the city, \$1,982,069,025 is used. An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$19,820,690 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Westfield has a vulnerability of "low" from severe thunderstorm, severe winds, and tornadoes, and a "medium" vulnerability from microbursts.

The entire city would be vulnerable to the destruction caused by severe thunderstorms, wind, microbursts and tornadoes. The vulnerabilities associated with flooding could be present if substantial rain accompanies severe thunderstorms. Additionally, high winds could impact the city's communication and energy infrastructure and older buildings. Most, if not all of the city's critical facilities, were designed to withstand lower wind speeds and could be damaged or destroyed by high wind events, microbursts of tornadoes.

Wildfire / Brushfire

Hazard Description

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

FEMA has classifications for 3 different classes of wildfires:

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

Location

Approximately 15,000 acres of Westfield (50% percent) is forested and therefore at risk of wildfire. Much of the western edge of Westfield is susceptible to wildfire as there are significant unfragmented forested areas in this section of the city. The fires could start either in Westfield or the neighboring towns of Montgomery and Russell. The location of occurrence is "Large," with more than 50 percent of land area affected.

Brushfires are most prevalent along East Mountain Road (due to illegal burning), the western edge of the city (which is more forested) and along the rail road tracks that run through Westfield.

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.

In Westfield, 50 percent of the land is forested (15,000 acres), and is therefore at risk of fire. A large wildfire could damage almost all of the city'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. A large wildfire could damage a large swath of Westfield's landscape, including vital watershed lands, in a short period of time. The forested land in Westfield, during a wildfire, may render emergency personnel unable to counter the fire due to the terrain.

Previous Occurrences

During the past 100 years, there have not been many wildfires occurring in the Pioneer Valley. While many of the communities surrounding Westfield have had occurrences of wildfire in recent history, Westfield has not had a wildfire within its borders. The wildfires that have occurred during the past 20 years are shown in the list below:

- 1995 – Russell, 500 acres burned on Mt. Tekoa
- 2000 – South Hadley, 310 acres burned over 14 days in the Litihia Springs Watershed
- 2001 – Ware, 400 acres burned
- 2010 – Russell, 320 acres burned on Mt. Tekoa
- 2012 – Eastern Hampden County, dry conditions and wind gusts created a brush fire in Brimfield, and burned 50 acres
- 2016 – Montgomery, 60 acres burned

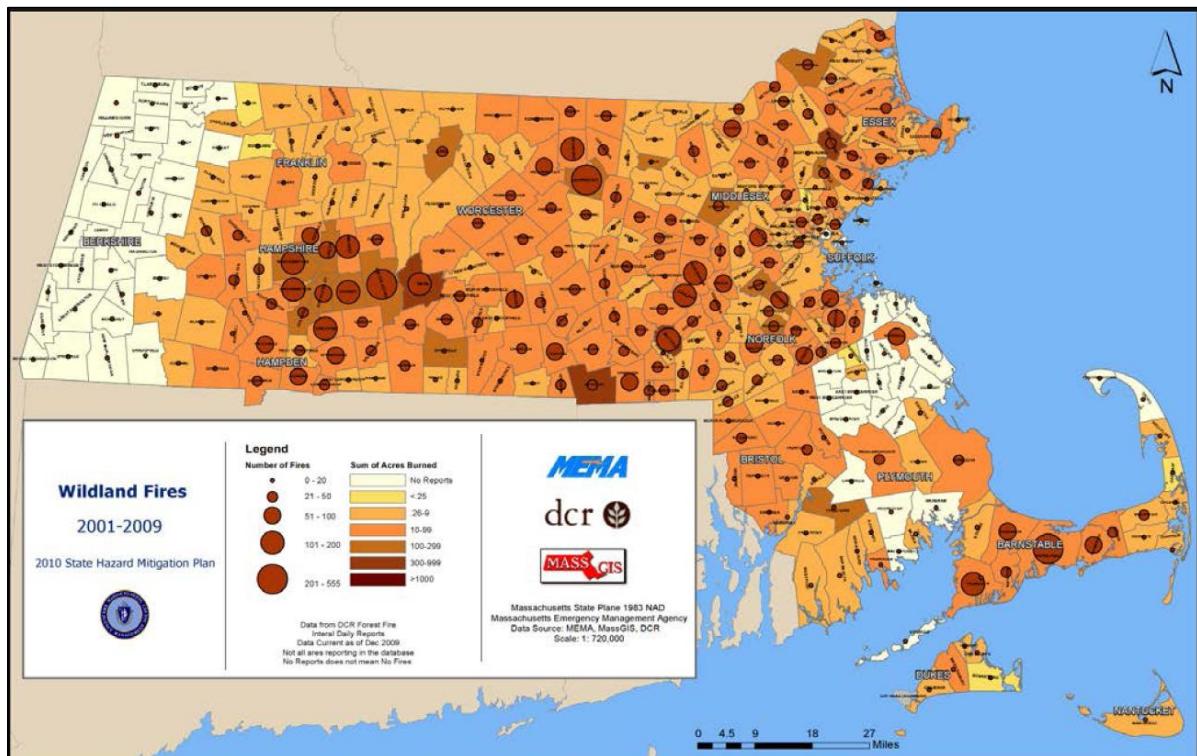
As a point of reference, the total number of fire incidents for the last five available years is provided below. These include structural, automotive and brush fires.

Total Fire Incidents in Westfield	
2009	123
2010	123
2011	125
2012	144
2013	161

Source: Massachusetts Fire Incidence Reporting System, County Profiles, 2013 Fire Data Analysis

The Westfield Fire Department responds to an average of 26 brushfires a year. Some brushfires are a result of illegal burning, while others are caused by sparks from a rail car or natural causes. The Fire Department estimates that there are between 86 and 100 illegal burns a year in town. They currently have no way to track how many burn permits are active within the city, because they are a lifetime permit tied to a telephone number as opposed to a location. They give out approximately 150 new permits a year.

Wildland Fires in Massachusetts, 2001-2009



Source: Massachusetts Hazard Mitigation Plan

Probability of Future Events

In accordance with the Massachusetts Hazard Mitigation Plan, the 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 City, the likelihood of a future wildfire is determined to be “moderate,” or between a 10 and 40 percent probability in any given year.

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

Impact

Westfield faces a “minor” impact from wildfires, with minimal damage anticipated in such an event. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the city, \$1,982,069,025 is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$19,820,690 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Westfield faces a "Medium" vulnerability from wildfire and brushfires.

The sections of the city bordering Russell and Montgomery would be the most vulnerable to wildfires given the past history of wildfires in those towns and the amount of contiguous forested land in that part of the City. Critical Infrastructure that would be vulnerable to wildfires or brushfires would be dependent on the location of the burn. However, most of the city's critical infrastructure is not located in this western section of the city. Critical infrastructure that is most likely to be impacted are two of the city's wells, a water tank and the western section of Route 20 in Westfield.

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.³ 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.⁴

Location

Because of the regional nature of the hazard, the entire city is susceptible to earthquakes, and the location of occurrence is "large," with over 50 percent of land affected.

Extent

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

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

³ Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm.

⁴ Federal Emergency Management Agency Web site: www.fema.gov/hazards/earthquakes/quake.shtm.

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

Source: US Federal Emergency Management Agency

Previous Occurrences

The most recent earthquakes in the region that could have affected the City of Westfield are shown in the table below. There is no record of any damage to the City of Westfield as a result of these earthquakes. Members of the Hazard Mitigation Committee did report having felt some light shaking in 2011 and 2014 from earthquake that happened elsewhere in New England.

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

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

New England States Record of Historic Earthquakes		
State	Years of Record	Number Of Earthquakes
Connecticut	1668 - 2007	137
Maine	1766 - 2007	544
Massachusetts	1668 - 2007	355
New Hampshire	1638 - 2007	360
Rhode Island	1776 - 2007	38
Vermont	1843 - 2007	73
New York	1840 - 2007	755

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 Hampden County to determine the Earthquake Index Value as shown in the table below.

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

Based upon existing records, there is a “very low” frequency of earthquakes in Westfield, with less than a 1 percent chance of an earthquake 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. Liquefaction of the land near water could also lead to extensive destruction.

The impact of an earthquake in Westfield would be “catastrophic”. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the city, \$1,982,069,025 is used.

An estimated 100 percent of damage would occur to 25 percent of structures, resulting in a total of \$495,517,256 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on this analysis, Westfield maintains a "Low" vulnerability from earthquakes.

Older buildings are particularly vulnerable to earthquakes because their construction pre-dates building codes that included strong seismic consideration. The City has a number of historical buildings that could be damaged or destroyed if a large enough earthquake were to happen. A loss of these historic buildings could represent a loss of Westfield’s history and culture. There have been no studies done to determine how Westfield’s critical infrastructure, such as the Emergency Operation Center, City Hall or Fire Stations would fair in an earthquake. Lastly all of the City’s evacuation routes contain either bridges or underpasses, and could be obstructed if a bridge were to fall as a result of an earthquake.

Dam Failure

Hazard Description

Dams and levees and their associated impoundments provide many benefits to a community, such as water supply, recreation, hydroelectric power generation, and flood control. However, they also pose a potential risk to lives and property. Dam or levee failure is not a common occurrence, but dams do represent a potentially disastrous hazard. When a dam or levee fails, the potential energy of the stored water behind the dam is released rapidly. Most dam or levee failures occur when floodwaters above overtop and erode the material components of the dam. Often dam or levee breeches 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.

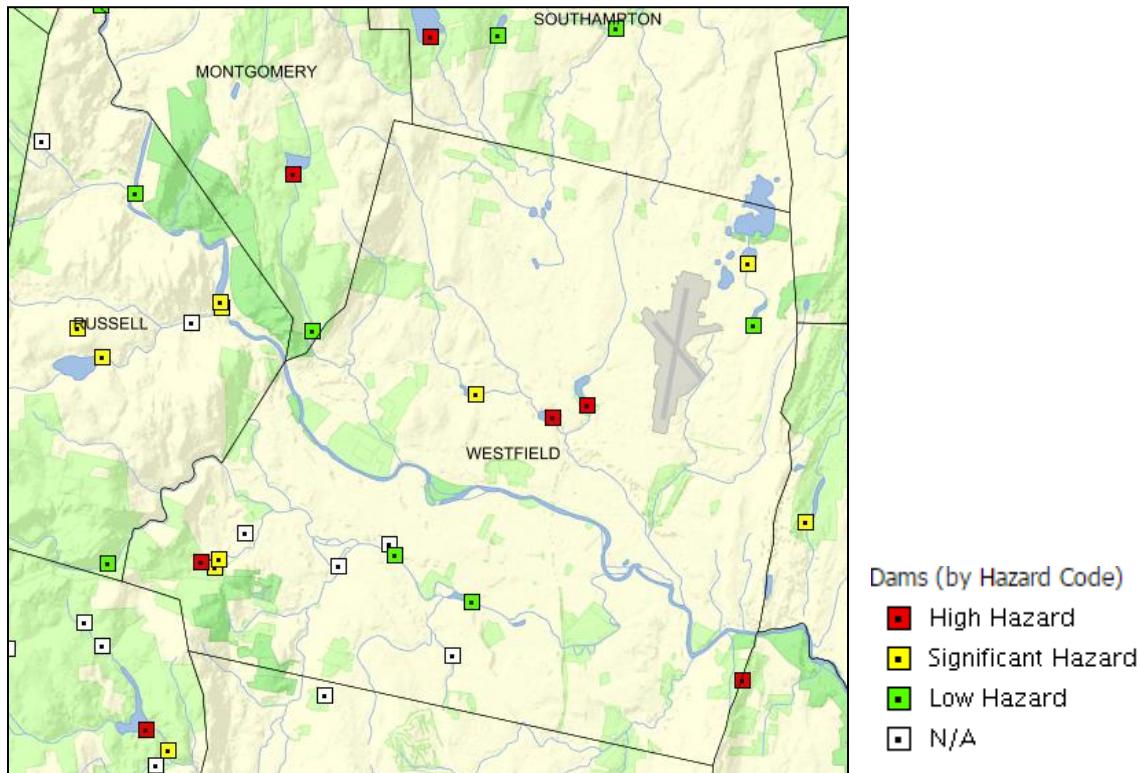
Location

Westfield has 14 dams located within its boundaries. The location of occurrence for a failure of a high hazard dam has been determined to be "large," with more than 50 percent of land area affected.

Dams and Dykes in Westfield	
Dam	Hazard Level
Arm Brook Dam	High
Powdermill Brook Dam	High
Westfield Sportsmen Club Dam, Inc. (1830)	Significant
Florek Pond Dam	Significant
West Parish Filter #1 Dam	Low
West Parish Filter #2 Dam	Low
West Parish Filter #3 Dam	Low
Stevens Paper Co. Lower Dam	Low
Stevens Paper Co. Upper Dam (1901)	Low

Dams and Dykes in Westfield	
Chapin Pond	Low
Howard Smith YMCA Pond Dam	Non-jurisdictional
Stanley Park Sam	Non-jurisdictional
Sunny Side Pool Dam	Non-jurisdictional
Horse Pond Dam	Non-jurisdictional

The location of Dams in Westfield can be seen on the map below.



Source: Mass GIS Oliver.

Additionally, there are four dams located outside of Westfield's boundaries that have inundation zones within the city. Three of these four dams have a high hazard level.

Dams Located Outside of Westfield with Inundation Zones Including Westfield	
Dam	Hazard Level
Cobble Mountain Dam	High
Montgomery Dam	High
Granville Dam	High
Tekoa Dam	Low

The Cobble Mountain Dam (owned by the City of Springfield) and the Granville Reservoir (owned by the City of Westfield) are both located in Granville. The Cobble Mountain Reservoir

directly impedes the Little River and the Granville Reservoir limits water on the Munn Brook—a tributary of the Little River. A failure of either of these dams is likely to have a significant impact on Westfield. It could include the inundation of Downtown Westfield, areas downstream including land along Route 20 from the Westfield Shops to the West Springfield Line and areas adjacent to the confluence of Westfield River and the Little River.

Extent

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

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

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

Previous Occurrences

A portion of the Crane’s Pond Dam failed during the flood of 1955. This flooding was caused by Hurricane Connie and Hurricane Diane which dropped over 26 inches of rain in less than a week. In total, 76 businesses and homes were condemned and 723 homes, businesses, industrials firms or farms experienced flood damage. Nine bridges were washed away or damaged. Damages and losses totaled 5-8 million dollars.

Probability of Future Events

As Westfield’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 hydrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

Throughout the west, communities downstream of dams are already seeing increases in stream flows from earlier releases from dams. Dams are constructed with safety features known as “spillways.” Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as “design failures,” result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

Impact

The Powdermill Brook Dam and the Arm Brook Dam are the two high-hazard dams in Westfield. In March of 2016, studies on these dams were completed by Tighe & Bond for the City of Westfield. They outline the procedures to be followed in case of dam failure and the likely inundation zones for each dam. Details on those located in the inundation zones of each dam can be found below. Studies have not been conducted for the other dams in the City. They, however, are not expected to have as drastic of an impact in the event of a failure.

Powdermill Brook Dam Inundation Zone

The Powdermill Brook Dam is an earthen dam, which was constructed as a result of 1955 floods that impacted Westfield. A failure of the dam “at maximum pool [would] likely cause the loss of life and serious damage to homes and a railroad.” The inundation zone of the Powdermill Brook Dam includes the areas of the City bounded by Route 202/North Elm Street, Powdermill Brook, Route 20 and the Conrail/Amtrak railroad line. The following are located within the inundation zone: Two separate railroad lines (Pioneer Valley Railroad and Conrail/Amtrak), two churches, 337 occupied properties that includes a mix of residential and businesses. Major employment centers that would be inundated include: Mestek, Prolamina, Pioneer Valley Professional Center, Noble Network Medical Building and the Westfield Coatings Corporation.

Arm Brook Dam Inundation Zone

The Arm Brook Dam lies just northeast of the Powdermill Brook Dam. Thus, their inundation zones include a lot of the same areas. The Arm Brook Dam is an earthen embankment that serves as both a flood control structure and opportunity for recreation. The inundation zones includes the area bounded by Route 202/North Elm Street, Powdermill Brook, Route 20, and the Conrail Amtrak railroad line and the residential area near Route 90, which lies just south of the dam. The following are located within the inundation zone: Route 90 (the Massachusetts Turnpike), two separate railroad lines (Pioneer Valley Railroad and Conrail/Amtrak), two churches, 337 occupied properties that includes a mix of residential and businesses. Major employment centers that would be inundated include: Mestek, Prolamina, Pioneer Valley Professional Center, Noble Network Medical Building and the Westfield Coatings Corporation.

An impact from a dam failure event could range from “limited” to “catastrophic,” with approximately 30 percent of property in the affected area damaged or destroyed. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in city, \$1,982,069,025 is used. An estimated 100 percent of damage would occur to 30 percent of structures, resulting in a total of \$594,620,707 worth of

damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on this analysis, Westfield has a "Very Low" vulnerability from dam or levee failure. Studies conducted on the Arm Brook and Powdermill Dam include a discussion of the properties that could be impacted by a dam failure. While there is a large population residing in the inundation zone, two railroad lines and a number of large businesses, none of the city's critical facilities are located in the inundation zone. A failure of the Arm Brook Dam could damage Interstate 90, which could lead to regional travel issues and a failure of either the Arm Brook or Powdermill Dam could damage Route 10-202, impeding evacuation efforts.

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.

Location

Because of this hazard's regional nature, a drought would impact the entire city, resulting in a "large" location of occurrence, or more than 50 percent of total land area affected.

Extent

The severity of a drought would determine the scale of the event and would vary among residents depending on whether the residents' water supply is derived from a private well or the public water system. Westfield's Public Water Supply is supplied by eight wells; these eight wells supply most of the City'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.

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

Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930.⁵ They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the US Drought Monitor:

Annual Drought Status	
Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 99% of the state
2003	No drought
2004	D0 conditions in 44% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 57% of the state
2009	D0 conditions in 44% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state
2013	D1 conditions in 60% of the state
2014	D1 conditions in 54% of the state
2015	D3 conditions in 52% of the state

Source: US Drought Monitor

During the creation of this plan Westfield, the Pioneer Valley and the state are in the midst of a severe drought, with many parts of the state seeing D3 (extreme drought) conditions. The City of Westfield, as of October 5, 2016 was classified as a community experiencing a severe drought. The city imposed a mandatory water ban, prohibiting water use for non-essential purposes. A combination of the extended drought which has led to low levels in the City's reservoir (nine feet below the spillway) and three of the city's eight wells being off-line, make it likely that Westfield will need to purchase water from the City of Springfield in the near future. While this agreement is likely to mitigate water shortages in the city, considerations regarding how a long-term drought could impact the region's water supply and the ability to purchase from other cities and towns needs to be considered.

⁵ US Geological Survey Water-Supply Paper 2375. "National Water Summary 1989 – Floods and Droughts: Massachusetts." Prepared by S. William Wandle, Jr., US Geological Survey.

Probability of Future Events

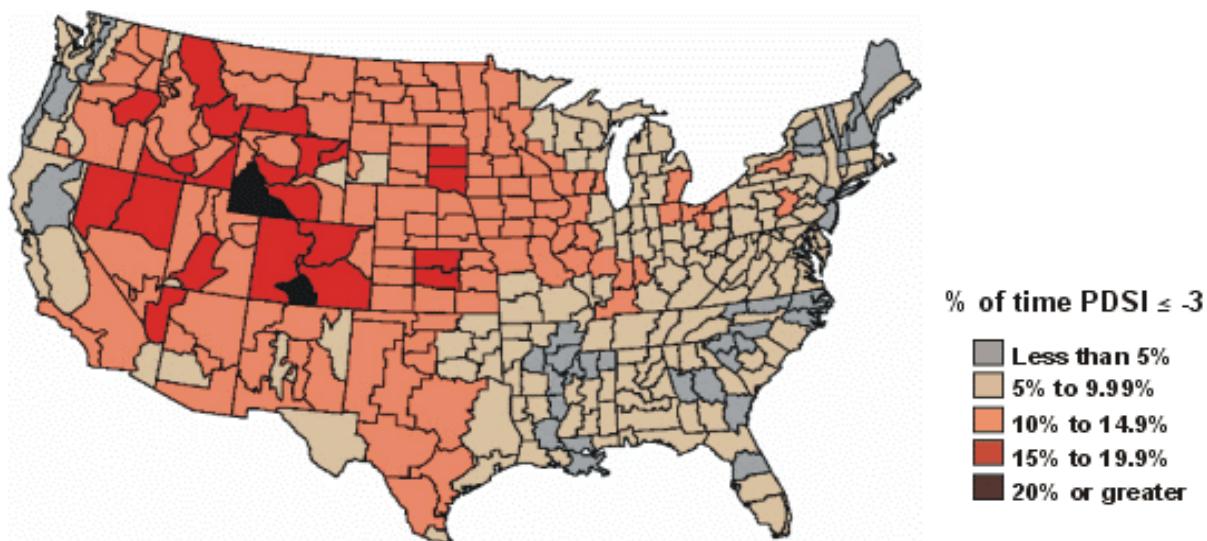
In Westfield, as in the rest of the state, drought has a “Very High” probability of future occurrence, or between 70 and 100 percent in any given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event. When evaluating the region’s risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought.⁶

Palmer Drought Severity Index

1895–1995

Percent of time in severe and extreme drought



Impact

Due to the water richness of western Massachusetts, Westfield is unlikely to be adversely affected by anything other than a major, extended drought. As a result, the impact of a drought would be “minor,” with only minor property damage or disruption on quality of life.

Additionally, farmers could be impacted economically, by the extended lack of water. On September 21, 2016, the United States Department of Agriculture (USDA) designated 11

⁶ National Drought Mitigation Center – <http://drought.unl.edu>

counties, including Hampden County, as primary natural disaster areas. Eligible farmers in these 11 counties and the three contiguous counties are eligible for low-interest emergency loans through the USDA. Farmers have eight months to apply for the loans which are intended to help mitigate the operation losses. The state of Massachusetts also established an Emergency Drought Loan Fund that farmers can access.

Vulnerability

Based on the above assessment, Westfield has a vulnerability of "Very Low" from drought.

While 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.

Extreme Temperatures

Greater variation and extremes in local atmospheric temperatures due to global changes in climate are now among the natural hazards that this plan anticipates. Westfield is likely to experience more instances of extreme and sustained heat and cold. And, because warmer air holds more moisture, higher temperatures will also bring wetter winters, more severe storms, and more frequent flooding. Locally, there will also be more single-day records highs, and more total days with highs above 90 degrees, and more heat waves with 3 or more days above 90 degrees. More extreme temperatures throughout Western Massachusetts and New England mean that there will be more floods, droughts, and tornados. There will also be more Atlantic hurricanes and nor'easters. Anticipated increases in extreme local temperatures is directly related to many of the previously described vulnerabilities, as well as increasing the risk of heat-related disease and injury, especially among senior citizens and residents unable to afford air conditioning.

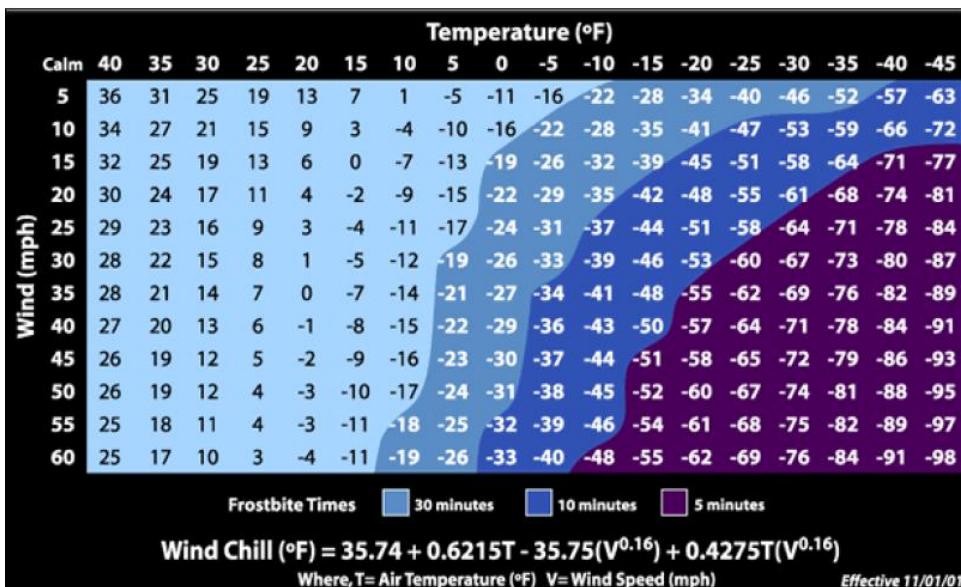
Location

Extreme temperatures would affect the whole community.

Extent

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

Wind Chills



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

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

Previous Occurrences

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

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

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

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

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

- Worcester, MA - 96°F

Probability of Future Events

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

Impact

Extreme cold and extreme heat are dangerous situations that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat or air conditioning or some other way to stay cool. The impact of extreme temperatures, the impact of extreme heat or cold in Westfield is considered to be "minor," with no property damage and very limited affect on humans.

Vulnerability

Westfield's vulnerability from extreme heat and cold is considered to be "Very Low."

Structures and infrastructure within the city are not at risk for damage due to extreme temperatures, but populations that are not prepared to contend with these temperature extremes could be most vulnerable.

Impacts of Climate Change

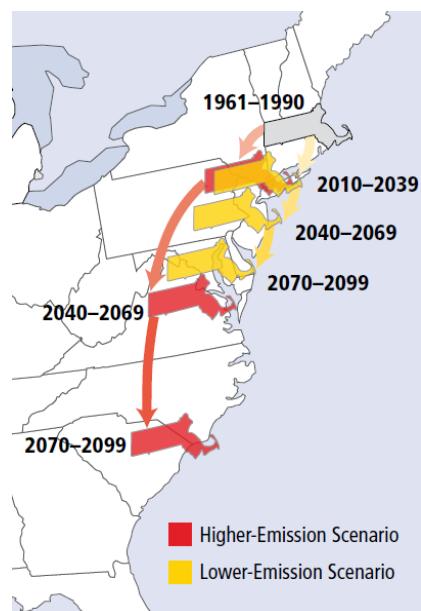
Climate change is already causing natural hazards to have more of an impact on Westfield, with hotter summers, wetter winters, more severe storms, and more frequent flooding. In the future, general climatic changes are projected to result in Westfield experiencing higher temperatures and more precipitation. 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 Westfield 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 Westfield. 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
- The Massachusetts Multi-Hazard Mitigation Plan

While the exact extent is still uncertain, it is clear that climate change is occurring and will greatly affect Westfield in the upcoming decades. As additional climate change research is completed, the City will continue to refine its flooding estimates.



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..
Source: NECIA 2006

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

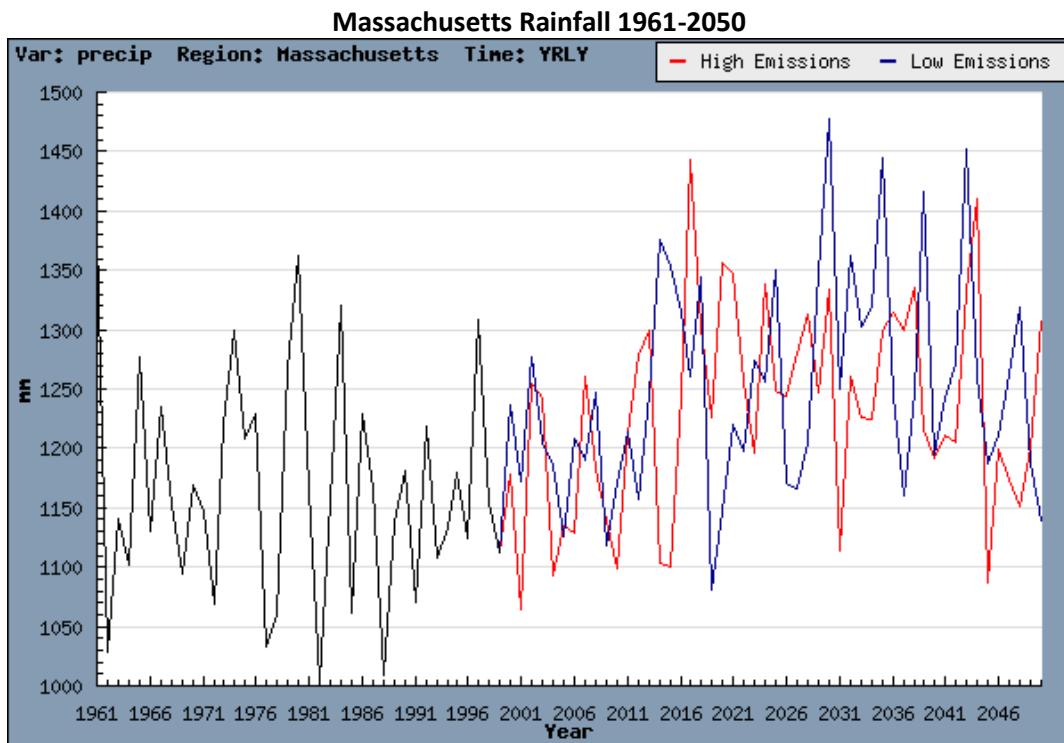
Sources: Massachusetts Climate Adaptation Report 2011, NECIA

Increased Flooding

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.

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

- Currently designated 10-year, 25-year, 100-year and 500-year floodplains will flood more frequently.
- More damage to areas too small to have FEMA floodplain designation and not already zoned floodplain. Many of these areas already flood consistently, and so climate change will be potentially very damaging to these areas.
- Increased occurrences of localized flooding, in areas designated on the Hazard Identification map.
- 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.



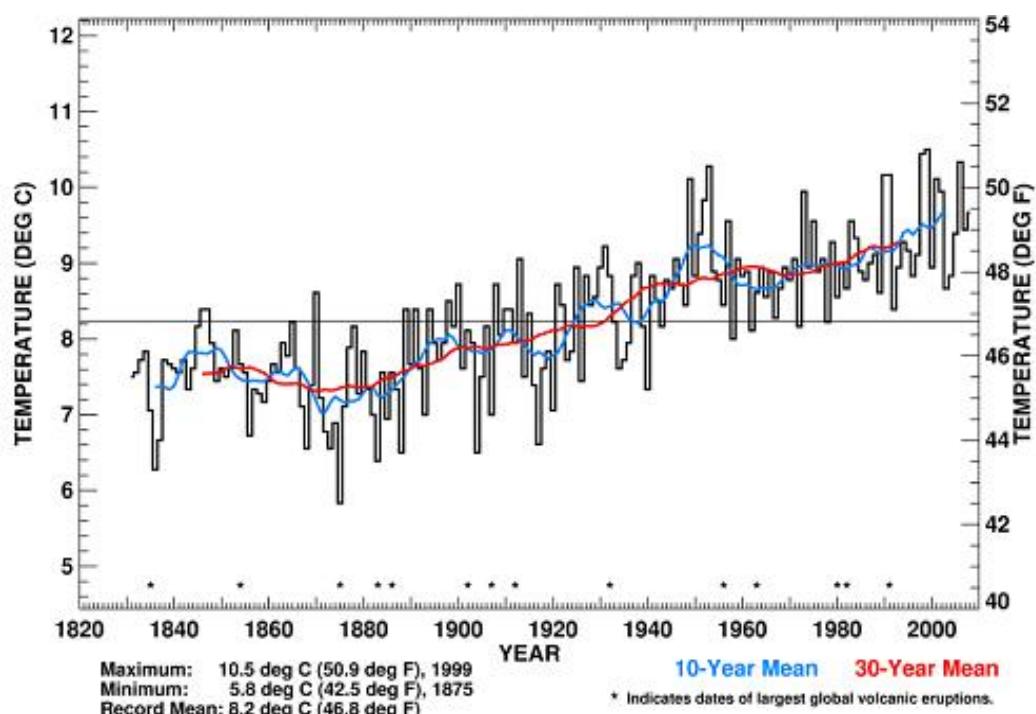
Rainfall has increased approximately 10% during the past 50 years, and is expected to continue to increase. Source: NECIA

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 Westfield. 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.

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 adversely 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.
- Greater stress on special populations, such as senior citizens, without access to air conditioning during heat waves.

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.⁷
- 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
- Increased occurrences of severe thunderstorms and hurricanes, which will result in more wind damage from major storms and greater flooding.

Secondary Effects

Secondary effects tied to the impact of climate change include:

- 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 disproportionately 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.

⁷ State of Connecticut Department of Environmental Protection. Facing Our Future: Adapting to Connecticut's Changing Climate. March 2009.

Other Hazards

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

4: CRITICAL FACILITIES

Facility Classification

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

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

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

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

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

Category 1 – Emergency Response Services

The City has identified the emergency response facilities as the highest priority in regards to protection from natural hazards:

Emergency Operations Center

Primary: Emergency Management Headquarters: 179 Apremont Way

Alternate: City Hall: 59 Court Street

Fire Station

Westfield Fire Department – Central Headquarters: 34 Broad Street

North Side Substation: 129 Southampton Road

Little River Substation: 366 Little River Road

Mechanics Station- Western Avenue

Police Station

Westfield Police Department – 15 Washington Street

Dispatch Center: 179 Apremont Way

Community Police Stations- Downtown: Elm Street

Powdermill: 126 Union Street

50 Southampton Road

Public Works Department

Public Works Department – 12 Ponders Hollow Road

Water Department

Sewage & Wastewater Treatment Department –28-30 Sackett Street

Westfield Water Pollution Control Plant -149 Neck Rd.

Emergency Fuel Stations

Department of Public Works- 12 Ponders Hollow Road

Westfield-Barnes Airport – 110 Airport Road

Flood Control Structures

Westfield Levee

Little River Levee System

Williams Riding Way Flood Control Pumping Station (Responsible for pumping all stormwater and sewage during a high river level event from the downtown.)

Emergency Electrical Power Facility

Local Emergency Planning Committee Headquarters- 179 Apremont Way

Munger Hill Elementary School- 33 Mallard Lane

Noble Hospital- 115 West Silver Street

North Middle School- 350 Southampton Road

Paper Mill Elementary School- 148 Paper Mill Road

South Middle School- 30 West Silver Street

Western Massachusetts Hospital- 91 East Mountain Road

Westfield High School- 177 Montgomery Street

Westfield State University- 577 Western Avenue

Portable generators owned by the water and sewer department that can be used as needed

Emergency Shelters

Franklin Ave School- 22 Franklin Street

Highland School- 34 Western Avenue

Munger Hill- 33 Mallard Lane

Noble Hospital- 115 West Silver Street

North Westfield Middle School- 350 Southampton Road

Paper Mill School- 148 Paper Mill Road

South Middle School- 30 West Silver Street

Southampton Road School- 330 Southampton Road

Western Massachusetts Hospital- 91 East Mountain Road

Westfield High School- 177 Montgomery Street

Westfield State University-577 Western Ave.

Westfield Voc Tech High- 33 Smith Avenue

Dry Hydrants, Fire Ponds, and Water Sources

No dry hydrants.

Fire ponds-Hampden Pond
North Road
Whitney Playground
Loomis Ridge- Cistern

Utilities

Westfield Gas and Electric- Substation- Meadow Street
Westfield State University Power Plant- Western Avenue
DCP Midstream- Odorizing Natural Gas Plant- 30 Charles Medeiros Way

Helicopter Landing Sites

Hampton Ponds Plaza Parking Lot/ Access Road- , N42 10.5 W 072 41.6
South Middle School*- 30 West Silver Street, N42 06.6 W 072 45.0
Walmart*- 141 Springfield Road, N42 06.4 W 072 42.4
Westfield High School- , N42 08.7 W 072 45.3
Westfield State University/Second Congregational Church Parking Lot*- 577 Western Avenue, N42 07.6 W 072 47.6
Westfield-Barnes Airport (Army Air guard Field) – 110 Airport Road
*Designated medical landing zones

Communications

Westfield Police Department – 15 Washington St.
Westfield Fire Department – Central Headquarters: 34 Broad St.
North Side Substation- 129 Southampton Road
Little River Substation- 366 Little River Road
Emergency Management Technology Center- 179 Apremont Way
Westfield Water Pollution Control Plant - 149 Neck Rd
Granville Reservoir
G & E Tower- Turnpike Industrial Road
Private Tower on Turnpike Industrial Road
Private Tower on North Elm Street
Cell Tower- Granville Road
Cell Tower-East Main Street

Primary Evacuation Routes

Route 20
Route 10-202
Interstate 90
Route 187
Columbia Greenway Rail Trail- Bike/Pedestrian and Emergency Vehicle Evacuation from downtown

Bridges Located on Evacuation Routes

Elm Street (Route 202 &10) - At Westfield River & Conrail/Amtrak Railroad tracks
Little River Road (Route 187) - At Great Brook
North Elm Street (Route 202 &10) - At Pioneer Valley Railroad tracks

Route 90- At East Mountain Road
Route 90- At Pioneer Valley Railroad tracks
Bridges Located on Evacuation Routes Continued
Southampton Road (Route 202 &10) - At intersection with Route 90
Southwick Road (Route 202 & 10) - At Little River, weight-limited due to deficient condition
Springfield Road (Route 20) - At Little River
Springfield Road (Route 20) - At Westfield River

Category 2 – Non Emergency Response Facilities

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

Problem Culverts/Bridges/Underpasses

Culverts

Union Street (Frog Hole)

North Elm Street- where the railroad passes under Route 202-10

City View Road

Culvert on Great Brook near 506 Shaker Road (Town of West Springfield concerned undersized culvert has potential to flood town wells upstream)

Bridges- weight-limited due to deficient condition

Lockhouse Road- at Pioneer Valley Railroad tracks

Southwick Road (Route 202 & 10) - At Little River

Dry Bridge Road- at Pioneer Valley Railroad tracks

Underpasses- low clearance, frequent accidents, standard truck height is 11'9"

Chapel Street*- At Pioneer Valley Railroad, clearance 11'0"

Thomas Street*- At Pioneer Valley Railroad, clearance 11'5"

Orange Street*- At Pioneer Valley Railroad, clearance 11'5"

East Mountain Road- at Conrail/Amtrak railroad tracks, by Western Massachusetts Hospital, clearance 10' 7 1/8"

East Mountain Road- at Pioneer Valley Railroad, clearance 10'6"

*Located within ~0.3 miles of each other and just off of Routes 202 &10

Water Supply

Granville Reservoir

8 Public wells (see below)

Well No.	Location	Pump Capacity (million gal/day)
Well #1	Off Holyoke Rd.	2.0
Well #2	Union St.	2.0*
Well #3	Shaker Rd.	3.195
Well #4	Shaker Rd.	2.02
Well #5	Off Northwest Rd.	0.14
Well #6	Off Northwest Rd.	0.29
Well #7	Behind E.Mtn.C.Club	2.0 *

Well #8 Behind E. Mtn. C. Club 2.0*
Private Wells (mostly on the north side of the city)
*Wells currently offline because of contaminants

Westfield is also authorized to withdraw up to 3.2 million gallons per day from the Springfield water system through an interconnection located off Shaker Road.

Sewer Infrastructure (Pump Stations)

See Critical Facilities Map

Transfer Station

Twiss Street

Electricity/Gas Supplier

Westfield Gas & Electric (municipal utility company administrative offices) - 100 Elm Street

Category 3 – Facilities/Populations to Protect

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

Special Needs Population

101 Meadow Street
284 East Mountain Road
Colony Circle
Cowles Court
Clifton Street
Forum House- 55 Broad Street
Highland Valley Elder Services, Nutrition Site- 16 Court Street
Westbrook Services- 306 Elm Street
Westbrook Services- George Street

Elderly Housing/Assisted Living

East Mountain View Senior Housing- 138 East Mountain Road
Governor's Center- 66 Broad Street
Harborside Healthcare Westfield- 60 East Silver Street
Renaissance Manor of Westfield- 37 Feeding Hills Road
The Arbor – 40 Court Street
Westfield Meadows Home for the Elderly- 74 Old Holyoke Road
Arm Brook Village- 5 North Road

Public Buildings/Areas

Amelia Park Children's Museum- 99 Elm Street
Boy's & Girl's Club of Greater Westfield- 28 West Silver Street
Hampton Ponds State Park
Senior Center – Noble Street
Stanley Park

Westfield Athenaeum (Library) - 6 Elm Street
Westfield District Court- 224 Elm Street
Westfield Fairgrounds

Schools

Abner Gibbs Elementary School- 50 West Silver Street
Alternative- 12 West Silver Street
Fort Meadow School Early Childhood Center- 35 White Street
Franklin Avenue Elementary School- 22 Franklin Avenue
Highland Elementary School- 34 Western Avenue
Munger Hill Elementary School- 33 Mallard Lane
North Middle School- 350 Southampton Road
Paper Mill Elementary School- 148 Paper Mill Road
Parkside Academy- 22 Ashley Street
South Middle School- 30 West Silver Street
Southampton Road Elementary School- 330 Southampton Road
St. Mary's High School- Bartlett
The White Oak School- 533 North Road
Westfield Area Head Start- 390 Southampton Road
Westfield High School- 177 Montgomery Street
Westfield State University- 577 Western Avenue
Westfield Technical Academy- 33 Smith Avenue
Russell Elementary School (in town of Russell- Only Westfield students attend)

Day Care/Nursery Schools (with 10 or more attendees)	Capacity
Boys & Girls Club of Greater Westfield, Inc. - 28 West Silver St.	52
Church of the Atonement Nursery School- 36 Court Street	56
Cotugno, Kathi M. - 7 Avery Street	10
Creative Kid's- 1251 East Mountain Road	78
Diamond, Kimberly A. - 62 Butternut Road	10
Jensen - Curran, Kimberly M. - 84 Tannery Road	10
Kirby's Kids Family Child Care- 92 Union Street	10
Little Explorers Learning Center- 1029 North Road	62
Open Door Preschool- 35 White Street	15
Sampson, Nicole- 684 North Road	6
Santiago, Ana L. - 26 Sackett Street	10
The Growing Tree Learning Center- 6 Mainline Drive	36
The Kids' Place- 184 Southampton Road	99
Westfield Area Head Start- 390 Southampton Road	100
Y's Kids Franklin Ave. School- 22 Franklin Avenue	24
Y's Kids Munger Hill- 33 Mallard Lane	24
Y's Kids Papermill- 148 Mill Road	26
Y's Kids-Southampton Road- 30 Southampton Road	39
Y's Kids-Westfield- 67 Court Street	100

Churches

Advent Christian Church- 11 Washington Street
Central Baptist Church- 115 Elm Street
Christ the King Church- 297 Russell Road
Christian Church of New Jerusalem Assembly of God- 6 King Avenue
Church of Atonement- 36 Court Street
Church of Tjc- 14 Bartlett Street
Emanuel Pentecostal Church- 30 Montgomery Street
First Congregational Church- 18 Broad Street
First United Methodist Church- 16 Court Street
First United Pentecostal Church- 118 Meadow Street
Full Gospel Church- 110 Union Street
Genesis Spiritual Life Center- 53 Mill Street
Greater Grace of the Pioneer Valley- 848 North Road
Holy Trinity Church- 335 Elm Street
Kingdom Hall of Jehovah's Witnesses- 117 Southwick Road
New Life Christian Center Assembly of God- 157 Dartmouth Street
Our Lady of The Blessed Sacrament Parish- Union Street
Pioneer Valley Baptist Church- 265 Ponders Hollow Road
Russian Evangelical Baptist Church- 866 North Road
Second Congregational Church- 487 Western Avenue
St. John's Lutheran Church- 60 Broad Street
St. Joseph's Polish National Church-
St. Mary Parish- 30 Bartlett Street
St. Peter Parish - St. Casimir Parish - 24 State Street
Tabernacle of David- Elm Street
The Fullness of Truth Church-
Westfield Alliance Church- 297 Russell Road
Westfield Evangelical Free Church- 568 Southwick Road
Word of Grace Church- 848 North Road
Wyben Union Church- Montgomery Road

Historic Buildings/Sites

Dewey House- 87 South Maple Street
Downtown Historic District
Hangar 2 (Barnes Airport)
Mechanic Street Cemetery
Middle Farms Cemetery- North or Russellville Road
Mundale Cemetery
Old Westfield Courthouse- 27 Washington Street
Owens District Cemetery- East Mountain Road
Pilgrim Candle- Depot Square, 16-36 Union Avenue
Pine Hill Cemetery- 140 West Silver Street
St. Joseph's Cemetery

St. Mary's Cemetery- 203 Southampton Road
 Westfarms Schoolhouse
 Westfield Athenaeum (Library) - 6 Elm Street
 Westfield City Hall- 59 Court Street
 Westfield Women's Club-Court Street
 Westfield Whip Factory- 360 Elm Street
 YMCA Mansion-Court Street

Apartment Complexes/Condominium Developments (over 8 units)

Alice Burke Way- East Silver Street	29A & 29B Harold Avenue
City View Commons Condominiums- 136 City View Road	150 Hillside Road
Colonial Pine Acres- Southampton Road	160 Hillside Road
Colonial West Apartments- 115 Main Street	166 Hillside Road
Dolan Ely-Noble Street	36 Holland Avenue
Edgewood Apartments- 134 Union Street	21A & 21B Kellogg Street
Kennedy- East Silver Street	8-14 Lindbergh Boulevard
Lansdowne Place- 38 Thomas Street	83 Main Street (Rear)
Meadows Apartments- 101 Meadow Street	112 Main Street
Park Square Townhouses- 140 Union Street	125 Main Street
Powder Mill Village- 126 Union Street	138 Main Street
Southwood Acres- 342 Southwick Road	22A & 22B Maple Street
Washington House- Washington Street	22 Montgomery Street
Willows Apartments- 19 Lockhouse Road	19 Morgan Avenue
6 & 8 Bates Street	16 Murray Avenue
83-101 Beveridge Boulevard	5 Notre Dame Street
27 Dewey Ave	11A & 11B Notre Dame Street
85A & 85B East Silver Street	21 Notre Dame Street
4 & 6 Ellsworth Street	029 Notre Dame Street
85-110 Ely Street	37 Notre Dame Street
362 Granville Road	40 Prospect Street
10 Greenwood Street	6-18 Pumpkin Lane
20 Greenwood Street	324 Russell Road
	434 Russell Road
	549 Russell Road
	555 Russell Road
	627A & 627B Russell Road
	690 Russell Road
	936A & 936B Russell Road
	942 Russell Road
	1430 Russell Road
	81 South Maple Street
	82 South Maple Street
	93 South Maple Street

929 Shaker Road	34 Meadow Street
0 Southwick Road	59 Mechanic Street
200 Southwick Road	8 Monroe Street
419 Southwick Road	11 Monroe Street
4A & 4B Sunflower Lane	370 North Elm Street
7-24 Sunflower Lane	6 Pleasant Street
23 & 25 Tannery Road	919 Southampton Road
6A & 6B Toledo Avenue	14 Sycamore Street
7-23 Toledo Avenue	28 Taylor Avenue
88 Union Street	25 Thomas Street
119 Union Street	38 Thomas Street
126 Union Street	11 Yale Street
134 Union Street	10 Spring Street
139 Union Street	
140 Union Street	
78 & 80 Western Avenue	Mobile Home Parks
5A - 5E Westminster Street	Arbor Mobile Home: 68
42 Arnold Street	Klondike Avenue- 56 sites
33 Broad Street	Hampden Village: 0 Root
47 Broad Street	Road- 23 sites
59 Broad Street	Hampden Village: 138 Root
25 Collins Street	Road- 235 sites
69 Court Street	Oaks Mobile Homes: 404
103 Court Street	Southwick Road- 44 sites
6 Cycle Street	Heritage Mobile Home Park:
22 Feeding Hills Road	868 Southampton Road- 75
46 Franklin Street	sites
60 Franklin Street	River Bend Mobile Home
81 Franklin Street	Park: 189 Springfield Road-
5 & 9 Holland Avenue	25 sites
100 Lockhouse Road	

Major Employers (≥ 100 employees)/Employment Areas

Atlas Copco Compressors Inc- 94 North Elm Street # 4
Barnes Airport Industrial Park
Big Y Foods- 475 East Main Street (Route 20)
Big Y Shopping Center- 10 East Silver Street
Boise-Cascade-33 Fowler Street
C & S Wholesale- 53 Summit Lock Road
City of Westfield-59 Court Street
Commercial Distributing Co- 46 South Broad Street
Connleaf's Inc- 48 Hundred Acres Road
Governor's Center- 66 Broad Street
Gulfstream Aerospace Corp- 33 Elise Street
Home Depot- 1111 Southampton Road
Home Depot- 514 East Main Street
Little River Plaza- 485 East Main Street
Loomis Fargo & Co- 28 Ponders Hollow Road
Mestek, Inc.- 260 North Elm Street
Noble Hospital- 115 West Silver Street
Prolamina-132 North Elm Street + 175 Ampad Road.
Renaissance Manor-Westfield- 37 Feeding Hills Road
Savage Arms Inc- 100 Springdale Road # 1
Super Stop & Shop- 57 Main Street
Tekoa Country Club- 459 Russell Road
Tighe & Bond- 53 Southampton Road # 3
Wal-Mart- 141 Springfield Road
Western Massachusetts Hospital- 91 East Mountain Road
Westfield School Department- 94 North Elm Street
Westfield Shops- 475 East Main Street
Westfield State University- 577 Western Ave
Westfield Youth Service Center- 51 East Mountain Road
Westgate Plaza- 261 East Main Street
YMCA- 67 Court Street

Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas			
Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding	Most flooding happens along the Westfield River and the Little River	Little River Fire Station and Railroad lines in 100-year floodplain. Most of downtown, City Hall and a number of schools in the 500-year floodplain	Route 20, Route 10-202 if Westfield River crests, Route 187 if Little River crests.
Severe Snowstorms/Ice Storms	Whole City	Schools with flat roofs. Energy and Communication Infrastructure.	None.
Severe Thunderstorms which cause wind damage	Whole City	Energy and Communication Infrastructure, Historic Buildings,	None, unless accompanied by flooding.
Hurricanes	Whole City	Energy and Communication Infrastructure, Critical facilities impacted by flooding	None, unless accompanied by flooding.
Tornadoes/Microburst	Whole City	Dependent on path/location.	
Wildfire/Brushfire	Section of City bordering Russell and Montgomery	Water Tank, Two wells- Near Russell Line	Route 20
Earthquakes	Whole City	Older Buildings	All
Dam Failures	Powdermill Dam and Arm Brook Dam Inundation Zone	None.	1-90 , Route 202
Drought	Whole City	None	None
Extreme Temperatures	Whole City	None	None

5: MITIGATION CAPABILITIES & STRATEGIES

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

Westfield has most of the no cost or low cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in floodplains, stormwater management, tree maintenance, etc. Westfield also has appropriate staff dedicated to hazard mitigation-related work for a community its size, including a an Emergency Management Director, a professionally run Department of Public Works, a Building Inspector, and a professional Planning staff and Westfield has recommended plans in place, including an Open Space and Recreation Plan, and a Capitol Improvements Plan. Not only does Westfield have these capabilities in place, but they are also deployed for hazard mitigation as appropriate. The City also has very committed and dedicated volunteers who serve on Boards and Committees and in Volunteer positions. The City collaborates closely with surrounding communities and is party to Mutual Aid agreements through the MEMA. Westfield is also an active member community of the Pioneer Valley Planning Commission (PVPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at the PVPC.

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

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

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

Goal Statement

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

Overview of Mitigation Strategies by Hazard

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

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the city's water bodies and waterways. The City currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the City's general bylaws, zoning bylaw, and subdivision regulations. Infrastructure like dams and culverts are in place to manage the flow of water.

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 forecasted, there is no certain way for predicting its length, size or severity. Therefore, most mitigation strategies focus on preparedness prior to a severe snow/ice storm.

The City'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. The City has adopted the State Building Code, which ensures minimum snow load requirements for roofs on new buildings.

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 cause 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 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 city.

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 City's recovery from an earthquake.

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. The primary mitigation strategy currently in place is to require subdivisions to provide an environmental review that assesses the impact that the development will have on groundwater.

Existing Mitigation Capabilities

The City of Westfield had numerous policies, plans, practices, programs and regulations in place, prior to the update to this plan, that were serving to mitigate the impact of natural hazards in the City of Westfield. These various initiatives are summarized, described and assessed on the following pages and have been evaluated in the “Effectiveness” column. For a status report of completed strategies that were identified in the 2008 Hazard Mitigation plan, see the table of “Completed and Deleted Mitigation Strategies” later in this section, as well as the completed FEMA Capability Assessment worksheet included in Appendix E.

Existing Mitigation Capabilities				
Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Culvert Replacement	Capital	Priority list of necessary culvert replacements and other construction projects to effectively manage flooding.	Flooding	Very Effective. Seeking funding for additional replacements
Flood Zone District	Regulation	Overlay district to protect areas delineated as part of the 100-year floodplain by regulating uses and special permit requirements.	Flooding	Effective. Could prohibit development (or at least mobile home parks) in the flood zone altogether.
Water Resource Protection District	Regulation	District to protect groundwater resources by regulating certain uses, drainage, and other requirements within Zone 1 and Zone 2 recharge areas of aquifer.	Flooding/Drought	Somewhat Effective. Could enforce special permit requirement more effectively.
Earth Removal	Regulation	Residential – limits the size of the excavation, must have PB approval Commercial – requires PB approval, and plan with measures to prevent erosion and groundwater contamination	Flooding	Effective. No changes.
Open Space Communities	Regulation	Permitted in Rural Residential and Residence A districts; allows for reconfiguration of lots in order to preserve most open space	Flooding/ Drought	Effective for minimizing impervious surfaces and maximizing open space and thereby infiltration
Manufactured Home Parks	Regulation	Regulates conditions, site plan for parks; includes setbacks and tree coverage.	Flooding	Somewhat effective. Could restrict location of parks.

Existing Mitigation Capabilities

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Site Plan Approval	Regulation	Requires site plan to preserve environmental features	Flooding/ Hurricane/ Severe Wind/ Tornadoes/ Microbursts	Effective.
Definitive Plan-Subdivision Regulations	Regulations	Must include Development Impact Statement; proposed storm drainage, sewer, water supply, and significant natural features such as watercourses.	Flooding/ Drought	Somewhat Effective.
Westfield Open Space and Recreation Plan	Planning Document	The OSRP inventories natural features and promotes natural resource preservation in the city, including the floodplain; wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks. The Plan also identifies key goals and strategies to protect open space.	Flooding/ Drought	Effective in identifying sensitive resource areas. Need to implement plan.
National Flood Insurance Program Participation	Program	As of January 2016, there were 256 homeowners with flood insurance policies	Flooding	Somewhat Effective. Could explore becoming a part of FEMA's Community Rating System and could better educate homeowners on the NFIP.
Flood Control Commission	Board	Established on December 1, 1960 it manages the City's flood control structures	Flooding	Effective
Zoning By-Law-Energy-Generating Wind Power Devices.	Regulation	Regulates erection of windmills, etc., including height and setback requirements.	Severe Snow/ Ice Storm/ Hurricane/ Severe Wind/ Tornadoes/ Microbursts/ Earthquakes	Effective. No Changes.

Existing Mitigation Capabilities

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Zoning By-Law- Wireless Communications Facilities	Regulation	Regulations require special permit/site plan approval; structures must meet height and setback requirements.	Severe Snow/ Ice Storm Hurricane/ Severe Wind/ Tornadoes/ Microbursts/ Earthquakes	Effective. No Changes
Zoning By-Law- Off-Street Parking	Regulation	Some uses have specific off-street parking requirements, thereby preventing overcrowding of street parking.	Severe Snow/ Ice Storm	Effective. No Changes.
Subdivision Regs.- Design Standards	Regulation	Street grade regulations (maximum 5-8%)	Severe Snow/ Ice Storm	Effective. No Changes.
Subdivision Regs.- Required Improvement	Regulation	Utilities must be placed underground at time of construction	Severe Snow/ Ice Storm Hurricane/ Severe Wind/ Tornadoes/ Microbursts	Effective. No Changes.
State Building Code	Regulation	The City of Westfield has adopted the Massachusetts State Building Code	Severe Snow/ Ice Storm Hurricane/ Severe Wind/ Tornadoes/ Microbursts/ Earthquakes	Effective. No Changes.
Back up Electric Power	Operational	Shelters have back up power, three mobile generators	Severe Snow/ Ice Storm	Effective. No Changes.
Tree Management	Operational	List of dangerous trees created annual for Westfield Gas and Electric	Severe Snow/ Ice Storm Hurricane/ Severe Wind/ Tornadoes/ Microbursts	Effective. No Changes.

Existing Mitigation Capabilities

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Snow Removal Equipment	Operational	City has acquired modern snow removal equipment.	Severe Snow/ Ice Storm	Effective. No Changes.
Emergency Shelter Generator Testing	Operation	The City of Westfield has instituted a program to regularly check the generators in all emergency shelters	Severe Snow/ Ice Storm	Effective. No Changes.
Emergency Communication infrastructure	Operation	Westfield emergency wireless communications facilities have been upgraded to microwave transmission so there are no wires to be damaged during severe wind events	Hurricane/ Severe Wind/ Tornadoes/ Microbursts	Effective. No Changes.
Zoning-Site Plan Review	Regulation	Fire Chief is involved in final review of site plan for structure	Wildfire/Brushfire	Effective. No Changes.
Zoning- General Regulations	Regulation	Prohibited uses and performance standards. Fire Chief must approve any and all flammable and explosive materials	Wildfire/Brushfire	Effective. No Changes.
Subdivision Regs.- Preliminary Plan	Regulation	Preliminary plan must be approved by Fire Department and Fire Alarm systems are required	Wildfire/Brushfire	Effective. No Changes.
Subdivision Regs.- Development Impact Statement	Regulation	Fire protection is one of the impact evaluated in the Development Impact Statement	Wildfire/Brushfire	Effective. No Changes.
Burn Permits	Operational	Resident must obtain burn permits, and personnel provide information on safe burn practices.	Wildfire/Brushfire	Somewhat Effective. Could require residents to get a new burn permit each year and enforce regulations by invoking penalties on offenders.
Public Education regarding fire	Education/ Outreach	The Fire Department has an ongoing education program in the schools	Wildfire/Brushfire	Effective. No Changes.
New Dam Construction Permits	Regulation	State law requires a permit for the construction of any dam.	Dam Failure	Effective. No Changes.
Dam Inspections	Operational	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Dam Failure	Ineffective. Dam owner, who may not have sufficient money, is responsible for inspection.

Existing Mitigation Capabilities				
Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Inundation Zones	Plan	Westfield has developed approved Emergency Action Plans and determined inundation zones for the Powdermill Brook and Arm Brook dams and for the 2 additional dams outside the city which would inundate parts of the city if breached	Dam Failure	Effective. No Changes.
Drought Management Plan	Plan	Westfield has developed a drought management plan for all public wells in the city.	Drought	Effective. Could develop a drought management plan for private wells.
Rain Barrels	Operational	The Health Department has instituted a program to educate residents on how to use and where to get rain barrels	Drought	Somewhat Effective

2008 Mitigation Actions Status

The Hazard Mitigation Committee reviewed the mitigation actions prioritized in the 2008 plan. Several strategies listed in the 2008 plan have been completed or removed from this update. The table below is taken from the 2008 plan. Each strategy includes a brief description regarding the status of the action item. Some of the mitigation strategies that have not been completed will be forwarded into the 2016 action strategy. They are highlighted in grey.

Over the course of this plan, the City implemented seven of the mitigation actions outlined in the 2008 plan. The Hazard Mitigation Committee has chosen to pull six of the mitigation actions in the 2008 plan forward into this plan update and has elected to remove eight mitigation actions that are considered to be no longer relevant in regards to mitigating hazards in the City.

Summary	Priority	Mitigation Action	Responsible Department/Board	Proposed Completion Date	2016 Status	Effectiveness
Complete.	1	Implement recommendations contained in the 2008 Westfield River Levee Evaluation including height increases, upgrading drainage outlets and pumping stations and some additional evaluations.	Flood Commission, City Engineer, Department of Public Works	2011	Complete. Pump Station Upgraded. Increased height of levee and installed backflow preventer.	Very Effective.
Complete.	2	Update the Integrated Hazardous Material Plan (last done in 1997)	Fire Department and Emergency Management Department	2009	Completed 2009-2010.	Effective.
Pull Forward, but include greater detail.	3	Identify, prioritize and replace, pending availability of funding, undersized and otherwise problematic culverts throughout City.	Department of Public Works, City Engineer	2010	A few have been replaced or upgraded over time.	Still more problem culverts to replace.
Pull Forward Modified.	4	Develop evacuation plans for dam inundation zones	Emergency Management Department, Water Resources, Fire Dept., Police Dept.	2010	Some discussion happened on the subject, but never a written plan.	Not effective. Pull forward and edit to reflect the need to educate residents once plans finalized.
Complete.	5	Establish system to inventory supplies at existing shelters and develop a needs list and storage requirements. Inventory supplies at existing shelters and develop a needs list and storage requirements, and re-supply shelters if needed.	Shelter Subcommittee of the Local Emergency Planning Committee	2009	Medical Reserve Corps and Department of Public Health keeping track and agreements in place through	Effective

		Establish arrangements with local or neighboring vendors for supplying shelters with food and first aid supplies in the event of a natural disaster.			procurement.	
Pull Forward Modified.	6	Update stormwater regulations.	Water Resources Department	2010	Not Complete. Will do with forthcoming MS4 permit regulation.	-----
Ongoing.	7	Collect, periodically update, and disseminate information on which local radio stations provide emergency information, what to include in a ‘home survival kit,’ how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.	Public Information Subcommittee of the Local Emergency Planning Committee	Ongoing	EMD does speakers and information distribution via paper, radio, TV, and web	Effective
Complete.	8	Develop and implement a plan for providing access to water, information, shelter, and food stores for special needs populations in town in the event of a severe winter storm.	Emergency Management Department, Board of Health	2010	Plan Complete in 2011.	Effective. Plan deployed in 2011 and shelter worked well.
Remove.	9	Develop and implement plan to transport emergency personnel (ie. doctors) to areas of city as needed during severe winter storms.	Emergency Management Department , Fire Department	2010	No plan in place.	Ineffective. Handled on a case-by-case basis. 2011 average people calling to use service.
Remove.	10	Become part of FEMA's Community Rating System	Mayor, City Council	2009	Not complete.	Not considered to be cost effective.
Remove.	11	Locate and purchase/rent/negotiate use of land for storing snow when it is removed from the Downtown area to mitigate the problems associated with restricted traffic that occur in the city's main centers.	City Council, Mayor's Office, Department of Public Works	2010/Ongoing	Not complete.	No longer relevant.
Complete.	12	Develop mobile emergency facilities list (ie. mobile medical clinic), locate sources for the facilities, especially discounted/adaptable equipment, and purchase equipment as funds are available.	Emergency Management Department, Fire Department	2010/Ongoing	Complete.	Effective. Mobile Decontamination Unit, Mass Casualty Unit and Chemical Injection Trailer for wells.
Pull Forward.	13	Use NNN communications system to contact all burn permit holders at the start of burning season with information on burn safety, procedures, and penalties.	Fire Department	Ongoing	Not Complete.	----

Remove.	14	In the Zoning regulations for Telecommunication Facilities, add prevention of wind-related damage as a stated purpose.	Planning Board	2009	Not Complete. Ordinance is Effective without specific wording added.	-----
Progress Made. Pull Forward.	15	Implement the Five-Year Action Plan strategies in Westfield's Open Space and Recreation Plan, particularly those dealing with protection of floodplains, forests and farmland.	Conservation Commission and Planning Department/Board	Ongoing	Ongoing. Some parcels acquired over span of plan.	Effective. Plan expires in 2017, no budget to update.
Pull Forward.	16	Prepare and implement a Water Conservation Plan for private wells	Health Department, Water Resources	2010	Not Complete.	-----
Complete.	17	Develop penalties for violations of burning regulations especially regarding out-of-season and prohibited material burning.	City Council, Fire Department	2009	Chapter 148A adopted.	Not effective. No Hearing Officers to enforce.
Remove.	18	In the Zoning regulations for Energy Generating Wind Power Devices, develop and add standards for prevention of wind-related damage.	Planning Board	2009	Not Complete. No longer relevant.	-----
Remove.	19	Evaluate EOC and shelters to determine if they are earthquake resistant and make necessary upgrades if they are found to be deficient.	Building Inspector, Emergency Management Department	2010/Ongoing	Not Complete. No longer relevant due to lack of funding and the low probability of earthquake.	-----
Remove.	20	Determine feasibility of constructing flood walls at critical facilities and construct if feasible.	Emergency Management Department, Conservation Commission, Highway Department	2011	Not Complete. Not feasible due to financial constraints.	-----
Remove.	21	Participate in the creation of a Regional Debris Management Plan.	City Council, Planning Board, and Emergency Management Department	2010	Not Complete. No movement at the Regional Level.	Effective. Local Debris Management Plan is in place and effective.

Prioritized Implementation Plan

Several of the action items previously identified in the 2008 Hazard Mitigation Plan are currently continuing, either because they require more time to secure funding or their construction process is ongoing. In addition, the Hazard Mitigation Committee identified several new strategies that are also being pursued. These new strategies are based on experience with currently implemented strategies, as well as the hazard identification and risk assessment in this plan.

When selecting new strategies to pursue, the Hazard Mitigation Committee consulted the FEMA Local Mitigation Planning Handbook, especially Chapter 6, and the FEMA “Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards.” There were a number of strategies considered that the committee considered, but did not include because the costs were prohibitive and the probability of the corresponding hazard occurring was low. These strategies include installing a tornado warning system, building a public tornado shelter and flood proofing the wastewater treatment plant. The committee also reviewed mitigation actions for snow and drought events, but found that many of the suggested strategies are already in place for these hazards at the local or state level. The City will instead focus on how they can be prepared to deal with the impact of these hazards that are likely to occur.

Prioritization Methodology

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

- **Application to multiple hazards** – Strategies are given a higher priority if they assist in the mitigation of several natural hazards.
- **Time required for completion** – Projects that are faster to implement, either due to the nature of the permitting process or other regulatory procedures, or because of the time it takes to secure funding, are given higher priority.
- **Estimated benefit** – Strategies which would provide the highest degree of reduction in loss of property and life are given a higher priority. This estimate is based on the Hazard Identification and Analysis Chapter, particularly with regard to how much of each hazard’s impact would be mitigated.
- **Cost effectiveness** – in order to maximize the effect of mitigation efforts using limited funds, priority is given to low-cost strategies. For example, regular tree maintenance is a relatively low-cost operational strategy that can significantly reduce the length of time of power outages during a winter storm. Strategies that have identified potential funding streams, such as the Hazard Mitigation Grant Program, are also given higher priority.
- **Eligibility Under Hazard Mitigation Grant Program** – The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Funding is made available through FEMA by the Massachusetts Emergency Management Agency. Municipalities apply for grants to fund specific mitigation projects under MEMA requirements

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

- **Low** – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical
- **Medium** – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people
- **High** – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete
- **Very High** – extremely beneficial projects that will greatly contribute to mitigation of multiple hazards and the protection of people and property. These projects are also given a numeric ranking within the category.

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

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:

- 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 the city and general knowledge of previous work in the city)
- Staff time for construction, maintenance, and operation activities (at a rate of \$25 per hour)

Project Timeline

The following chart is a completed list of projects recommended by the Committee. The following action plan identifies Responsibility, Funding and a Time Frame for the mitigation projects recommended. The actions will begin as soon as the plan is approved and the community is eligible for funding, unless otherwise stated, and will be completed as noted in the implementation date column in the table below (called "Timeframe" in table).

Status	Action Name	Action Type	Hazards Addressed	Responsibility/Oversight	Priority	Estimated Cost	Funding Source	Time Frame
New	Develop an electronic system to track burn permits, allowing the Fire Department to easily communicate with and keep track of burn permit holders.	Local Plans and Regulations	Wildfire/ Brushfire	Fire Department/ Emergency Management Director/ Possible collaboration with Westfield State University.	Very High	Low	Staff Time; Volunteer Time	1 year
New	Educational event/Campaign on what residents can do to mitigate hazards on their property (making sure storm drains aren't blocked with leaves, insulating pipes, etc.) and on how to be prepared for hazards that can't be mitigated.	Education and Awareness	All Hazards	Emergency Management Director, Department of Public Health	Very High	Low	Staff Time	6 months- 1 year
Ongoing	Once database is developed, use Rapid Notify communications system to contact all burn permit holders at the start of burning season with information on burn safety, procedures, and penalties.	Education and Awareness	Wildfire/ Brushfire	Fire Department	High	Low	Staff Time	6 months after database created and annually ongoing.
New	Improve drainage on Lloyd's Hill Road as sidewalk improvements are implemented.	Structures and Infrastructure Projects	Flooding	City Engineer, Department of Public Works	High	High	City	2 -3 years, project is in final design stages
New	Northwest Road at the Little River: Raise the road to avoid washouts.	Structures and Infrastructure Projects	Flooding	City Engineer, Department of Public Works	High	High	City, HGMP, Chapter 90	4-5 years, pending available funding
New	Construct the planned expansion of the Columbia Greenway through downtown. Due to its elevated nature, the Greenway can serve as an evacuation route for pedestrians and emergency vehicle access, if severe flooding were to impact the downtown.	Structure and Infrastructure Project	Flooding	City Engineer, Department of Public Works.	High-Medium	High	State- In STIP, funded through CMAQ	2-3 years

Status	Action Name	Action Type	Hazards Addressed	Responsibility/Oversight	Priority	Estimated Cost	Funding Source	Time Frame
Ongoing	Enforce stormwater regulations.	Local Plans and Regulations	Flooding	Water Resources Department	High-Medium	Low	Staff Time	Work will be ongoing.
New	Fill vacant Tree Warden position or assign DPW staff tree management responsibilities in order to begin work on a forestry plan and deal with a backlog of tree removal requests due to health concerns.	Local Plans and Regulations	Hurricanes, Severe Wind, Severe Snow and Ice,	Department of Public Works	High-Medium	Medium	City Funding, Staff Time	1-2 years
New	Formalize a debris management plan, so that the city can be prepared to effectively respond in the wake of disaster	Local Plans and Regulations	All Hazards	Emergency Management Director, Department of Public Works	Medium	Low	Staff Time	6 months- 1 year
New	Complete Little River Levee (near Ponders Hollow Road) Evaluation and implement recommended actions from process.	Structures and Infrastructure Projects	Flooding	Flood Commission, City Engineer, Department of Public Works	Medium	High	City Funding, HGMP	Study complete in 1 year. Infrastructure upgrades as funding is available.
New	Improvement drainage on East Mountain Road at Route 20, near the railroad, to reduce frequency of localized flooding.	Structures and Infrastructure Projects	Flooding	City Engineer, Department of Public Works	Medium	High	Chapter 90, City, HGMP	4-5 years, pending available funding
New	Improve drainage on Union Street at the CSX Railroad, to reduce frequency of localized flooding.	Structures and Infrastructure Projects	Flooding	City Engineer, Department of Public Works	Medium	High	Chapter 90, City, HGMP	4-5 years, pending available funding
Ongoing	Prepare and implement a Water Conservation Plan for private wells	Local Plans and regulations	Drought	Department of Public Health, Water Resources Department	Medium-Low	Medium	Staff Time	2 years
Ongoing	Implement the Five-Year Action Plan strategies in Westfield's Open Space and Recreation Plan, particularly those dealing with protection of floodplains, forests and farmland.	Natural Systems Protection	All Hazards	Conservation Commission and Planning Department/Board	Low	High	City, CPA, HGMP	Work will be ongoing

Status	Action Name	Action Type	Hazards Addressed	Responsibility/Oversight	Priority	Estimated Cost	Funding Source	Time Frame
New	Update Open Space and Recreation Plan in 2017 (when plan is set to expire). Goals in this plan include the acquisition of land for conservation purposes, which could play a role in mitigation. An approved, updated plan also keeps the city eligible for funding.	Local Plans and Regulations/ Natural Systems Protection	All Hazards	Planning Department, Conservation Commission	Low	Low-Medium	Staff Time, DLTA	2017

6: PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

Upon completion of the draft Hazard Mitigation Plan, a public meeting was held by the City staff and the Pioneer Valley Planning Commission on September 21, 2016 to present and request comments from city 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 City Council and adopted.

Plan Implementation

The implementation of this plan began upon its formal adoption by the City Council and approval by MEMA and FEMA. Those City departments and boards responsible for ensuring the development of policies, bylaw revisions, and programs as described in this plan will be notified of their responsibilities immediately following approval. The City'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:

- ***Westfield Comprehensive Emergency Management Plan*** (particularly the Critical Infrastructure Section) – The Critical Infrastructure section was used to identify those infrastructure components in Westfield that have been identified as crucial to the function of the Westfield; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
- ***Westfield Open Space, Recreation Plan*** this Plan was used to identify the natural context within which the Westfield 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.
- ***Westfield Zoning Ordinance*** – Westfield's Zoning was used to gather identify those actions that the city is already taking that are reducing the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts.
- ***Massachusetts' State Hazard Mitigation Plan*** - This plan was used to insure that the city's Hazard Mitigation Plan 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 City 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 in 2017, 2018, 2019, 2020, and 2021 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 City 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 City's Comprehensive Emergency Management Plan.

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

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

Plan Monitoring and Evaluation

The City's Emergency Management Director will call meetings of all responsible parties to review plan progress annually and 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 City 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 are 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 City'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 City 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 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 city 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 City Hall, and copies of the revised Plan will be made available to the public at City Hall.

With an anticipated adoption date in the winter of 2016, this plan will expire in the winter of 2021. At that time, the Committee will work to update the Hazard Mitigation Plan Update. In order to meet the required 2021 submission, the process to update Westfield's Hazard Mitigation Plan Update should begin early in the summer of 2021. The updated plan needs to be submitted to MEMA and FEMA in the fall of 2021.

RESOLUTION NO. 2804

**CITY OF WESTFIELD
IN CITY COUNCIL**

January 5, 2017

**A RESOLUTION ADOPTING THE CITY OF WESTFIELD LOCAL HAZARD
MITIGATION PLAN UPDATE**

WHEREAS, the City of Westfield established a Committee to update the City's local Hazard Mitigation Plan; and,

WHEREAS, the City of Westfield Hazard Mitigation Plan update contains several potential future projects to mitigate potential impacts from natural hazards in the City of Westfield; and,

WHEREAS, a duly-noticed public meeting was held by the Hazard Mitigation Committee on August 31 and September 15, 2016 for the public and municipality to review prior to consideration of this resolution; and,

WHEREAS, the City of Westfield has been notified that the plan satisfactorily meets all of the mandatory requirements pending adoption and receipt by FEMA of the electronic copies of adoption and the final plan; and,

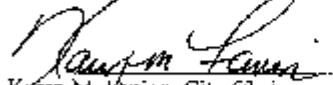
NOW, THEREFORE, in consideration of the foregoing, **BE IT RESOLVED**; by the City Council of the City of Westfield that the Local Natural Hazards Mitigation Plan is hereby approved and adopted.

Presented to the Mayor,

Approved by the Mayor

For approval Jan 9 2017

Jan. 9 2017


Karen M. Fenton, City Clerk


Brian J. Sullivan, Mayor

7: APPENDICES

Appendix A - Technical Resources

1) Agencies

Massachusetts Emergency Management Agency (MEMA).....	508/820-2000
Hazard Mitigation Section	617/626-1356
Federal Emergency Management Agency (FEMA)	617/223-4175
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) –	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 Service413/253-8200
US Geological Survey.....508/490-5000

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP)MA Emergency Management Agency
406 Public Assistance and Hazard MitigationMA 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 ProtectionUS 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 ClearingUS 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 ProgramsMA Department of Environmental Protection

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

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

3) Internet Resources

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/disaster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/geog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program, 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.tornadoproject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	http://www.iiaa.iix.com/ndcmap.html	A multi-disaster risk map.
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

APPENDIX B-Documentation of the Planning Process

Westfield Hazard Mitigation Committee Meeting #1 Agenda

**Westfield City Hall Room 201
August 5, 2016 10:00am**

1. Introductions/Administrative
 - a. affirm local Hazard Committee membership
2. Overview of Hazard Mitigation Planning Process
 - a. Background on Hazard Mitigation Planning
 - b. Planning process and requirements
 - i. 3-5 committee meetings
 - ii. 2 public outreach meetings
 - iii. MEMA / FEMA review and conditional approval
 - iv. Select Board adoption
 - v. FEMA final approval
 - c. Schedule for committee and public outreach meetings
3. Begin Review of Base Plan

Westfield Hazard Mitigation Committee Meeting #1- Sign In

August 5, 2016 10:00am
Westfield City Hall, Room 201

Name	Position	Email
Eric Bishop	Deputy Chief	fire_recreations@cityofwestfield.org
Jim Wiggs	Emergency Mgmt Director	j.wiggs@cityofwestfield.org
Joe Stoyak	Traffic Bureau WPD	J.Stoyak@cityofwestfield.org
Francis Lazz	DPW Assistant Director	F.Lazz@cityofwestfield.org
Mike Cresson	Engineering	m.cresson@cityofwestfield.org
John McLean	Fire Envt. Ins.	j.mclean@baystatehealth.org
Steve Capriani	Code Enforcement Inspector	S.Caprani@cityofwestfield.org
Ton Hibert	Code Enforcement Inspector	T.HIBERT@cityofwestfield.org
Bruce E. Bussiere	Director Emergency Mgmt	bruce.bussiere@baystatehealth.org
Jay Hastings	Police Lieutenant	J.HASTINGS@westfield.ma-ed.org
Heather Miller for Dave Billips	Systems Engineer DPW Director	h.miller@cityofwestfield.org d.billips@cityofwestfield.org
MARY REGAN	FIRE CHIEF	M.regan@cityofwestfield.org
Amber Danachey	Comm. Dev Planning	A.danachey@cityofwestfield.org
Ashley Exton	RPC	

Westfield Hazard Mitigation Committee

Meeting #2 Agenda

**City Hall Room 201
August 17, 2016 2-4pm**

1. Complete Hazard Identification and Risk Assessment
2. Capability Assessment--using FEMA worksheet

Planning process and requirements

1. 3-5 committee meetings
2. 2 public outreach meetings
3. MEMA / FEMA review and conditional approval
4. Select Board adoption
5. FEMA final approval

Westfield Hazard Mitigation Committee Meeting #2- Sign In

City Hall Room 201

August 17, 2016 2:00-4:00 p.m.

**Westfield Hazard Mitigation Committee
Meeting #3 Agenda**

**Westfield City Hall
August 30, 2016 1-3pm**

1. Finalize Capability Assessment as needed
2. Identification of Critical Infrastructure (Chapter 4)
 - a. Review and Edit Map
3. Start process of identifying mitigation strategies time permitting

Planning process and requirements

- a. 3-5 committee meetings
- b. 2 public outreach meetings
- c. MEMA / FEMA review and conditional approval
- d. Select Board adoption
- e. FEMA final approval

Westfield Hazard Mitigation Committee Meeting #3- Sign In

Westfield City Hall Room 201
Wednesday August 31, 2016 1-3pm

Name	Position
JAY WINKEY	CITY PLANNER
Casey Barber	DFW - Deputy Spec
Mel Passotto	ENGINEER
Steve Cipriani	Code enforcement inspector
Joe Rouse	Public Health Director
Eric Bishop	Fire Dept
Heather Miller	Water Dept.
Ashley Eason	PVPC

**Westfield Hazard Mitigation Committee
Meeting #4 Agenda**

**Westfield City Hall
September 14, 2016 1-3 pm**

1. Administrative: Hours worked thus far outside of meetings
 2. Identify Mitigation Strategies for Action Plan
 3. Prioritize Strategies
 4. Chapter 6 review if time.
- Upcoming:
 - Westfield News Radio Show- September 15th 6-8am
 - Second Public Meeting- September 21st -6:30pm Room 315a
 - Feel free to invite anyone that you think would be interested
 - Last committee meeting- September 28th- 1-3pm

Westfield Hazard Mitigation Committee Meeting #4- Sign In

Westfield City Hall
September 14, 2016 1:00-3:00pm

Name	Position
JAY VINSKEY	CITY PLANNER
Jim Wiggs	Emergency Management
Francis Con	DPV
Mark Crimmins	ENGINEERING
Eric Bishop	Fire Department
Ashley Eaton	PWRC



AUG 18 2016



Timothy W. Brennan, Executive Director

MEDIA RELEASE

CONTACT: Ashley Eaton, PVPC Planner, (413) 781-6045 or aeaton@pvpc.org, or Jim Wiqns, City of Westfield Emergency Management Director, (413) 568-1222 or j.wiqns@cityofwestfield.org.

FOR IMMEDIATE RELEASE
August 17, 2016

City of Westfield Schedules Public Engagement Event For Hazard Mitigation Plan Update

Westfield residents, business owners, stakeholders and representatives from surrounding communities are invited to provide comments on the update of the City of Westfield's Hazard Mitigation Plan on Wednesday, August 31 at 6:30 p.m. at the Westfield City Hall (Room 201) on 59 Court Street. All members of the public are welcome to attend the event. Local businesses, residents of neighboring communities, and municipal officials of neighboring communities are also encouraged to attend and provide their feedback.

The meeting will include an introduction to the Hazard Mitigation planning process, a summary of existing mitigation initiatives, and an overview of past hazards in the City. Municipal officials and PVPC staff will be available to answer questions and listen to comments.

The plan is being produced by the City with assistance from the Pioneer Valley Planning Commission and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). This planning effort is being undertaken to help the City of Westfield assess the risks faced from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

For more information, please contact PVPC's Ashley Eaton at aeaton@pvpc.org or (413) 781-6045.

City of Westfield Website Posting:

The screenshot shows the City of Westfield website. At the top, there's a navigation bar with links for Home, Government, Departments, Residents, Business, and Community. The 'Community' menu is open, showing options like Area Maps, Community Links, History of Westfield, News, Parks & Facilities, Photo Gallery, and Westfield Housing Authority. The main content area features a large image of a statue and a church, followed by a banner for 'Mayflowers'. Below that are sections for 'NEWS & ANNOUNCEMENTS' and 'CALENDAR'. There are also links for 'Active City Projects', 'Agendas & Minutes', and 'Employment'. On the right side, there's a 'Connect With Us' section with links for Facebook, Twitter, and RSS, along with a 'My Dashboard' button. A 'Contact Us' and 'Notify' button are also present.

PVPC Website Posting for Public Meeting #1

The screenshot shows the PVPC website page for the City of Westfield Hazard Mitigation Plan Public Meeting #1. The header includes the PVPC logo, a 'Catalyst for Regional Progress' tagline, and links for TRANSLATE PAGE, CHANGE FONT SIZE, and social media (Twitter, YouTube, Facebook). The main navigation menu has categories: ABOUT, PLANNING, DOING, and MEASURING. Below the menu, a breadcrumb trail shows the user is at Tags > Hazard Mitigation. The main title is 'City of Wesfield Hazard Mitigation Plan Public Meeting #1'. The date is listed as Wednesday, August 31, 2016 - 6:30pm. A paragraph describes the meeting invite, stating that Westfield residents, business owners, stakeholders, and representatives from surrounding communities are invited to provide comments on the update of the City of Westfield's Hazard Mitigation Plan. It mentions that all members of the public are welcome to attend, including local businesses, residents of neighboring communities, and municipal officials. The meeting will include an introduction to the Hazard Mitigation planning process, a summary of existing mitigation initiatives, and an overview of past hazards in the City. Municipal officials and PVPC staff will be available to answer questions and listen to comments. The plan is being produced by the City with assistance from the Pioneer Valley Planning Commission and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). The plan aims to help the City of Westfield assess risks, identify action steps, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards. For more information, contact PVPC's Ashley Eaton at aeaton@pvpc.org or (413) 781-6045.

Westfield Hazard Mitigation Plan Update Public Meeting 1

Sign-in
()

August 31, 2016 1388-3:00pm

Name	Email (if want to be notified of second meeting)	Area of Town
MARY Ann Bassister	Mababusk@conect.net	114 Rockwood Ave Westfield, MA 01085
Daniel Desroches	des@westfieldnewgroup.com	Westfield Woods
JAT WISKEY	U	Curr parkway
Melissa Stello		Resident

Media Coverage for Public Meeting #1

Mass Live Article announcing meeting:

The screenshot shows a news article from MassLive.com. The headline reads: "Public hearing scheduled to help upgrade Westfield's Hazard Mitigation Plan". Below the headline is a large, ornate stone archway with the words "WESTFIELD, MASSACHUSETTS" carved into it. To the left of the archway are social media sharing icons (Facebook, Twitter, Email) and a count of "2 shares". On the right side of the article are several sidebar elements: an advertisement for "Thrifty Car Sales" featuring three cars and a "VIEW SAVINGS" button; a section titled "MASSLIVE ON SOCIAL MEDIA" with links to Facebook, Twitter, and Instagram; and a "BREAKING NEWS NEWSLETTER" sign-up form with fields for email address and zip code, and a "Sign up now" button.

www.masslive.com/news/index.ssf/2016/08/public_hearing_scheduled_to_he.html

IT'S MOM'S SECRET WEAPON FOR FAMILY MOUTH PROTECTION WATERSIDE DENTAL

MASS LIVE

Ready to do the job because he's been on the job for 23 years. COCCHI SHERIFF*

0 Public hearing scheduled to help upgrade Westfield's Hazard Mitigation Plan

2 shares

8.22.13 | WESTFIELD | (file photo)

By Ted LaSorsa | Special to The Republican
Email the author | Follow on Twitter
on August 18, 2016 at 7:18 PM, updated August 19, 2016 at 7:20 PM

Print Email

WESTFIELD - A hearing has been set for Aug. 31 to assist city officials in a planned upgrade to the city's Hazard Mitigation Plan.

The public can weigh in on the plan during the

MASSLIVE ON SOCIAL MEDIA

Thrifty Car Sales
BE SMART. BUY THRIFTY.

VIEW SAVINGS

BREAKING NEWS NEWSLETTER

When the big stories break, we'll send you an alert.

Enter your e-mail address OPTIONAL Enter Zip

Sign up now >

The entire article can be found here:

http://www.masslive.com/news/index.ssf/2016/08/public_hearing_scheduled_to_he.html

The Westfield News Public Meeting #1 Recap

<http://thewestfieldnews.com/hazard-mitigation-planning-underway>

The Westfield News
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Hazard mitigation planning underway

September 1, 2016 • Dan Diroschers • Westfield • Leave a comment

WESTFIELD—Residents were given the first chance to discuss the new hazard mitigation plan yesterday evening at city hall.

The meeting was the first of two public participation events that are being held by the Pioneer Valley Planning Commission (PVPC), who is helping to create the new plan along with a hazard mitigation planning committee, and is funded by FEMA and MEMA. The committee is comprised of several parts of municipal and civil services, including department of public works, police and fire departments and even the local hospital.

The discussion mostly covered the possible changes that will be coming to Westfield's current hazard mitigation plan, which was last changed in 2008.

"Hazardous mitigation is action taken to reduce or eliminate long-term risk to people and property," presenter and PVPC land use-environmental planner Ashley Eaton said.

Eaton said that the current plan is expired by FEMA standards, which requires that plans be updated every five years. Without the plan being updated, Eaton said that the city is not eligible for FEMA and MEMA grants to help fund many hazard mitigation projects, like dam and levy repairs, flood control equipment, snow removal and hazard preparedness. However, Eaton stressed that this does not preclude the city from receiving funding or assistance from FEMA or MEMA if a disaster strikes.

Eaton said that the key changes that have been suggested by the committee so far is the inclusion of both extreme temperature and climate change responses within the plan, as well as improving language and scope regarding microbursts; the latter of which has brought increased awareness in western Massachusetts since 2008.

Public participation at the meeting was limited, as the audience was small. However, PVPC will be having additional meetings that the public can attend on Sept. 14 and Sept. 21, from 1 p.m. to 3 p.m. at city hall. Also, on Sept. 21 there is a tentatively planned public discussion event for the hazard mitigation plan, but the time has not been set.

If any residents have comments, concerns or would like to see anything addressed by the committee or in the plan, they are urged to email Ashley Eaton at aeaton@pvpc.org, or by calling (413)781-6045.

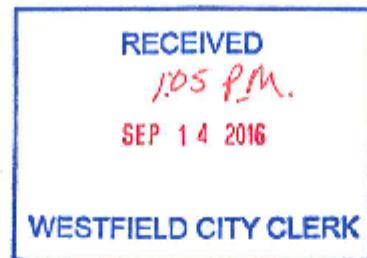
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77,445 page views

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MEDIA RELEASE

CONTACT: Ashley Eaton, PVPC Planner, (413) 781-6045 or aeaton@pvpc.org or
Jim Wiggs, Westfield Emergency Management Director, (413) 568-1222
j.wiggs@cityofwestfield.org

FOR IMMEDIATE RELEASE
September 12, 2016

City of Westfield to Hold Second Public Engagement Event for Hazard Mitigation Plan Update

Westfield residents, businesses, and surrounding community residents and representatives are invited to provide comments on the City of Westfield Hazard Mitigation Plan Update on Wednesday, September 21, 2016, at 6:30pm in Room 315a at Westfield City Hall on 59 Court Street.

The purpose of the 2016 Hazard Mitigation Plan Update is to identify and assess Westfield's natural hazard risks and determine how to best minimize and manage them. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards. Public participation and input is essential!

The meeting will include a discussion of existing mitigation initiatives addressing natural hazards in Westfield, and the strategies as currently proposed by the committee. Municipal staff and PVPC staff will be available to answer questions and listen to comments on the draft plan. The meeting provides an opportunity for you to share your opinions and participate in the mitigation planning process. A draft of the plan will be available for review on the PVPC website.

The plan is being updated by the City with assistance from the Pioneer Valley Planning Commission and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA).

Upon completion, the plan will be 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.

For more information, please contact PVPC's Ashley Eaton at aeaton@pvpc.org or (413) 781-6045.

Westfield Hazard Mitigation Plan Update Public Meeting 7

35

September 21, 2016 6:30pm

Name	Email	Address
Henry Warchol	warch@verizon.net	Westfield Prospect Hill
Albert C. Grawrie Jr	CHAMBERS WESTFIELD POST CORNER INTERNSHIPS	brotheral01@hotmail.com Westfield - "Hillside"
Mack M. Goodwin	"	chmgoodwin@comcast.net Westfield - "Northside"
Maya and Steve Jin Weiss	mukablasti@concast.net	Westfield - Northside
Casey Berube	c.berube@juno.com	WE.M.W. DPW
Paula Rose	paulrased1@concast.net	Citizen
Berry Plimley	"	Westfield - Northside

Media Coverage for Meeting #2:

MassLive Article announcing meeting:



0 Westfield schedules second hearing on updating Hazard Mitigation Plan

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8.22.13 | WESTFIELD | (Manon Mirabelli)

 By Ted LaBorde | Special to The Republican
[Email the author](#) | [Follow on Twitter](#)
on September 16, 2016 at 2:15 PM, updated September 16, 2016 at 3:49 PM

[Print](#) [Email](#)

WESTFIELD - Residents will have a second opportunity to offer comments, concerns with the city's Hazard Mitigation Plan Sept. 21.

City officials and representatives from the Pioneer Valley Planning Commission will hold a second public hearing on the updating the plan at 6:30 p.m. in Room 315A at City Hall.

WESTFIELD HEADLINES

Debate featuring Sen. Don Humason and challenger JD Parker O'Grady to be televised on WGBY

Auntie Anne's pretzel shops looking for franchisees in Hadley, Lee



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Full article can be found here:

http://www.masslive.com/news/index.ssf/2016/09/westfield_schedules_second_hearing_on_updating_hazard_mitigation_plan.html#incart_river_home

The Westfield News Public Meeting #2 Recap:

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October 6, 2016

6:47 AM EDT on October 06, 2016
Expires: 10:00 AM EDT on October 06, 2016

Thursday 10/06 High 75° Low 46° Friday 10/07 High 76° Low 47° Saturday 10/08 High 68° Low 49°

Extended Forecast click here



Hazard mitigation plan update

September 23, 2016 Dan Deucher PoliceFor Westfield Leave a comment

WESTFIELD—The Hazard Mitigation Committee held its second public information session Wednesday evening, to discuss changes to the plan and get more public feedback before the plan's final edit.

The committee, along with the Pioneer Valley Planning Commission (PVPC), is looking to update the city's hazard mitigation plan, which is expired by FEMA standards. The plan is set in most municipalities in order to limit the amount of long-term effect an emergency or disaster can have in an area.



Full article can be found here: <http://thewestfieldnews.com/hazard-mitigation-plan-update>

Media Organizations Sent Press Releases

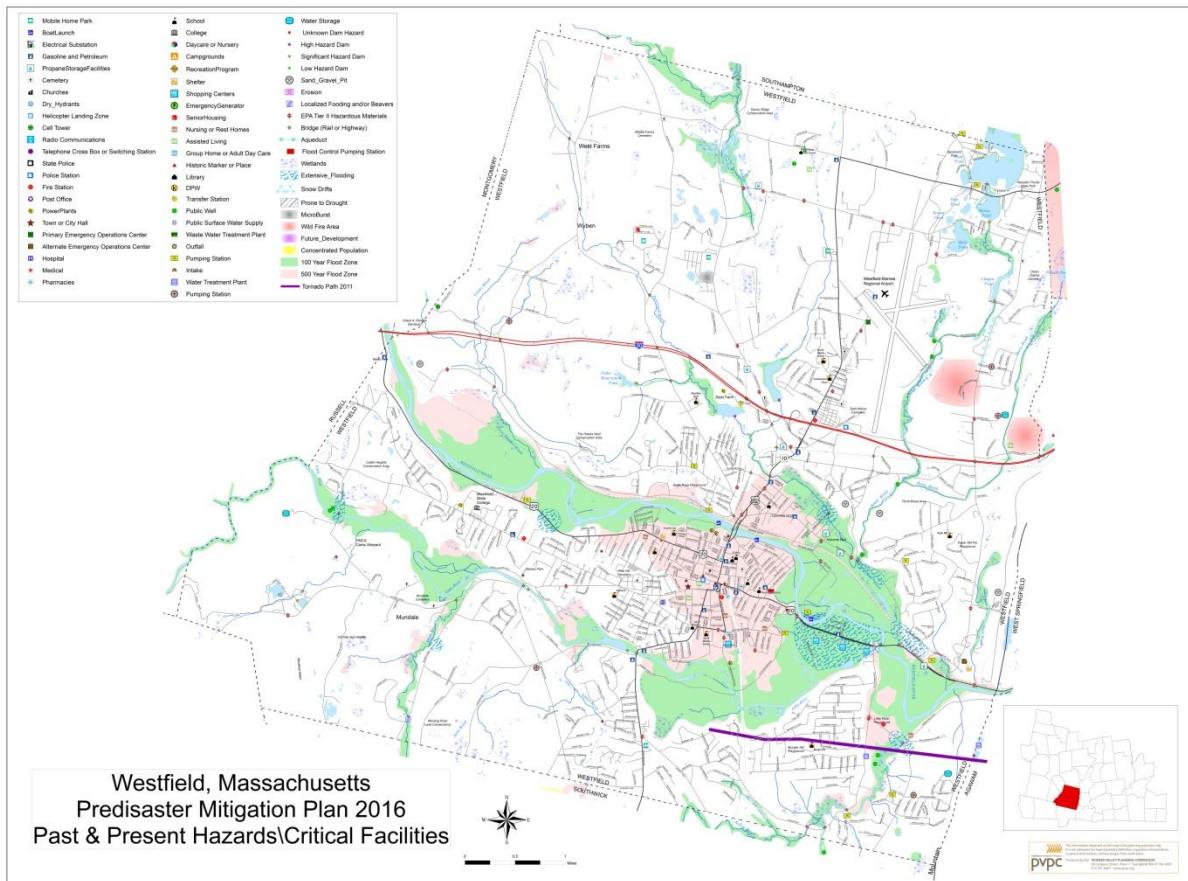
Media Organization	Address	Town	State	Zip Code
African American Point of View	688 Boston Road	Springfield	MA	01119
Agawam Advertiser News	23 Southwick Street	Feeding Hills	MA	01030
Amherst Bulletin	115 Conz Street	Ware	MA	01060
Belchertown Sentinel	1 Main Street	Belchertown	MA	01007
Berkshire Eagle	75 South Church Street	Pittsfield	MA	01202
Brattleboro Reformer	62 Black Mountain Rd.	Brattleboro	VT	05301
CBS 3 Springfield	One Monarch Place	Springfield	MA	01144
Chicopee Register	380 Union Street	West Springfield	MA	01089
CommonWealth Magazine	18 Tremont Street	Boston	MA	02108
Country Journal	5 Main Street	Huntington	MA	01050
Daily Hampshire Gazette	115 Conz Street	Northampton	MA	01060
El Sol Latino	P.O. Box 572	Amherst	MA	01004
Going Green	PO Box 1367	Greenfield	MA	01302
Hilltown Families	P.O. Box 98	West Chesterfield	MA	01084
Holyoke Sun	138 College Street	South Hadley	MA	01075
Journal Register	24 Water Street	Palmer	MA	01069
La Voz Hispana	133 Maple Street #201	Springfield	MA	01105
Ludlow Register	24 Water Street	Palmer	MA	01069
Massachusetts Municipal Association	One Winthrop Street	Boston	MA	02110
Quaboag Current	80 Main Street	Ware	MA	01082
Recorder	14 Hope Street	Greenfield	MA	01302
Reminder	280 N. Main Street	East Longmeadow	MA	01028
Southwick Suffield News	23 Southwick Street	Feeding Hills	MA	01030
State House News Service	State House	Boston	MA	02133
Tantasqua Town Common	80 Main Street	Ware	MA	01082
The Longmeadow News	62 School Street	Westfield	MA	01085
The Republican	1860 Main Street	Springfield	MA	01102
The Westfield News	62 School Street	Westfield	MA	01085
Town Reminder	138 College Street	South Hadley	MA	01075
Urban Compass	83 Girard Avenue	Hartford	CT	06105
Valley Advocate	115 Conz Street	Northampton	MA	01061
Vocero Hispano	335 Chandler Street	Worcester	MA	01602
WAMC Northeast Public Radio	1215 Wilbraham Road	Springfield	MA	01119
Ware River News	80 Main Street	Ware	MA	01082
West Springfield Record	P.O. Box 357	West Springfield	MA	01098
WFCR-Public Radio	131 County Circle	Amherst	MA	01003

WGBY-Public TV	44 Hampden Street	Springfield	MA	01103
WGGB ABC40/FOX 6 News	1300 Liberty Street	Springfield	MA	01104
WHMP-FM	15 Hampton Avenue	Ware	MA	01060
Wilbraham-Hampden Times	2341 Boston Road	Wilbraham	MA	01095
Worcester Telegram & Gazette	20 Franklin Street	Worcester	MA	01615
WRNX/WHYN/WPKR Radio	1331 Main Street	Springfield	MA	01103
WWLP-TV 22	PO Box 2210	Springfield	MA	01102

Appendix C – List of Acronyms

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

Appendix D – Past and Potential Hazards/Critical Facilities Map



Appendix E - Capability Assessment Worksheet

Worksheet 4.1

Capability Assessment Worksheet

Jurisdiction: Westfield, Massachusetts

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

Planning and Regulatory

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

Plans	Yes/No Yr	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	No	
Capital Improvements Plan	Yes	
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	
Continuity of Operations Plan	Yes	Referred to as a Continuity of Government Plan
Transportation Plan	No	Evacuation plans in the Continuity of Government Plan Projects in the RTP and TIP
Stormwater Management Plan	Yes	
Community Wildfire Protection Plan	No	Have protocols in place
Other special plans (e.g. brownfields, redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Yes	Disaster Recovery Plan, Elm Street Redevelopment Plan, Projects in PVPC's Regional Brownfield Plan, Open Space and Recreation Plan.

Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	Yes	Version/Year: Massachusetts State Building Code, 8 th edition.

Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Score:
Fire Department ISO Rating	Yes	Rating:3
Site plan review requirements	Yes	

Land Use Planning & Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	
Subdivision ordinance	Yes	
Floodplain ordinance	Yes	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater
Flood insurance rate maps	Yes	
Acquisition of land use for open space and public recreation uses	Yes	OSRP Plan.
Other		

How can these capabilities be expanded and improved to reduce risk?
Implement the goals and project identified in the OSRP. OSRP expires in 2017 and will need to be updated.

Administrative & Technical

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

Administration	Y/N	Describe capability Is coordination effective?
Planning Board	Yes	
Mitigation Planning Committee	Yes	Come together to create and update plan
Maintenance programs to reduce risk (e.g. tree trimming, clearing drainage systems)	Yes	Tree trimming and drainage cleaning. Also proactively manage snow and ice. Working with the state on specific projects.
Mutual aid agreements	Yes	With fire, police, emergency management, state agreements. DPH has one with the Hampden County Health Coalition

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Yes	

	(FT)	
Floodplain Administrator	Yes (FT)	
Emergency Manager	Yes (PT)	
Community Planner	Yes (FT)	
Civil Engineer	Yes (FT)	
GIS Coordinator	Yes (FT)	
Other	Yes	Department of Public Health and Department of Public Works

Technical	Y/N	Describe capability Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	Phone and Internet alerts can be sent out. No outdoor warning system
Hazard data and information	Yes	
Grant writing	Yes	Departments responsible for writing on grants. Not necessarily formal training.
Hazus analysis	No	
Other		

How can these capabilities be expanded and improved to reduce risk?
There could be better collaboration across city departments. There is an opportunity for grant writing training. An outdoor notification system could be purchased. The Green downtown is being used far more frequently for events since its reconstruction, but there is not system that could be used to alert people to severe weather moving in.

Financial

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

Funding Resource	Access Eligibility Y/N	Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital Improvements Project funding	Yes	Mitigation Efforts are included in funded projects
Authority to levy taxes for specific purposes	Yes	With limitations at the state level
Fees for water, sewer, gas or electric services	Yes	
Impact fees for new development	No.	
Storm water utility fee	Yes.	

Incur debt through general obligation bonds and/or special tax bonds	Yes.	
Community development block grants	Yes.	
Other federal funding programs		Emergency Management Performance Grant, Fire education money through Homeland Security
State funding programs		Chapter 90 funds, DEP grants for dam removal, CPA state match, MEMA funding, Gateway Cities Funding
Other		

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

Education & Outreach

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

Program/Organization	Y/N	Describe program/organization and how it relates to disaster resilience and mitigation
Local citizens groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Friends of the Columbia Greenway, Friends of Parks and Recreation, Friends of the Senior Center, Medical Reserve Corp, Winding River Land Conservancy, Westfield River Watershed Association, Historic Society
Ongoing public education or information program (e.g. responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire: Safety and Burn information; Community policing; Water dept mails information on conservation- MS4 will require more information sharing; EMD does campaigns on preparedness. DPH- information on ticks, addiction, radon. Senior Center- Safe house # + detection.
Natural disaster or safety related school programs	Yes	-fire safety in schools -5210- DPH healthy living program
StormReady certification	Yes	Last done in 2012. No longer current
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	Yes	Agreements with Churches for shelters. Agreement with Lecrenski Brothers for buses and refrigerated vehicles.
Other		

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