The Town of West Springfield

Local Natural Hazards Mitigation Plan

Adopted by the West Springfield City Council on December 20, 2010.

Prepared by: The West Springfield Natural Hazards Mitigation Planning Committee

and

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1: INTRODUCTION

Hazard Mitigation

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

Planning efforts, like the one undertaken by the Town of West Springfield 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 a local natural hazard mitigation plan before a disaster occurs 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.

Planning Process

The natural hazard mitigation planning process for the Town of West Springfield included the following tasks:

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

• Adopting and implementing the final Local Natural Hazards Mitigation Plan.

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

Public Committee Meetings

7/15/09, 7:00 pm: Informational and organizational meeting with Town Council and Planning Board, held at West Springfield Town Offices.

2/10/10, 10:00-12:00 noon: Working committee meeting held at Town Offices.

4/5/10, 1:00-3:00 pm: Working committee meeting held at Town Offices.

A mailing was made to each committee member prior to each meeting that contained information from the previous meeting, an agenda sheet, and information to be covered.

Public Meetings

In 2005 the Town of West Springfield agreed to collaborate with the Pioneer Valley Planning Commission to develop a local Hazard Mitigation plan and participate in the development of a regional Hazard Mitigation plan. Because PVPC is facilitating development of 32 local plans, it is not until 2009 that West Springfield's plan was finalized.

December 20, 2010: The City Council voted to adopte the Local Natural Hazard Mitigation Plan. Meeting held at West Springfield City Offices.

Public and Neighboring Jurisdiction Involvement in the Planning Process

From 2007-2010 the Pioneer Valley Planning Commission sent a series of press releases to all area media outlets to inform private citizens that the planning process for development of local Hazard Mitigation plans in the Pioneer Valley had commenced and that all residents of West Springfield were invited to attend plan development sessions.

In addition to media outreach, all public meetings were posted at the West Springfield Municipal Office Building in compliance with the Commonwealth of Massachusetts' open meeting law.

In the initial stages of the process for developing this mitigation plan, the Pioneer Valley Planning Commission conducted a series of outreach efforts to make the public aware of the scope of the region's mitigation activities. In October of 2005, the Planning Commission notified all Select Boards and Chief Elected Officials that their community could participate in the region's mitigation planning process. Again, on April 4, 2006, the Planning Commission mailed a notice of planning activities to all Chief Elected Officials and Select Boards in the Pioneer Valley. Both mailings explained the purpose

of mitigation planning and invited communities to participate in either Round I or Round II of the region's mitigation planning process.

In addition to media outreach, all public meetings were posted at Town Hall in compliance with the Commonwealth of Massachusetts' open meeting law.

On October 23, 2009 the Pioneer Valley Planning Commission sent a press release (see Appendix E) to all area media outlets to inform the public that a draft of West Springfield's Hazard Mitigation Plan had had been placed on PVPC's website and hard copies were available at PVPC's offices and that all residents, businesses and other concerned parties of West Springfield and adjacent communities were encouraged to comment on the plan. The plans were made available in this manner for 30 days. Citizens from adjacent municipalities were also encouraged to comment on West Springfield's plan.

Additionally, the Western Region Homeland Security Advisory Council (WRHSAC) and the Regional Emergency Planning Committees of western Massachusetts have been kept informed of the Hazard Mitigation planning process underway in western Massachusetts since 2005. The WRHSAC includes representatives of all emergency disciplines who are charged with bringing the information they learn at the meetings back to their colleagues. In this way, emergency response professionals, Fire Fighters, Police, Ambulance, municipal officials, dispatch, transit and EMS from all of western Massachusetts have been educated about hazard mitigation planning in the region and have been specifically encouraged to review and comment on neighboring jurisdictions plans.

2: LOCAL PROFILE

Community Setting

West Springfield in Western Massachusetts' is a diverse community with both suburban and rural qualities, and a historic downtown. The town is comprised of over 17 square miles, located on the western bank of the Connecticut River. West Springfield is bordered by Holyoke to the north, and Chicopee and Springfield to the east. Westfield lies to West Springfield's west, and Agawam to the south.

While its colonial settlement dates back to 1665, the town was formally established in 1774. Its location along the banks of the Connecticut River was once rich farmland replenished by the annual flooding of the river. Elements of the town's old New England flavor include the Town Common, framed by towering shade trees, and historic structures like the Josiah Day House, circa 1754, which is believed to the be the oldest structure of its kind in Massachusetts.

West Springfield is the birthplace of the Morgan Horse and the home of the Eastern States Horse Show, one of the oldest in the country. West Springfield is also the home of the Eastern States Exposition ("The Big E"), a state fair for the New England region and one of the largest agricultural fairs in the nation.

West Springfield is also an emerging commercial center for the region. Major retailers and warehouse outlets have located along the Riverdale Street (Route 5) and Memorial Avenue (Route 147) commercial corridors. A dense urban network connects these main routes with the Town Common, interspersed with still active rail lines and industrial warehouses.

West Springfield offers semi-rural, suburban, and even some urban characteristics and housing options. During the 1990s, when many of the region's urban centers were losing residents, West Springfield grew to almost 28,000.

Infrastructure

West Springfield's infrastructure reflects its early settlement and evolution into a commercial and industrial center.

Roads and Highways

West Springfield's town center is spread from its historic Town Common, home to many civic and historical buildings, to the "Big E" fairgrounds – with much commercial and industrial development between. The key roads include Route 5 (Riverdale Street) which travels along the western bank of the Connecticut River, and Route 147 (Memorial Avenue) and Route 20 (Park Avenue) both of which span the River to offer a connection to Springfield. Other significant routes include River Road, along the

Agawam River; Elm Street and Union Street, which connect and parallel Route 5; Kings Highway, which travels through the town's northern neighborhoods; and Piper Road which runs from the north into downtown and turns into North and then South Boulevard.

Transit

The Pioneer Valley Transit Authority (PVTA) provides bus and shuttle service in and out of West Springfield, and contracts through MV Transportation to also offer paratransit, a door-to-door demand responsive van service.

Rail

The CSX rail lines run through West Springfield, with a rail yard located just northwest of the intersection of Union Street and Memorial Avenue. None of these are passenger lines.

Public Water and Sewer Service

Nearly 100% of the Town is served by a municipal water system. Ninety percent of wastewater is sent to the Springfield Regional Wastewater Treatment Facility located at Bondi's Island in Agawam. Remaining properties in Town utilize individual septic systems.

Natural Resources

West Springfield's physical boundaries consist of three impressive features. The Connecticut River to the east provides the community with five miles of river frontage on New England's largest river. To the south, the Westfield River forms an eight mile boundary, a portion of which is located adjacent to Mittineague Park, West Springfield's largest park. Because West Springfield is located at the confluence of these two rivers, much of the eastern portion of the community is the floodplain of the two. The landscape then gently slopes to the west where the East Mountain range is physically prominent. East Mountain's summit at 690 feet is the highest point in West Springfield, and provides spectacular view of Springfield, the Connecticut River, and the picturesque valleys and farmland surrounding.

Water Resources

Sitting on the western banks of the Connecticut River, West Springfield owes much of its historical development to its proximity to this regional water resource. Almost of the fresh water in West Springfield is contained in the Westfield and Connecticut Rivers. The Connecticut River runs along the eastern boundary of West Springfield for five miles. The section of the Westfield River that runs along the northern boundary of West Springfield is approximately eight miles long, and runs from the Westfield town line to its confluence with the Connecticut River at Pynchon Point. Both of these water bodies have witnessed dramatic water quality improvement in recent years, and are considered generally safe for fishing and swimming. However, currents and boat traffic in the Connecticut and water depths in the Westfield make swimming impractical in most locations.

Other water resources in West Springfield are quite limited but include a variety of brooks, ponds, and wetlands that support diverse habitats. The brooks include Schoolhouse, Goldine, Bagg, and Piper Brook all of which drain into the Connecticut River and Paucatuck, Block and Squassick Brook which are tributaries of the Westfield River. The only other water body of significant size is the Bearhole Reservoir which covers about 15 acres and is located on East Mountain and created by damming the Paucatuck Brook.

Most of the limited number of wetlands in the town are located in the northwestern and central sections and are classified by the U.S. Department of the Interior Fish and Wildlife Service as mainly Palustrine forested, scrub-shrub or emergent systems. A number state-listed species have been identified in West Springfield and all but one of them depends on its water resources for at least some portion of their lifecycle.

Forests and Fields

Over one third (37%) of the total acreage of West Springfield is forested, approximately 4,137 acres, providing important habitat opportunities. Additionally, West Springfield boasts mature street trees within its Town Common and lining several main thoroughfares. These trees are important the maintaining the character of the downtown as well as providing shade and mitigating stormwater run-off. Additionally, there are a few hundred acres of fields, cropland, and orchards scattered throughout West Springfield. These agricultural lands also provide good wildlife habitats. These fields and meadows each have their unique trees and grasses. Furthermore, these forests and fields provide recreational opportunities for town residents.

Development

West Springfield's pattern of land use evolved from its rural New England heritage and agricultural beginnings, early 20th century industrialization, and late 20th century suburbanization. In turn, West Springfield's topography, soils, and physiography (lakes, rivers, wetlands and watershed areas) shape and constrain these culturally determined land use patterns.

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

The West Springfield Zoning Ordinance establishes 20 base zones, and 4 overlay zones:

- <u>Five residential zones</u> Residence A (RA), Residence A-1 (RA-1), Residence A-2 (RA-2), Residence B (RB), Residence C (RC);
- <u>Six commercial (business) zones</u> -- Neighborhood Business (NB), Business A (BA), Business A-1 (BA-1), Business B (BB), Business B-1 (BB-1), Central Business (CB);
- <u>Three industrial zones</u> Industrial (I), Industrial Park (IP), Industrial Park-Light (IPL);
- <u>Five flexible zones</u> Special Use Technical (SU-T), Special Use Office (SU-O), Special Use Multi-family (SU-M), Special Use Mobile Home (SU-H), and Planned Unit Development (PUD);
- <u>One Recreation zone</u> Recreation zone (REC) and
- <u>Four overlay zones</u> River Protection (RP), Water Supply Protection (WSP), Flood Hazard (FH), and Age Restricted Housing (ARH)

Although appropriate zoning is all relevant to protecting the health and safety of the Town residents, four of West Springfield's districts are specifically relevant to natural hazard mitigation. These are outlined here:

- <u>River Protection</u> This overlay district applies to all lands within 300 feet of the annual high-water line the river. It aims to both protect the water quality and health of the river by providing a buffer and protect residents of town by ensuring that development is safe and access is appropriately sited.
- <u>Flood Hazard</u> This overlay district was created to reduce public safety threats from flooding, eliminate new hazards to public safety officials, prevent occurrence of water contamination emergencies, avoid the loss of utility services from flooding, eliminate the cost of clean up of flooding conditions, and reduce the damage to public and private property resulting from flooding.
- <u>Recreation</u> This district creates a natural buffer or green belt between the town and the Westfield and Connecticut Rivers. It is intended to protect life, public safety, and property from flooding hazards
- <u>Water Supply Protection District</u> The purpose of this overlay district is to protect and preserve West Springfield'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, details site plan requirements and special permit procedures.

The Zoning Ordinance also establishes a Site Plan/Special Permit Approval procedure for specific uses and structures within West Springfield. 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 West Springfield are protected, and includes several specific evaluation criteria that are relevant to natural hazards.

Current Development Trends

Today, the majority of West Springfield's 17.6 square miles is a combination of undeveloped land, totaling almost 4,400 acres, and residential land, totaling 3,566 acres. The rest of the town's land is split relatively equally between several uses. Commercial land is the third most prolific land use, at approximately 722 acres, followed closely by industrial land at approximately 638 acres. Water comprises almost 480 acres of land in West Springfield, and agricultural land comprises approximately 345 acres. There are 388 acres of outdoor recreational land throughout Town, and land characterized as urban open/public land constitutes 297 acres. Finally, land used for transportation constitutes approximately 365 acres.

Currently, development in West Springfield is guided by existing zoning and other land use regulations to seek areas where the environmental conditions and existing public utilities support such development. West Springfield's existing zoning provides some incentives to guide development to the existing town center.

Development in Hazard Areas

Most hazards identified in this plan are regional risks, therefore, all new development falls into the hazard area. The exception to this is flooding. According to the Community Information System (CIS) of FEMA, there were 9 residential structures and 11 other structures located within the Special Flood Hazard Area (SFHA) in West Springfield as of August 2005, the most current records in the CIS for the Town of West Springfield.

3: HAZARD IDENTIFICATION & ANALYSIS

Profiling the Natural Hazards

Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to identify and profile the natural hazards which are most likely to have an impact on West Springfield.

Each of these hazards was assessed by the Committee for location of occurrence, extent, previous occurrences, and probability of future events. (See Appendix C for sources, methodology.) This resulted in a ranking of hazard, by risk, see Table 3.1. More detailed descriptions of each of the points of analysis are included in the Identification and Vulnerability Assessment (below).

Table 3.1: Hazard Profiling and Risk Index Worksheet						
Type of Hazard	Location	Extent	Previous Occurrences	Probability of Future Events	Hazard Risk Index Rating	
Flooding (100-year)	Large	Catastrophic	Yes	Very Low	5	
Flooding (localized)	Medium	Limited	Yes	Very High	1	
Severe Snow/Ice Storms	Large	Minor	Yes	Very High	5	
Hurricanes/Severe Wind	Medium	Limited	Yes	Low	3	
Tornado/Microburst	Small	Catastrophic	Yes	Low	3	
Wildfire/Brushfire	Medium	Limited	Yes	Low	3	
Earthquake	Large	Catastrophic	No	Very Low	5	
Dam Failure	Small	Minor	Yes	Low	4	
Drought	Small	Minor	No	Very Low	5	
Man-Made Hazard: Hazardous Materials	Large	Critical	Yes	Low	3	

Natural Hazard Identification and Vulnerability Assessment

The following is a description of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of West Springfield. The Past and Potential Hazards/Critical Facilities Map (Appendix D) reflects the contents of this analysis.

Vulnerability Assessment Methodology

In order to determine estimated losses due to natural hazards in West Springfield, each hazard area was analyzed with results shown below. The data below was calculated using FEMA's Understanding Your Risks: Identifying Hazards and Estimating Losses, August 2001.

Total value of all structures in West Springfield (2006): \$2,378,826,854

Median value of a home in West Springfield (2006): \$189,950

Average household size: 2.4 persons

Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The damage calculations are rough estimate and likely reflect worst-case scenarios. Computing more detailed damage assessment based on assessor's records is a labor-intensive task and beyond the scope of this project.

Flooding

The average annual precipitation for West Springfield and surrounding areas in northwestern Massachusetts is 46 inches. There are three major types of storms that bring precipitation to West Springfield. Continental storms that originate from the west continually move across the region. These storms are typically low-pressure systems that may be slow-moving frontal systems or more intense, fast-moving storms. Precipitation from coastal storms, also known as nor'easters, that travel into New England from the south constitute the second major storm type. In the late summer or early fall, the most severe type of these coastal storms, hurricanes, may reach Massachusetts and result in significant amounts of rainfall. The third type of storm is the result of local convective action. Thunderstorms that form on warm, humid summer days can cause locally significant rainfall.

Floods can be classified as either *flash floods*, which are the product of heavy, localized precipitation in a short time period over a given location or *general floods*, which are caused by precipitation over a longer time period in a particular river basin. There are several local factors that determine the severity of a flooding event, including: stream and river basin topography, precipitation and weather patterns, recent soil moisture

conditions, amount of impervious surface area, and the degree of vegetative clearing. Furthermore, flooding can be influenced by larger, global climate events. Global warming and climate change have the potential to shift current rainfall and storm patterns. Increased precipitation is a realistic result of global warming, and could potentially increase the frequency and intensity of flooding in the region. Currently, floods are one of the most frequent and costly natural hazards in the United States.

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).

In contrast, general flooding events may last for several days. 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).

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

The Floodplain Map for the Town of West Springfield shows the 100-year and 500-year flood zones identified by FEMA flood maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. Likewise, the 500-year flood has a 0.2 percent chance of occurring in any given year. In West Springfield, there are several floodplain areas – primarily along the Connecticut and Westfield Rivers and Block, Paucatuck, Piper, and Golddine Brooks. There are some smaller 500-year floodplains mapped as well, many associated with the above named water bodies but also in several low-lying areas throughout West Springfield.

The major floods recorded in Western Massachusetts during the 20th century have been

the result of rainfall alone or rainfall combined with snowmelt. West Springfield has experienced many flooding events over the last decade. Generally, these small floods have had minor impacts, temporarily impacting roads and residents' yards. The one major flood event on record was the flood of March 1936. Direct accounts of the extent of the flooding in West Springfield do not seem to exist, however there is extensive documentation of the flooding in neighboring Springfield and therefore flooding West Springfield can be extrapolated from that information.

An unusually cold and snowy winter, followed by a spell of warm and rainy weather, turned the normal spring rising of the Connecticut River into an unprecedented natural catastrophe. The flood inundated Hadley, Hatfield, Northampton, Holyoke, and Springfield, as well as smaller towns (West Springfield was one) and villages along its course. In Massachusetts alone, the Great Flood killed ten people and left 50,000 homeless. It was an unmatched natural catastrophe for the Bay State, causing over \$200,000,000 in damage in 1936 dollars.

Flooding (100-year base flood): Low Risk

There are approximately 651 acres of land within the FEMA mapped 100-year floodplain and 548 acres of land within the 500-year floodplain within the Town of West Springfield. According to the Community Information System (CIS) of FEMA, there were 9 residential structures and 11 other structures located within the Special Flood Hazard Area (SFHA) in West Springfield as of August 2005, the most current records in the CIS for the Town of West Springfield. Therefore, a vulnerability assessment for a 100-year flood equals approximately \$1.7 million of damage to residential structures, with approximately 22 people impacted.

Specific vulnerability assessments were estimated for sites within the SFHA which have been susceptible to 100-year floods in the past, they are described below. At this time the Town of West Springfield has no repetitive loss properties as defined by FEMA's NFIP.

Location

Localized street Flooding does occur in low-lying areas of the town during rain and thaw events. There are extensive flood control structures in Town along the Connecticut and Westfield Rivers, which are frequently maintained and has been recently upgraded at select sites.

<u>Extent</u>

See information in Location section

Previous Occurrences

See information in Flood section

Probability of Future Events

There is a very low chance of localized flooding within the 100-year flood plain. West Springfield has a very up to date flood management system. The chance of a major flood in the 100-year flood plain is by definition 1% in any given year.

Flooding (localized) – High Risk

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, West Springfield often experiences minor flooding at isolated locations due to drainage problems, or problem culverts.

Most of the flood hazard areas listed here were identified due to known past occurrence in the respective area. 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 town tend to be impacted by beavers, so localized flooding can potentially occur at any culvert crossing.

To determine the vulnerability of the Town to localized flood events, the property within identified areas was visually analyzed using aerial photography (Pictometry), which allowed structures to be identified and tallied. Specific vulnerability assessments were estimated for sites which have been susceptible to localized flooding in the past, and are described below.

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There are approximately 651 acres of land within the FEMA mapped 100-year floodplain and 548 acres of land within the 500-year floodplain within the Town of West Springfield. According to the Community Information System (CIS) of FEMA, there were 9 residential structures and 11 other structures located within the Special Flood Hazard Area (SFHA) in West Springfield as of August 2005, the most current records in the CIS for the Town of West Springfield. Therefore, a vulnerability assessment for a 100-year flood equals approximately \$1.7 million of damage to residential structures, with approximately 22 people impacted.

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Location

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<u>Extent</u>

The extent of 100 year base flooding is very minor.

Previous Occurrences

During rain and thaw events minor street flooding does occur.

Probability of Future Events

There is a very low chance of localized flooding within the 100-year flood plain. West Springfield has a very up to date flood management system. The chance of a major flood in the 100-year flood plain is by definition 1% in any given year.

Flooding (localized) – High Risk

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, West Springfield often experiences minor flooding at isolated locations due to drainage problems, or problem culverts.

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Location

Front Street

<u>Extent</u>

An estimated 40 people are displaced when the apartment complex area floods

Previous Occurrences

This has occurred previously with severe rain events.

Probability of Future Events

There is a low probability of severe future localized flooding, but the probability of mild localized flooding is very high. There are a number of roads in low-lying areas that do get flooded in severe rain events. However, the flooding lasts only a short time and does not usually cause significant property damage or any physical harm or loss of life.

Severe Snow/Ice Storm – Low Risk

Severe winter storms can pose a significant risk to property and human life because the rain, freezing rain, ice, snow, cold temperatures and wind associated with these storms can disrupt utility service, phone service, and make roadways extremely hazardous. Severe winter storms can also be deceptive killers. The types of deaths that can occur as a result of a severe winter storm include: traffic accidents on icy or snow-covered roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold temperatures. Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt.

Power and telephone lines, trees, and telecommunications structures can be damaged by ice, wind, snow, and falling trees and tree limbs. Icy road conditions or roads blocked by fallen trees may make it difficult to respond promptly to medical emergencies or fires. Prolonged, extremely cold temperatures can also cause inadequately insulated potable water lines and fire sprinkler pipes to rupture and disrupt the delivery of drinking water and cause extensive property damage.

New England generally experiences at least one or two severe winter storms each year with varying degrees of severity. Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases. Severe winter storms typically occur during January and February; however, they can occur from late September through late April.

Location

Severe winter weather occurs regionally and therefore would impact the entire town, although several specific locations are more susceptible to damage. These problem areas have been described and assessed for vulnerability.

Piper Road (near High School)

Any severe winter weather incident can cause critical snow and ice hazards at several points along these streets in the northern portion of West Springfield. This is due to significant grade and a dangerous turns, causing driving difficulties and impairing visibility.

<u>Bernie Avenue</u>

Severe winter weather incidents of icing can cause critical ice hazards where Bernie Avenue travels under the I-90 highway overpass in the northern portion of West Springfield. This is due to ice build up along the road and along I-90, causing driving difficulties.

Route 20

Any severe winter weather incident can cause critical snow and ice hazards at several points along Route 20 in West Springfield. This is due to significant grade changes and dips in the road, causing driving difficulties and icing on the road.

<u>Kings Highway</u>

Any severe winter weather incident can cause critical snow and ice hazards at several points along Kings Highway in West Springfield. This is due to significant grade changes and dips in the road, causing driving difficulties and icing on the road.

<u>Brush Hill Road</u>

Any severe winter weather incident can cause critical ice hazards over the I-90 overpass along Brush Hill Road in West Springfield. This is due to significant grade and a dangerous turns, causing driving difficulties and impairing visibility.

Snow Drift Areas

Lower Dewey Road

Any severe winter weather incident can cause critical snow and ice hazards at several points along Lower Dewey Road in the northern portion of West Springfield. This is due to significant grade and a dangerous turns, causing snow drifts, driving difficulties and impairing visibility.

<u>Extent</u>

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 factor in the area affected by the snowstorm, the snow, and the number of people living in the path of the storm. The NESIS score 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.

Previous Occurrences

West Springfield's recent history has not recorded any loss of life due to the extreme winter weather, but there are usually several incidents of property damage or personal injury each winter. These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

- West Springfield has been subject to 22 winter storms categorized as major to extreme according to the NESIS scale since 1960. Additional historically significant winter storms to affect West Springfield include the Great Snow of 1717 and the Blizzard of 1888
- Moderate risk town wide due to snow, ice and extreme cold.
- Elderly are affected by extreme weather.

Probability of Future Events

Based on the NESIS scale, West Springfield is at risk of a major to extreme winter storm in any given year is slightly less than 50 percent.

Hurricanes/Severe Wind – Low Risk

Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour, and 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. Severe wind can also occur in the absence of a hurricane, especially impacting mountain tops. Global warming will increase the threat of hurricanes and severe wind as oceans and the atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future.

Location

All of West Springfield is at risk from hurricanes with ridgetops more susceptible to wind damage and the flood-prone portions of town to flooding from the heavy rains.

Several locations which have been susceptible to wind or hurricane damage are described below:

Vulnerable Locations

The higher elevations near the tops of hills and ridges throughout West Springfield precipitate severe wind incidents, especially during severe thunderstorms, hurricanes, or blizzards. However, no damages have been reported.

<u>Extent</u>

West Springfield'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. During hurricanes or severe wind events, the Town has experienced small blocks of downed timber and uprooting of trees onto structures and parked vehicles.

- Estimated wind damage: 5% of the structures with 10% damage, \$11,894,134;
- Estimated flood damage: 10% of the structures with 20% damage, \$47,576,537;
- Vulnerability assessment for a hurricane event (both wind and flood damages): \$59,470,671;
- Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included.

Previous Occurrences

In Massachusetts, sixteen major hurricanes have had landfall since 1851, two of which affected Western Massachusetts. These include: Hurricane Carol in 1954 and Hurricane Gloria in 1985. Hurricanes are usually ranked category 1-5, using the Saffir-Simpson Scale, with category 5 hurricanes being the most severe. Both Hurricane Carol and Gloria were category 1-2 storms, meaning winds ranged from 74-110 mph with the potential for some roofing or window damage to buildings, damage to unanchored

mobile homes, trees, or poor construction, and/or some minor flooding. Additional hurricanes (No-name hurricane- 1938, The Great Atlantic Hurricane-1944, Donna-1960, Gloria- 1985, and Bob-1991), hurricane remnants (Floyd- 1999) and other storms with high winds (Groundhog Day Gale- 1976), affect West Springfield with some regularity.

Table 3-2 Major Non-Winter Storms to Affect WestSpringfield Area					
Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)			
Great Hurricane of 1938	1938	Unclear, 3 or 4			
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			

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of major hurricanes in West Springfield (once every fifty years is less than a one percent chance of any such storm occurring in a given year) while the possibility of a less severe hurricane or tropical storm affecting West Springfield in any given year is approximately 10 percent.

Tornadoes/Microbursts – Moderate Risk

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 Hampshire County.

Of additional concern are microbursts, which often do tornado-like damage and can be mistaken for tornadoes. In contrast to the upward rush of air in a tornado, air blasts rapidly downward from thunderstorms to create microbursts. Microbursts and tornadoes are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of climate change from global warming.

Location

The hazard area for tornadoes in West Springfield varies according to the intensity and size of the tornado. There have not been enough tornadoes in West Springfield to accurately predict sections of town that are more likely to experience a tornado.

<u>Extent</u>

Because tornadoes and microbursts rarely occur in this part of the country, assessing damages is difficult. Furthermore, buildings have not been built to Zone 2, Design Wind Speed Codes. The entire Town of West Springfield is vulnerable.

- Tornadoes/microburst hazard estimates 20% damage to 10% of structures in Town;
- Vulnerability assessment estimates in damages; \$47,576,537;
- Estimated cost does not include building contents, land values or damages to utilities.

Previous Occurrences

According to the Commonwealth of Massachusetts records, no known tornados have touched down in West Springfield. However, local knowledge reports tornado-like conditions in September, 1978 and October 1985.

In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath directly over West Springfield, known as "tornado alley." Fifteen incidents of tornado activity (all F2¹ or less) occurred in Hampden County between 1959 and 2005.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of tornadoes in West Springfield.

Wildfires/Brushfire – Low Risk

According to FEMA, there are three different classes of wildland fires: surface fires, ground fires and crown fires. The most common type of wildland fire is a surface fire that burns slowly along the floor of a forest, killing or damaging trees. A ground fire burns on or below the forest floor and is usually started by lightening. Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions. While wildfires or brushfires have not been a significant problem in West Springfield, there is always a possibility that changing land use patterns and weather conditions will increase a community's vulnerability. For example, drought conditions can make forests and other open, vegetated areas more vulnerable to ignition. Once the fire starts, it will burn hotter and be harder to extinguish. Soils and root systems starved for moisture are also vulnerable to fire. Residential growth in rural,

¹ F2 refers to the commonly used Fujita Tornado Damage Scale which ranks tornados F0-F5 depending on estimated wind speeds and damages, with F5 the most severe.

forested areas increases the total area that is vulnerable to fire and places homes and neighborhoods closer to areas where wildfires are more likely to occur. Global climate changes may also influence precipitation patterns, making the region more susceptible to drought and therefore, wildfires.

Hampden County has approximately 273,000 acres of forested land, which accounts for 67% of total land area. Forest fires are therefore a potentially significant issue. In West Springfield, approximately 37% of the town's total land area is in forest, or about 4,137 acres, and is therefore at risk of fire.

Location

According to the Hazard Mitigation Planning committee, West Springfield has experienced wildfires in Bear Hole and in Mittineague Park, but these fire events did not meet the State definition of a wildfire.

<u>Extent</u>

The West Springfield Fire Department responds to house fires and the few "wildfires" that occur. Moderate risk exists for potential wildfire incidents, especially near some of the town's forested, agricultural, and recreational lands. Forested and agricultural areas with high fuel content have more potential to burn. In addition, it is often very difficult to access some of the locations to extinguish brush fires.

- Up to 100 structures could be impacted by a wildfire in one of the Town's rural areas;
- Assuming 100% damage to 100% of the structures, not including costs repairing or replacing any power lines, telephone lines, and contents of structures;
- Vulnerability assessment estimates approximately \$18,995,000 in damages for a wildfire.

Previous Occurrences

There is no record, authenticated or anecdotal, of wildfires in West Springfield.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low probability of wildfires in West Springfield.

Earthquakes –Low Risk

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. 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. 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.

Location

In the event of an earthquake, all of West Springfield would be affected with some portions more impacted than others, depending on the magnitude of the earthquake and the underlying population density.

<u>Extent</u>

Massachusetts introduced earthquake design requirements into their building code in 1975. 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 1975 may not have been designed to withstand the forces of an earthquake. The seismic standards have also been upgraded in 2009, with the 7th edition of the State Building Code.

- Moderate potential for serious damage in downtown West Springfield;
- Structures are mostly wood frame construction, so loss estimates predict 20% of town assessed value, not including Costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures;
- Vulnerability assessment estimates approximately \$475,765,371.

Previous Occurrences

Nineteen earthquakes, intensity V (Modified Mercalli scale) or greater, have centered in Massachusetts since it was colonized by Europeans. A shock in 1755 reached intensity VIII at Boston and was felt across the State. In addition, Massachusetts was affected by some of the more severe Canadian shocks plus the earthquake of 1929 that centered on Grand Banks of Newfoundland.

Strong earthquakes in the St. Lawrence Valley in 1638, 1661, 1663, and 1732 were felt in Massachusetts. The 1638 and 1663 shocks damaged chimneys at Plymouth, Salem, and Lynn. On June 11, 1643, Newbury, Massachusetts, was strongly shaken. Again in <u>1727</u> (November 9) an earthquake described as "tremendous" in one report and "violent" in another caused much damage at Newbury. The shock was felt from the Keenebec River to the Delaware River and from ships at sea to the extreme western settlements. Several strong aftershocks were reported from the area through February 1728.

A complete list of earthquakes affecting New England can be found in Table 3-3. None have been noted to cause any damage in West Springfield or the surrounding area.

Table 3.2: New England Earthquakes (1924-2002) ² magnitude 4.2 or higher				
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		

Table 3.3: New England States Record of Earthquakes ²				
State	Years of Record	Number of Earthquakes		
Connecticut	1568 - 1989	137		
Maine	1766 - 1989	391		
Massachusetts	1627 - 1989	316		
New Hampshire	1728 - 1989	270		
Rhode Island	1766 - 1989	32		
Vermont	1843 - 1989	69		
New York	1737 - 1985	24		
Total Earthquakes in New England (1568-1989)		1,239		

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of major earthquakes in West Springfield (there have been no earthquakes over 4.2 on the Richter scale in nearly 100 years) while the possibility of a less severe earthquake or tropical storm affecting West Springfield in any given year is slightly less than 1 percent but these are unlikely to cause any significant damage.

² Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm

Dam Failure - Medium Low Risk

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

Many dams in Massachusetts were built in the 19th century without the benefit of modern engineering design and construction oversight. Dams can fail because of structural problems due to age and/or lack of proper maintenance. Dam failure can also be the result of structural damage caused by an earthquake or flooding brought on by severe storm events. Most earthen dam failures occur when floodwaters above overtop and erode the material components of the dam.

The Massachusetts Department of Conservation and Recreation (MA DCR) was the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). Until 2002, DCR was also responsible for conducting dam inspections but then state law was changed to place the responsibility and cost for inspections on the owners of the dams. This means that individual dam owners are now responsible for conducting inspections.

The state has four 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.
- Non-jurisdictional: The storage capacity of the impoundment and height of dam are such that they need not be regulated.

The inspection schedule for dams is as follows:

- Low Hazard dams 10 years
- Significant Hazard dams 5 years

• High Hazard dams – 2 years

The time intervals represent the maximum time between inspections. More frequent inspections may be performed at the discretion of the state. Dams and reservoirs licensed and subject to inspection by the Federal Energy Regulatory Commission (FERC) are excluded from the provisions of the state regulations provided that all FERC-approved periodic inspection reports are provided to the DCR. All other dams are subject to the regulations unless exempted in writing by DCR.

Location

According to DCR sources, as well as local knowledge, there are currently six dams in West Springfield. The follow table identifies the dams within the town as well as whether they are classified as low, significant, or high hazard.

Table 3.5: Dams in West Springfield						
Dam name/	ID	Owner	Purpose	Condition/last	Hazard Risk	
date built				inspected		
Bearhole		Town of West	Recreation/	Good/		
Reservoir	MA00073	Springfield	Flood Control	11-1-06	Significant	
Springfield						
Country Club		Springfield	Recreation/	Satisfactory/		
Dam- 1955	MA00612	Country Club	Flood Control	11-27-06	Significant	
DSI						
Dam(formerly						
Strathmore						
Paper			Hydroelectric			
Company		Fibermark DSL,	Power/Water			
Dam)	MA00611	Inc.	Supply	Poor/ 12-20-01	Significant	
Lyncosky Upper						
Pond Dam-				Unknown /	Non-	
Unknown	MA02695	Denis Breton	Unknown	Unknown	jurisdictional	
Lyncosky Lower						
Pond Dam-				Unknown /	Non-	
Unknown	MA02696	Denis Breton	Unknown	Unknown	jurisdictional	
Piper Reservoir						
Swimming Pool		Town of West		Unknown /	Non-	
Dam- Unknown	MA02697	Springfield	???	Unknown	jurisdictional	

Note: DCR has conflicting records of whether the DSI Dam (formerly Strathmore Paper Company Dam) is within West Springfield or neighboring Agawam. For the purposes of this plan, the committee decided to keep this dam within the analysis.

<u>Extent</u>

A vulnerability assessment was done for the inundation area below the three significant risks, Bearhole Reservoir, Springfield Country Club Dam, and DSI Dam.

• 20 homes located in the inundation zones;

- Assumes 100% damage to 100% of the structures, but does not include costs of repairing or replacing the road, or any power or telephone lines, or the contents of structures;
- Vulnerability assessment estimates \$13,799,000 in damages;

Previous Occurrences

West Springfield has no history of any dam failures, during recorded time.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low probability of dam failure in West Springfield.

Drought –Low Risk

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector.

Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

Location

A drought would affect all of West Springfield.

<u>Extent</u>

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

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. Even so, there have been several years of drought-like conditions in Western Massachusetts: 1940-1952, 1980-1983, and 1995-2001. Furthermore, global warming and climate change may have an effect on drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts. Additionally, even minor droughts will increase the risk of wildfire, especially in areas of high recreational use.

Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930. They range in severity and length, from three to eight years. In many of these droughts, water-supply

systems were found to be inadequate. Water was piped in to urban areas, and watersupply systems were modified to permit withdrawals at lower water levels.

West Springfield has had limited experience with severe drought conditions. The town has not experienced a threat to its water supply, and doesn't anticipate any severe water shortages. The town is generally well below its approved withdrawal rate, however, withdrawals in July and August often come close to the approved withdrawal rate. The Town does maintain connections to the City of Springfield's system for summer withdrawals.

Probability of Future Occurrences

Based upon the past events, it is reasonable to say that there is a low probability of drought in West Springfield.

Man-Made Hazards – Hazardous Materials – Low Risk

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes and businesses routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

The Toxics Release Inventory (TRI), a publicly available EPA database that contains information on specific toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities.

Location

According to TRI, there are thirteen (13) industries currently releasing hazardous materials within West Springfield's town limits. Of these thirteen sites, six are considered Tier II Hazardous Materials storage facilities. These six, along with seven additional Tier II sites, also total thirteen (13) Tier II Haz-Mat storage sites, all of which are included on the Past & Potential Hazards/Critical Facilities Map (Appendix D).

In addition, varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores. These hazardous materials are transported regularly over our highways and by rail and if released can spread quickly to any community. Incidents can occur at any time without warning. Human error is the probable cause of most transportation incidents and associated consequences involving the release of hazardous materials.

West Springfield relies on Chicopee's HazMat team] for responding to incidents involving hazardous materials through a mutual aid agreement. There is a history of

major accidents involving some sort of oil or chemical spill. Transportation of chemicals and bio-hazardous materials by vehicle transport on I-90, I-91, Route 5, Route 20, Route 147, side streets and the CSX Rail Road is a concern. Small areas of hazardous materials storage increase the potential for future incidents. Areas of concern include I-90, Route 91, Route 5, Route 20, routes 147, and the railroad planned intermodal center and surrounding side streets.

<u>Extent</u>

The extent of hazardous chemical release is not predictable as it is dependent on the location including whether it is from a stationary or moving source, amount and type of chemical released, and weather conditions at the time of the release, but given the range of chemicals present Tier II storage sites in West Springfield as well as the large number of trains carrying hazardous chemicals that move through the city, the extent could range from limited to critical.

Previous Occurrences

Available data dating from 1998-2003 shows an average of 14 releases of hazardous materials (total) from these sites per year and there has been no property damage or loss of life associated with these releases.

Probability of Future Events

Given available data there are likely to be about 14 releases of hazardous chemicals each year, however the likelihood of a catastrophic release is low.

4: CRITICAL FACILITIES

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 the community.
- Would create a secondary disaster if a hazard were to impact it.

Critical Facilities within Hazard Areas

Hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding. There are several critical facilities that fall within the 100-year floodplain as shown in the table at the end of this section.

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

- The first category contains facilities needed for Emergency Response in the event of a disaster.
- The second category contains Non-Emergency Response Facilities that have been identified by the Committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of West Springfield.
- The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster.
- The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster.

The critical facilities and evacuation routes potentially affected by hazard areas are identified in Table 4-1, following this list. The Past and Potential Hazards/Critical Facilities Map (Appendix D) identifies these facilities.

Category 1 – Emergency Response Services

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

 Emergency Operations Center Primary: City Municipal Office Building- 26 Central St. Secondary: Main Fire Station- 44 Van Deene Ave.

- Fire Station
 West Springfield Fire Department 44 Van Deene Ave.
- Police Station
 West Springfield Police Department 26 Central Street

 Merrick Sub-station 767 Main Street
- 4) Department of Public Works Department of Public Works – 403 Westfield Street
- 5) Emergency Fuel Stations Highway Department
- 6) Emergency Electrical Power Facility Town Office - emergency generator to serve EOC and main computers in Police Departments and 3 portable generators

7) Emergency Shelters

West Springfield MiddleSchool- 31 Middle School Dr West Springfield Senior High School- 425 Piper Road St Thomas The Apostle Church- 75 Pine Street Eastern States Exposition- Memorial Ave. Fausey School- 784 Amostown Road. Tatham School- 61 Laurel Road John Ashley School- 88 Massasoit Ave. Memorial Avenue School- 201 Norman Street Mitt Congregational Church1- 1840 Westfield Street West Springfield Senior Center- 128 Park Ave. The Colburn School- 115 Southworth Street *Shelters also have generators.

8) Water Sources

Numerous locations in West Springfield, any available. Eastern States exposition Senior High School Reservoir-Amestown Road, Block Brook

9) Transfer Station

On Past & Potential Hazards/Critical Facilities Map – Agawam Avenue.

- 10) Helicopter Landing Sites
 - School parking lot

(Permitted anywhere feasible.)

11) Communications

cell/radio towers throughout town – see Past & Potential Hazards/Critical Facilities Map.

Interstate drive Bridge Street Westfield Road Prospect Avenue

12) Primary Evacuation Routes Route 90 Route 5 Route 20 Route 91 Route 147 Piper Road / Bernie Ave

13) Bridges/Culverts Located on Evacuation Routes Bridges

Evacuation Route	<u>Crosses</u>	<u>Owner</u>	<u>Year Built</u>	<u>Year Rebuilt</u>
Route 20 (Westfield Street)	Railroad	Mass Highway	1925	1981
		Mass Turnpike		
Route 90 (Eastbound)	Access Ramp	Authority	1957	1993
		Mass Turnpike		
Route 90 (Westbound)	Access Ramp	Authority	1957	1993
Route 147 (Memorial Avenue)	Route 5	Mass Highway	1953	NA
Route 147 (Memorial Avenue)	Route 5	Mass Highway	1955	NA
Route 20 (Park Ave Rotary)	Route 5	Mass Highway	1952	NA
		Mass Turnpike		
Route 90 (Eastbound)	Morgan Road	Authority	1957	1994
		Mass Turnpike		
Route 90 (Westbound)	Morgan Road	Authority	1957	1994
		Mass Turnpike		
Route 90	Lane Quarry Road	Authority	1957	NA
		Mass Turnpike	4057	1000
Route 90 (Eastbound)	Route 5	Authority	1957	1982
Ramp to Routes 90 & 91	Route 5	Mass Highway	1953	1997
Route 91 (Northbound)	Route 90	Mass Highway	1967	NA
Route 91 (Southbound)	Route 90	Mass Highway	1967	NA
Route 91 (Northbound)	Prospect Avenue	Mass Highway	1967	NA
Route 91 (Southbound)	Prospect Avenue	Mass Highway	1967	NA
Route 90 & 91 Connector	Prospect Avenue	Mass Highway	1968	NA
Route 90 & 91 Connector	Ramp to Route 90	Mass Highway	1968	NA
Route 91	East Loop	Mass Highway	1966	NA
Route 91	West Loop	Mass Highway	1966	NA
Route 91	Route 5	Mass Highway	1966	NA
		Mass Turnpike		
Route 90 (Eastbound)	Railroad	Authority	1957	1994
Route 90 (Westbound)	Railroad	Mass Turnpike	1957	1994

Authority

Category 2 – Non Emergency Response Facilities

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

1) Problem Culverts

Amostown and Piper Road – where an undersized culvert crosses the road 100 Bernie Ave – where an undersized culvert crosses the road

2) Water Supply

Town reservoir Southwick wellfield-transmission line is under-sized Springfield cross connection for backup

Category 3 - Facilities/Populations to Protect

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

- 1) Special Needs Population Cowey School – 1Park and Elm Streets
- 2) Elderly Housing/Assisted Living LeLang Terrace Oxford Place Grove Street Village Main Street Monastry Heights Prospect Ave Nursing Home
- Public Buildings/Areas Senior Center – 128 Park Street Mitteneague Park Eastern States Exposition Grounds Storrowtown Village
- 4) Schools

John Ashley School (Kindergarten)- 88 Massasoit Ave. Cowing School Early Childhood Center- 160 Park Street Coburn Elementary School- 115 Southworth Street Fausey Elementary School- 784 Amostown Road Memorial Elementary School- 201 Norman Street Mittineague Elementary School- Second Street Tatham Elementary School- 61 Laurel Road West Springfield Middle School- 31 Middle School Drive West Springfield High School- 425 Piper Road Make Way for Ducklings Nursery School- 20 Lathrop Street St. Thomas School- 75 Pine Street Grace Nursery School- 1552 Westfield Street Springfield Day Nursery School- 373 Park Street Mitteneague United Methodist Preschool- 800 Amostown Road Montessori-American-Children's House of West Springfield- 118 Riverdale Street Trinity Nursery School & Kindergarten- 361 Sumner Avenue The Growing Tree Learning Center- 451 Russell Road West Springfield Area Headstart- 511 Main Street

Day Care	<u>Capacity</u>
Mendez, Melanie Sue- 56 Burford Avenue	5
Messer, Kathryn S 208 City View Ave.	8
Mittineague Methodist Community Preschool- 800 Amostown Road	76
Mittineague's Children Center- 1840 Westfield St.	39
Moran, Marianne- 42 Sheridan Ave.	8
Nielsen, Davida L 550 Amostown Road	6
Orlandi, Gail F 145 Pease Avenue	9
Parkin, Ellen M 105 Morton Street	8
Reyes, Maria- 48 George St.	6
Robert, Michele L 39 Glenview Drive	6
Rogers, Sylvia L 421 Gooseberry Rd	8
Roy, Linda E 62 Bretton Rd.	6
Sanabria, Rosa A 394 Morgan Road	8
St. Onge, Debra- 70 Chilson Road	6
Stowell, Regina A 98 Mt. Pleasant Ave.	5
Sullivan, John Timothy- 113 Butternut Hollow Road	8
The Kids' Place- 915 Memorial Avenue	96
Thomas, Wanda- 256 Valley View Circle	6
After School Program of West Springfield- 615 Main Street	26
Alevras, Kathleen A 1790 Westfield Street	6
Argiro, Cindy K 212 Kings Highway	6
Burgen, Heather- 44 Lenny's Way	6
Buteau, Diana M 92 Garden Street	8
Champiney, Dena M 181 Hillcrest Avenue	7
Corley, Jennifer L 208 Sibley Ave	5
Crowell, Rhoda P 433 Brush Hill Avenue	5
Dirienzo, Cara- 43 Warren St.	5
Dombkowski, Susan- 103 Beverly Hills Lower	6
Eickelberg, Leslie- 320 Poplar Ave.	6
Feliciano, Iris- 78 George St.	7
Fernandez, Carmen Maria - 25 Allen St., 2nd floor	6
Florence, Kathleen- 254 Greystone Avenue	5
Forney, Patricia A- 116 Silver St.	8
French, Colleen P 52 Janet St.	4
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Gonzalez, Celines 70 Irving St.	3
Grace Nursery School- 1552 Westfield Street	36
Guiel-Ashe, Laurie A 396 Morton Street	8
Howard, Christine- 86 Woodmont St.	5
Ivers, Dana Lynn- 104 Forest Glen	5
Kreuzer, Sharon- 47 Warren St.	5
Lynch, Joyce O 135 Warren Street	6
Maloney, Carol Ann - 22 Southworth Street	7
Maltsev, Olga- 304 City View Ave.	6
Marquez, Jessica C 129 Field Street	7
Maslanka, Kelly- 79 Ely Ave.	5
McElligott, Cathleen- 12 Kerry Lane	8

5) Churches

Bible Baptist Church – 575 Morgan Road Church of Christ- 61 Upper Church Street Emmanuel Baptist Church- 38 Front Street Grace Lutheran Church- 1552 Westfield Street Mitteneague Congregational Church- 1840 Westfield Street Slavic Pentecostal Church- 22 Pleasant Street Holy Ghost Temple Church- 30 Massasoit Avenue Mitteneague United Methodist Church- 800 Amostown Road First United Methodist Church- 802 Main Street First Baptist Church- 337 Piper Road Russian Pentecostal Church Hope- 407 Park Street St. Nicholas Orthodox Church- 23 Southworth Street Immaculate Conception Parish Center- 475 Main Street West Springfield Covenant Community Church- 112 Amostown Road First Congregational Church of West Springfield- 20 Lathrop Street Church of the Good Shepherd- 214 Elm Street Victory Temple Church of God in Christ- 521 Union Street Bethesda House of Grace- 440 Main Street Gospel Hall- 48 Garden Street El Amanecer de la Esperanza-27 Sylvan Street

6) Historic Buildings/Sites

St. Thomas Cemetery- 47 Pine Street Beth Israel Cemetery Paucatuck Cemetery Ashley Cemetery Joshua Day House - Park Ave Cemeteries on Past & Potential Hazards/Critical Facilities Map.

 Apartment Complexes (more than 8 units) Courtyard Apartments- 1139 Westfield Street Deville Apartments- 1149 Elm Street Arms Apartments- 31 Mercury Court Ashley Arms Apartments- 131 Ashley Avenue Toll House Apartments- 2034 Riverdale Street Bradford Arms Apartments- 55 Craig Drive Colonial House Apartments- 55 Craig Drive Park Street Manor- 370 Park Street Van Deene Manor- 61 Van Deene Avenue

8) Employment Centers (>100 Employees) Riverdale Shops Brightside-Families & Child- 2112 Riverdale St ITT Power Solutions- 11 Interstate Dr Interim Healthcare- 442 Westfield St # 1 American Ingenuity Inc-96 Windsor St Home Depot- 179 Daggett Dr Stop & Shop Supermarket- 935 Riverdale St # A1 Cyalume Technologies Inc-96 Windsor St Wingate at West Springfield- 42 Prospect Ave Western Massachusetts Electric-Liberty Security Svc- 1111 Elm St # 32b Sullivan Paper Co Inc- 42 Progress Ave Kohl's Department Store- 935 Riverdale St Landmark at Monastery Heights- 110 Monastery Ave West Springfield High School- 425 Piper Rd Chili's Grill & Bar 1175 Riverdale St Grinspoon Real Estate- 380 Union St # 300 West Springfield Auto Parts- 945 Main St Plastic Packaging Corp-1227 Union St Best Western-West Springfield- 1080 Riverdale St Brightside Campus School- 2112 Riverdale St Long Horn Steakhouse- 1105 Riverdale St Mc Clelland Health Systems- 85 Interstate Dr United Mutual Holding Co- 95 Elm St West Springfield City GIS- 26 Central St

Category 4 – Potential Resources

Contains facilities that provide potential resources for services or supplies.

1) Food/Water

Costco- 119 Daggett Drive Stop & Shop- 935 Riverdale Street Big Y- 503 Memorial Drive Park Street Convenience Store- 54 Park Street Price Rite Grocery – Union Street Extention Convenience Mart- 7 Chester Street Country Store- 1022 Amostown Road Stop and Save- 83 Riverdale Street West Springfield Foodmart- 2260 Westfield Street Parus- 766 Main Street F.L. Roberts Inc & Co.- 518 Memorial Avenue Corner Pantry- 723 Main Street Union Mart- 470 Main Street Dairy Mart- 50 Morgan Road

2) Hospitals/Medical Supplies

Healthsouth Spine & Work Start Center- 71 Park Avenue Costco – 119 Dwight Street CVS- Century Plaza, Memorial Avenue CVS- 152 Elm Street Rite Aid- 99 Westfield Street Western Mass Compunding Center- 138 Memorial Avenue Stop & Shop Pharmacy- 935 Riverdale Street Big Y (?)- 503 Memorial Drive Wheelchair Depot- 315 Main Street

- 3) Gas/Heating Oil/Propane
 - <u>Gasoline</u>

Matta Borthers Service Station- 173 Elm Street Merit Oil Corporation- 341 Memorial Avenue BP Gasoline (F.L. Roberts Inc & Co.)- 518 Memorial Avenue West Springfield Self Service- 562 Westfield Street West Springfield Street Sunoco- 735 Westfield Street Sunaco (FI Roberts)- 928 Riverdale Street Cumberland Farms- 977 Main Street Paul Clark's Gulf-Union Park Ave.

<u>Heating Oil</u> None—pick up in Springfield <u>Propane</u> Energy Usa Propane Inc- 1275 Union St

4) Building Materials Suppliers

Capital Insulation Company- 103 Wayside Avenue Sanford & Hawley- 253 Baldwin Street 84 Lumber Co.- 38 Monterey Drive Anderson & Raymond Supply-622 Union Street W.J. Foss Industry Supply- 380 Union Street Home Depot- 179 Daggett Drive Crown Home Gutters- 76 Merrick Street Tri-County Contractors Supply- 153 Wayside Avenue Herrington's Showplace- 103 Myron Street Pella Windows & Doors- 69 Ashley Avenue Nescor- 148 Doty Circle New England Sash- 1111 Elm Street

Universal Kitchen & Bath- 184 Wayside Avenue Competitive Kitchen Design- 6 Allston Avenue Engineered Surfaces LLC- 237 Western Avenue Northern Granite & Marble- 380 Union Street Valley Machine Knife Corporation-33 Wayside Avenue Wood Stock Mills- 266 Cold Spring Avenue Eastern Region Associates-Precision Door Service-Bath Crest of Western Mass-Arena's Fencing- 168 Windsor Street A Jack Moore Associates- 151 Wayside Avenue Atlantic Fasteners Co- 49 Heywood Avenue Connecticut Valley Block- 55 Circuit Avenue Cortina Tile & Marble- 1645 Riverdale Street Interstate Products- 28 Bosworth Street Prime Drilling & Sawing Associates- 151 Wayside Avenue New England Lumber Specialties- 202 Day Street New England Door Closer- 694 Union Street J&P Glass & Mirrors- 15 Bosworth Cook Builders Supply- 210 Agawam Avenue

5) Heavy & Small Equipment Suppliers Nutmeg International, Van Deene and Park Ave. Bart Truck, River Street Mack Truck, Ashley Ave. New England Bob cat, Wayside Ave. Tri County, Wayside Ave.

Table 4.1:	Table 4.1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas				
Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected		
Flooding (localized)	Rail underpass-Union/River St.	N/A	Rte 5 South		
	Westfield ST./Little Georges	N/A	Rte 20		
Severe Snow/Ice Storm	Interstate Dr.	Access to radio tower and water tower	Birnie Ave. exit N.		
	Birnie Ave.				
	Rte 20		Rte 20		
	Piper Ave.		Piper Rd.		
Hurricane/Severe Wind					
Wildfire/Brushfire					
Earthquake					
Dam Failure	Reservoir		RRX @ Rte 5		
Drought					
Hazardous Materials					

(Past & Potential Hazards/Critical Facilities Map Located In Appendix D)

5: MITIGATION STRATEGIES

One of the steps of this Natural Hazard Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection. Once these gaps in protection are identified, future mitigation strategies can be crafted and recommended. This is done by evaluating existing and future measures in comparison to the Town's goal statement for natural hazard mitigation.

Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to natural disasters. To provide adequate shelter, water, food and basic first aid to displaced residents in the event of a natural disaster and to provide adequate notification and information regarding evacuation procedures, etc., to residents in the event of a natural disaster.

For the extent of this analysis, the Committee reviewed the following Town documents:

- Zoning Ordinance
- Rules and Regulations Governing the Subdivision of Land
- West Springfield Community Development Plan
- West Springfield Master Plan 2009
- West Springfield Open Space and Recreation Plan
- CEM Plan
- Other relevant Ordinances as identified (Code, etc.)

This section of the plan serves to identify current mitigation strategies and recommend future mitigation strategies. This is done both generally, and by hazard type.

General Mitigation Measures

Several of the recommended mitigation measures have multiple benefits because, if implemented, they will mitigate or prevent damages from more than one type of natural hazard. These do not fall under one hazard type, but could be put into place for facilitation of better natural hazard protection generally. West Springfield is well situated to address hazards and does not add any general mitigation need to measures.

What's the CEM Plan?

existing An important general preparedness and response tool is West Springfield's Comprehensive Emergency Management Plan (CEM Although the CEM Plan is Plan). focused on the procedural response to emergency, it organizes an includes supply and information, information inventories, and outlines detailed increasing steps for

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways.

Current Mitigation Measures

The Town currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the Town's zoning ordinances, subdivision regulations, as well as a proposed stormwater management bylaw. Relevant goals are included in the adopted Open Space and Recreation Plan. Infrastructure like dams and culverts are in place to manage the flow of water. These current mitigation strategies are outlined in the following table.

	Table 5-1: Existing Flood Hazard Mitigation Measures				
E	xisting Strategy	Description	Effectiveness	Potential Changes	
Flood Control Structures		Six dams and numerous levees.	Extremely effective.	Ensure dam owners realize their responsibility to inspect the dams.	
Culvert Replacement		Priority list of necessary culvert replacements and other construction projects to effectively manage flooding.	Very effective for managing flood control needs.	Seek funding from HMGP for top- priority projects.	
	Floodplain District	Areas delineated as part of the 100-year floodplain are protected by strict use regulations.	Very effective for preventing incompatible development within the flood prone areas.		
g Ordinances	Floodway District	Areas delineated as the channel of a watercourse and the adjacent land areas are reserved to discharge the base flood without cumulatively increasing the water surface elevation.	Very effective.		
Zoning	Upland Flood Areas	Overlay district to manage areas delineated as affected by base floods, but not within the Connecticut or Westfield Rivers.	Effective		
	River Protection District	Overlay district encompassing riverbanks out to 300 feet of Connecticut and Westfield Rivers.	Effective		

	Water Supply Protection District	Overlay district to protect groundwater resources by regulating certain uses, drainage, and performance guarantees.	Very effective for preventing groundwater contamination and for controlling stormwater runoff.	
	Special Use Districts/ Planned Unit Development District	These districts encourage the flexible, orderly and rational development of larger parcels of land, i.e. five acres or more. Allow for preservation of environmental features.	Effective	
	Drainage	For residential lots, all impervious surface run-off must be recharged on site.	Effective	
	Alteration and Relocation of Streams	No river or stream shall be altered or relocated in such a way as to reduce its carrying capacity for flood waters.	Effective	
	Cluster Development	Provides regulations for cluster subdivision development by special permit. Allows protection of contiguous open space.	Somewhat effective for minimizing impervious surface, allowing for more groundwater infiltration.	
	Common Driveway	Provides for minor development without additional roads thereby lessening environmental impact.	Effective for minimizing impervious surface, allowing more groundwater infiltration.	
	Special Permit Approval	Proposed use must not impact the land, surface water and subsurface water, and their ability to sustain such use without degradation.	Somewhat effective.	Consider performance based evaluation.
	Site Plan Approval	Proposed uses must meet requirements for drainage and preventing erosion and pollution to waterbodies.	Somewhat effective for preventing incompatible development.	
ivision	Preliminary and Definitive Plans	Plans must include significant natural features.	Somewhat effective for protecting sensitive lands including natural flood retention areas.	
Subdi	A Plan for More than one Building for Dwelling	Grading Plan Erosion Control	Somewhat effective at preventing reduction of flood storage capacity.	

	Purposes per Lot	Suitability of Land Analysis		
	Design Standards	Protects significant natural features, specifically includes	Effective for preventing incompatible	
		100-yr floodplain.	development.	
	Sewerage	Includes details for	Effective.	
		drainage and surface water		
		run-off.		
Wes	st Springfield Open	Inventories natural features	Effective in identifying	Work to implement
Spa	ce and Recreation	and promotes natural	sensitive resource	relevant goals and
па	I	town including areas in the	floodplains	
		floodplain; such as wetlands,	Encourages forest,	
		groundwater recharge	farmland protection,	
		areas, farms and open	help conserve the	
		space, rivers, streams and	town's flood storage	
		brooks.	capacity.	
Wes	st Springfield	Created a land use suitability	Effective.	Work to implement
ivias	ster Plan	map, and water supply		relevant goals and
		two recommendations from		policies in Fian.
		the town's existing Open		
		Space and Recreation Plan		
		and the Master Plan—that of		
		creating and implementing		
		a town policy on land		
		acquisition and retining the		
		mans		
Nati	ional Flood	As of 2006, there were 50	Somewhat effective.	The town should
Insu	rance Program	homeowners with flood	provided that the town	evaluate whether
Part	icipation	insurance policies	remains enrolled in the	to become a part
			National Flood	of FEMA's
			Insurance Program.	Community Rating System.

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Replace top priorities on culvert replacement list—Amostown, Piper, Birnie Ave.
- Ensure dam owners realize their responsibility to inspect the dams regularly.
- Create more performance-based evaluations for special permit approval.

- Implementing the goals and strategies of the West Springfield Open Space and Recreation Plan dealing with protection of floodplain, forests, and farmland.
- Evaluate whether to become a part of FEMA's Community Rating System.
- Educate citizens living in the floodplain about the NFIP as part of digital FIRM update.

Severe Snow/Ice Storm

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

Current Mitigation Measures

The Town's current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. These current mitigation strategies are outlined in the following table.

Note: To the extent that some of the damages from a winter storm can be caused by flooding, all of the flood protection mitigation measures described in Table 5-1 in the previous section can also be considered as mitigation measures for severe snow/ice storms.

	Table 5-2: Existing Severe Snow/Ice Storm Hazard Mitigation Measures				
Ex	xisting Strategy	Description	Effectiveness	Potential Changes	
Ordinance	Off-Street Parking Standards	Requires some off-street parking for certain uses; prevents excessive street parking.	Effective for preventing plowing hazards.		
Zoning C	Common Driveways	Allows for adjacent lots to share a driveway, fewer curb cuts.	Effective for providing access		
ations	Construction Standards	Utilities must be placed underground	Effective for preventing power loss.		
Subdivision Regula	Design Standards	Standards include street grade regulations (collectors 5% max; all others 8% max); and intersection regulations (minimum 60 angle).	Effective.		
		Street right-of-way must include room for storage of snow from plowing.	Effective.		
State I	Building Code	The Town of West Springfield has adopted the Massachusetts State Building Code.	Effective.		
Backu	p Electric Power	Shelters have backup power, three mobile generators	Very effective in case of power loss.		
Tree M	lanagement	List of dangerous trees created annually for WMECO.	Very effective, preventative collaboration.		

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Determine if existing generators at shelters are effective, replace if not effective.
- Increase enforcement of restrictions prohibiting residents from plowing snow into the road.
- Participate in the creation of a Regional Debris Management Plan.

What is a Regional Debris Management Plan?

Natural disasters can precipitate a variety of debris, including trees, construction and demolition materials and personal property. After a natural disaster, potential threats to the health, safety and welfare of impacted citizens can be minimized through the implementation of a debris management plan. Such a plan can be critical to recovery efforts after a disaster, including facilitating the receipt of FEMA funds for debris clearance, removal and disposal.

Hurricanes/Severe Wind

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

The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Therefore, all of the flood protection mitigation measures described in Table 5-1 can also be considered hurricane mitigation measures.

The high winds that oftentimes accompany hurricanes can also damage buildings and infrastructure. But regulations can be put into place to help minimize the extent of wind damages.

The Town's current mitigation strategies to deal with severe wind are equally applicable to wind events such as tornadoes and microbursts. Therefore, the analysis of severe wind strategies is coupled with this hazard.

Tornadoes/Microbursts

The location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes or microbursts comes 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. In addition, current land development regulations can also help prevent wind damages.

The following table outlines the Town's existing mitigation strategies that help prevent wind damages, whether from hurricanes, tornadoes, microbursts, or any other event.

	Table 5-3: Existing Severe Wind Hazard Mitigation Measures (Including Hurricane, Tornado, Microburst Hazards)				
I	Existing Strategy	Description	Effectiveness	Potential Changes	
	Wireless Communications Facilities	Wireless communication towers/facilities standards restrict height and setbacks.	Somewhat effective for preventing damage to nearby property		
Subdiv Regs	Improvements	Utilities must be placed underground	Effective for preventing power loss.		
State	Building Code	The Town has adopted the MA State Building Code.	Effective.		
Tree N	<i>Aanagement</i>	List of dangerous trees created annually for WMECO.	Very effective, preventative collaboration.		

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

• Participate in the creation of a Regional Debris Management Plan.

Wildfire/Brushfire

Although somewhat common, the vast majority of brushfires in West Springfield are small and quickly contained. However, as with any illegal fire or brushfire, there is always the risk that a small brushfire could grow into a larger, more dangerous wildfire, especially if conditions are right. Therefore, it is important to take steps to prevent wildfires and brushfires from turning into natural disasters.

Current Mitigation Measures

The following table identifies what the Town is currently doing to manage brushfires and makes some suggested potential changes and recommendations for decreasing the Town's likelihood of being heavily impacted by a wildfire or brushfire.

	Table 5-4: Existing Wildfire/Brushfire Hazard Mitigation Measures				
Exi	sting Strategy	Description	Effectiveness	Potential Changes	
Ince	Fire Districts	The Town is separated into two fire districts, according to zone districts.	Effective.		
Zoning Ordina	Water Supply Protection District	Some uses need to be approved by the Fire Department (ie, storage of liquid petroleum products)	Effective.		
	Site Plan and Special Permit Approval	Special granting authority can request Fire Department inspection/review of any plan.	Effective.		
rision Itions	Definitive Plan	Must be reviewed by Fire Department for approval.	Effective.		
Subdiv Regula	Design Standards	Street layout must be able to accommodate fire vehicles.	Effective.		
Public Outre	: Education/ ach	Fire Department has an ongoing educational program in the schools	Effective.	None.	

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

Earthquake

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

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

Current Mitigation Measures

The Town's most relevant existing mitigation measures are described in the following table.

	Table 5-5: Existing Earthquake Hazard Mitigation Measures				
Existing Strategy		Description	Effectiveness	Potential Changes	
Zoning Ordinance	Wireless Communications Facilities	Wireless communication towers/facilities standards restrict height and setbacks.	Somewhat effective for preventing damage to nearby property		
State Building Code		The Town of West Springfield has adopted the State Building Code.	Effective for new buildings only.	Evaluate older structures categorized as critical facilities to determine if they are earthquake resistant.	
Debris Management Plan		A debris management plan could be developed.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.	

Potential changes to the Town's current strategies have been identified in the above table, and these are compiled below:

- Evaluate critical facilities to determine if they are earthquake resistant.
- Participate in the creation of a Regional Debris Management Plan.

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 no where to flow.

Current Mitigation Measures

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.

Т	Table 5-6: Existing Dam Failure Hazard Mitigation Measures				
Existing Strategy	Description	Effectiveness	Potential Changes		
New Dam Construction Permits	State law requires a permit for the construction of any dam.	Effective. Ensures dams are adequately designed.	None.		
Dam Inspections	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply.	Identify sources of funding for dam safety inspections. Incorporate dam safety into development review process.		

Recent changes in legislation have shifted some of the responsibility of dam safety onto dam owners. The Town recognizes the need to adjust to this change. Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

• Identify sources of funding for dam safety inspections.

Drought

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

Current Mitigation Measures

West Springfield has several water protection regulations in place, as evidenced in the section on flooding. Additional regulations and mitigation options, specific to drought mitigation, are included here.

	Table 5-7: Existing Drought Hazard Mitigation Measures			
Exist	ing Strategy	Description	Effectiveness	Potential Changes
Zoning Ordinance	Water Supply Protection District	Areas delineated as recharge areas for aquifers are protected by strict use regulations.	Very effective for preventing groundwater contamination and for controlling stormwater runoff, promoting groundwater recharge.	
	Alteration and Relocation of Streams	Watercourses shall not be altered unless it can be shown that there is no impact to their water quality/supply.	Somewhat effective.	
	Site Plan	The project must be served by adequate water supply, approved by BOH.	Effective.	
Subdivision Regulations	Preliminary and Definitive Plans	Water supply systems must be shown on plans, prove adequate supply.	Effective.	
	Sewage	All lots must be served by public water supply where feasible, approved by Water Department	Effective.	
	Construction Standards	When applicable, private wells are regulated so as not to locate too close to leach fields, sewer lines, etc.	Effective.	
West Maste	Springfield er Plan	Makes recommendations for protecting West Springfield's water quality/supply.	Somewhat effective for raising awareness about protecting water quality, supply, and conservation.	Implement plan goals.

Potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

• In regards to the West Springfield Master Plan, implement the goals and strategies dealing with protection of waterbodies and forestland.

Hazardous Materials

Hazardous materials are in existence throughout Town, and are constantly being moved on West Springfield's roads and highways. However, there is no way to anticipate where and when a hazardous materials spill or explosion could take place. Therefore, it makes is somewhat difficult to determine mitigation strategies, but West Springfield has some regulations currently in place to mitigate the impacts of a hazardous materials disaster.

	Table 5-8: Existing Hazardous Materials Hazard Mitigation Measures				
E	Existing Strategy	Description	Effectiveness	Potential Changes	
Zoning Ordinance	Water Supply Protection District	No hazardous materials permitted within areas delineated as recharge areas for groundwater aquifers. Other substances regulated by Fire Department.	Very effective for preventing groundwater contamination.	Prohibit all haz- mats similar to Water Supply Protection District.	

Future Mitigation Measures

Potential changes to the Town's current strategies have been identified in the above table, and these are compiled below:

6: PRIORITIZED IMPLEMENTATION SCHEDULE

Summary of Critical Evaluation

The West Springfield Hazard Mitigation Planning Committee reviewed each of the recommendation future mitigation measures identified, and used the following factors to prioritize mitigation projects:

- Ability to reduce loss of life
- Ability to reduce disaster damage
- Social acceptability
- Ability to complete or be combined w/other actions
- Technical feasibility / potential success
- Impact on the environment
- Administrative workability
- Ability to meet regulations
- Political acceptability
- Ability to save or protect historic structures
- Legal implementation
- Ability to meet other community objectives
- Economic impact
- The duration of its implementation period
- Environmental compatibility

Project Prioritization

The West Springfield Hazard Mitigation Planning Committee created the following prioritized schedule for implementation of prioritized items. The table lists items in order of priority.

Note: As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

Table 6.1: Prioritized Implementation Schedule – Action Plan					
Priority	Mitigation Action	Responsible Department/Board	Proposed Completion Date	Funding Source/ Estimated Cost	Incorporation into Existing Plans
1	Seek HMGP funds for culvert replacement	DPW	2011	HMGP	
2	Adopt performance-based evaluation	Planning Dept.	2011	In-kind	Master Plan
3	Implement top priority recommendations of Master Plan	Planning Dept.	2011-and beyond	various	Master Plan
4	Consider FEMA CRS	Mayor	2011		
5	Participate in regional Debris Management Plan	EMD	2010-or when it happens	DHS	Master Plan
6	Evaluate older structure for earthquake resilience	Planning Dept.	2013	unknown	Master Plan
7	Identify funding for dam safety inspections and share with dam owners	Conservation Commission	2011	DCR	OSRP
8	Ensure dam owners realize their responsibility to inspect dams regularly	DPW	2015	MEMA	OSRP, Master Plan
9	Implement the goals and strategies of the West Springfield Open Space and Recreation Plan dealing with protection of floodplain, forests, and farmland.	Con Comm	2014	MA DCR	OSRP

7: PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon completion, copies of the Draft Local Hazards Mitigation Plan for the Town of West Springfield were distributed to the town boards for their review and comment. A public meeting was held by the West Springfield Town Council to present the draft copy of the West Springfield Local Natural Hazards Mitigation Plan to town officials and residents and to request comments from this committee and the general public. The Natural Hazards Mitigation Plan was formally approved by the Town Council and forwarded to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their approval.

Plan Implementation

The implementation of the West Springfield Local Natural Hazards Mitigation Plan will begin following its formal adoption by the West Springfield Town Council and approval by MEMA and FEMA. Specific town departments and boards will be responsible for ensuring the development of policies, ordinance revisions, and programs as described in Sections 5 and 6 of this plan. The West Springfield Natural Hazards Planning Committee will oversee the implementation of the plan.

Plan Monitoring and Evaluation

The measure of success of the West Springfield Local Natural Hazards Mitigation Plan will be the number of identified mitigation strategies implemented. In order for the town to become more disaster resilient and better equipped to respond to natural disasters, there must be a coordinated effort between elected officials, appointed bodies, town employees, regional and state agencies involved in disaster mitigation, and the general public.

The West Springfield Natural Hazards Planning Committee will meet on an annual basis or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm strategies to remove obstacles to implementation. The parties noted in Section 6 of the plan, who are assuming responsibility for implementation of different prioritized actions, will oversee implementation and integrate recommended actions into existing and future plans as appropriate. Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. At a minimum, the committee will review and update the plan every five years, beginning in the fall of 2013. The meetings of the committee will be organized and facilitated by the Emergency Management Director or designee. Outreach to the public, surrounding communities, agencies, businesses, academia, non-profits, or other interested parties outside of the town of West Springfield will be done in advance of each annual meeting in order to solicit their participation in assessment of the plan. The approved West Springfield Hazard Mitigation Plan will be

available for ongoing public review and comment at the Municipal Office Building, the public library and at the PVPC offices.

Incorporation of Plan Requirements into other Planning Mechanisms/ Documents

At times when the Town of West Springfield is considering creation of or changes to local planning documents or procedures including, but not limited to comprehensive plans, capital improvement plans, zoning and building codes site reviews and permitting processes the information and recommendations contained in this plan will be reviewed by the people and committees involved in those processes and, when appropriate, will incorporate those recommendations into the new planning procedures.

P.02

TOWN OF WEST SPRINGFIELD TOWN COUNCIL

PRESIDENT MICHAEL J. FINN

VICE PRESIDENT JOHN R. SWEENEY 26 CENTRAL STREET WEST SPRINGFIELD, MA 01089-2753 PHONE: (413) 263-3022 Email: spettacconi@west.springfield.toA.US



KATHLEEN A. BOURQUE BRIAN J. GRIFFIN GEORGE R. KELLY ROBERT M. MANCINI GERARD B. MATTHEWS LIDA M. POWELL ANGUS M. RUSHLOW

RECEVED

DEC 2 3 2010

FLAMMEND OLDY, WESPRINGEROD, MA DIDDO

December 21, 2010

Edward Gibson, Mayor Town of West Springfield 26 Central Street West Springfield, MA 01089

Re: Hazard Mitigation Plan

Dear Mayor Gibson,

At their meeting of December 20, 2010, the Town Council, by a vote of (7) seven to (0) zero, resolved that the West Springfield Town Council adopt the Local National Hazard Mitigation Plan prepared by various town departments to be adequate to address Natural Hazards discussed therein.

If you have any questions, please contact our office,

Thank you,

ec:

Sweeney

Vice-President

Richard Worbiskis, Planning Dept Jack Dowd, DPW Diane Folcy, Town Clerk

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Havenhurst Road to be appointed to the Redevelopment Authority Board to fill the vacancy created by Michael L. Vedovelli with a term to expire on 6-17-2012, *seconded* by Councilor Bourque.

Councilor Kelly reported that the Human Resource Subcommittee voted 2-0 to recommend. President Finn asked if there were any comments and/or questions, there were none.

RCV: 7-0 Motion Passes

Budget

Ordinance

4. Traffic

Councilor Kelly reported the following: that the Traffic & Safety Subcommittee were reviewing and researching Virginia Ave./Ely Ave. complaints with the outcome to be considered, a Yield sign.

Conversation ensued with President Finn, Councilors Bourque, Kelly and Atty. Donahue regarding the following: Yield sign requirements, Town Council approval, cautionary signs not needing Town Council approval, and merging roads. Atty. Donahue stated he would have a report at the next Town Council meeting as to the requirements of a Yield sign.

Unfinished Business

a. Discussion and Vote: Hazard Mitigation Plan

Councilor Matthews *moved* that it be resolved that the West Springfield Town Council adopt the Local National Hazard Mitigation Plan prepared by various town departments and determined by said departments to be adequate to address natural hazards discussed therein, a copy of which is to be filed with the minutes of this meeting, *seconded* by Councilor Kelly. Councilor Matthews explained the history of the document and the needed acceptance of the Legislative body as part of the process for emergency grants and programs for the Town of West Springfield. He further discussed the input of the various departments for the document. President Finn asked if there were any comments and/or questions, there were none.

RCV: 7-0 Motion Passes

b. Discussion and Vote: Police Dept.- Unpaid prior years bills

Councilor Bourque *moved* that it be ordered that the Town Council authorize the payment of unpaid bills of the prior years from the current fiscal year appropriations as follows: \$1,309.38 for Service Connected Injuries from the Police Department Account # 0001-210-07-5179-00;

\$412.12 for Vehicle Maintenance from the Police Department Account # 0001-210-08-5487-00; and

\$84.70 for Publication costs from the Police Department Account #0001-210-5731-00. And that the Town Account shall not pay any of said bills until the statutory certifications have been received and approved by her or her designee.

Seconded by Councilor Kelly.

Councilor Bourque reported that the Budget Subcommittee voted 3-0 to recommend. She explained the statute on payment of Unpaid Bills from a prior year and the certification needed. She reported her request to Atty. Donahue for language, within this motion and any motions thereafter, in order to meet the law and then noted this current language within the motion would suffice to meet the law.

Councilor Griffin reported this would need a 2/3's vote to pass.

Councilor Bourque asked if the 2/3's meant those present or the Council of the Whole. Atty. Donahue reported it would be of those present. President Finn asked if there were any comments and/or questions, there were none. **RCV: 7-0 Motion Passes**

c. Discussion and Vote: Traffic Rules and Orders re: Harwich Rd.

Councilor Kelly gave a history of this Traffic Rule and Order prior to making the motion. Each of the Councilors had the motion and maps in front of them at their desks. He stated that he would do all the deleted areas for Harwich Rd. first and then waive the reading of the corrected additions. There were no objections.

Councilor Kelly moved the following:

ARTICLE IV - SECTION 2 "PROHIBITED ON CERTAIN STREETS"

Upon the following streets or highways or parts thereof parking is hereby prohibited: -H-

Delete the following:

"Harwich Road, easterly side, from the northerly sideline of Churchill Road, extended, southerly to the easterly sideline of Terry Road, extended."

ARTICLE IV - SECTION 2A

Upon the following streets or highways or parts thereof, parking is prohibited at any time between May 15th and September 15th in any calendar year:

Delete the following:

" 2. Harwich Road, northerly and easterly side, from Ashley Street for a distance of nine hundred five and 85/100 (905.85) feet to a point at the beginning of the tangent to Westfield Street."

ARTICLE IV – SECTION 5F. PARKING PROHIBITED DURING CERTAIN HOURS ON CERTAIN STREETS

No person shall park a vehicle between the hours of 9:00 P.M. and 8 A.M. in the following described streets or parts thereof:

Delete the following:

"Harwich Road, starting at the southwesterly corner of the intersection of Churchill Road with Harwich Road, southerly six hundred sixty seven and 83/100 (667.83) feet to the northeasterly corner of Park Drive at Harwich Road."

ARTICLE VIII - TOW-AWAY ZONE REGULATIONS - SECTION 6. PARKING PROHIBITIONS, TOWING ZONE

No person shall stand or park or allow, permit or suffer any vehicle registered in his name to stand or park on any of the ways or parts of ways hereinafter described and during the periods of time set forth. Vehicles found in violation of the provisions of this section except those specifically exempted by law shall be removed to a convenient place under the direction of an Officer of the Police Department and the owner of the vehicle so removed, or towed away shall be liable to the cost of such removal and/or storage, if any, as set forth in Section 3 of this Article. The owner of any vehicle removed or towed

under the provisions of this Section shall also be subject to the penalties provided in Chapter

90, Section 20A of the General Laws.

Delete the following:

"Harwich Road, easterly side, from the northerly sideline of Churchill Road, extended, southerly to the easterly sideline of Terry Road, extended."

"Harwich Road, westerly side, starting at the southwest corner of the intersection with Churchill Road at Harwich Road, southerly six hundred sixty seven and 83/100 (667.83) feet to the northeast corner of Park Drive at Harwich Road."

Councilor Kelly requested to waive the reading of the additions for Harwich Rd., there were no objections.

President Finn asked if there were any comments and/or questions.

Conversation ensued with President Finn and Councilors Matthews, Kelly, Powell, and Bourque regarding the following: history of the Traffic Rules and Orders being revised and when the Town Council accepted the revised edition the fact that substantive matters still needed to be reviewed for consistency, a crosswalk in the area that was not mentioned in the motion, the Traffic & Safety Subcommittee bringing all matters to be proposed/recommended to the full Town Council for a vote, and the fact that a curb cut and signage are already in place at the area relative to a crosswalk.

President Finn asked if there were any comments and/or questions, there were none. RCV: 7-0 Motion Passes

New Business

a. Formal Referral: : Retirement Board - MGL Chapter 32 § 101m, Section 27 & 28 President Finn formally referred the following to the Budget Subcommittee: Retirement Board – MGL 32 § 101m, Section 27 & 28.

Councilor Bourque requested a copy of the law with the formal referral.

President Finn acknowledged the request.

Councilor Griffin thanked President Finn for his service as President to the Town Council, and gave his appreciation for all his hard work this year.

Adjournment

At 7:37 p.m. President Finn entertained a motion to adjourn, *moved* by Councilor Kelly, *seconded* by Councilor Powell.

Voice Vote: 7-0 Motion Passes

Respectfully Submitted,

Susan Pettazzoni

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 (SRPEDD)	508/823-1803
MA Board of Building Regulations & Standards (BBRS)	617/227-1754
MA Coastal Zone Management (CZM)	617/626-1200
DCR Water Supply Protection	617/626-1379
DCR Waterways	617/626-1371
DCR Office of Dam Safety	508/792-7716
DFW Riverways	617/626-1540
MA Dept. of Housing & Community Development	617/573-1100
Woods Hole Oceanographic Institute	508/457-2180
UMass-Amherst Cooperative Extension	413/545-4800
National Fire Protection Association (NFPA)	617/770-3000
New England Disaster Recovery Information X-Change (NEDRIX – an association of private	
companies & industries involved in disaster recovery planning)	781/485-0279
MA Board of Library Commissioners	617/725-1860
MA Highway Dept, District 2	413/582-0599
MA Division of Marine Fisheries	617/626-1520
MA Division of Capital & Asset Management (DCAM)	617/727-4050
University of Massachusetts/Amherst	413/545-0111
Natural Resources Conservation Services (NRCS)	413/253-4350
MA Historical Commission	617/727-8470
U.S. Army Corps of Engineers	978/318-8502
Northeast States Emergency Consortium, Inc. (NESEC)	781/224-9876
National Oceanic and Atmospheric Administration: National Weather Service; Tauton, MA.	508/824-5116
US Department of the Interior: US Fish and Wildlife Service	413/253-8200
US Geological Survey	508/490-5000

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP)	Massachusetts Emergency Management Agency
406 Public Assistance and Hazard Miligation	
Community Development Block Grant (CDBG)	DHCD, also refer to RPC
Dam Safety Program	MA Division of Conservation and Recreation
Disaster Preparedness Improvement Grant (DPIG)	Massachusetts Emergency Management Agency
Emergency Generators Program by NESEC‡	Massachusetts Emergency Management Agency
Emergency Watershed Protection (EWP) Program	USDA, Natural Resources Conservation
Service Flood Mitigation Assistance Program (FMAP)	Massachusetts Emergency Management Agency
Flood Plain Management Services (FPMS)	US Army Corps of Engineers
Mitigation Assistance Planning (MAP)	Massachusetts Emergency Management Agency
Mutual Aid for Public WorksWestern Massach	nusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) †	Massachusetts Emergency Management Agency
Power of Prevention Grant by NESEC‡	Massachusetts 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 Clearing	US Army Corps of Engineers
Shoreline Protection Program	MA Department of Conservation and Recreation
Various Forest and Lands Program(s)	MA Department of Environmental Protection
Wetlands Programs	MA Department of Environmental Protection

‡NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multihazard 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.

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

3) Internet Resources

		mitigation projects.
NASA – Goddard Space Flight Center "Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/dis aster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal- state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/g eog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	http://www.fema.gov/fema/csb.html	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links
The Tornado Project Online	http://www.tornadoroject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster 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 – 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	Town Council
BOH	Board of Health
LEPC	Local Emergency Planning Committee
EMD	Emergency Management Director
Con Com	Conservation Commission
EOC	Emergency Operations Center
CEM Plan	Comprehensive Emergency Management Plan
WMECO	Western Massachusetts Electric Company
HAZMAT	Hazardous Materials

Appendix C – Natural Hazard Profiling Methodology³

In order to adeptly profile each of the hazards, a Hazard Identification and Analysis Matrix was prepared to organize the information that was gathered for this project.

The matrix is organized into the following sections: Type of Hazard, Location of Occurrence, Extent of Impacts, Previous Occurrences, Probability of Future Occurrence, and Hazard Index. The Hazard Index was completed to rank the hazards according to the frequency of occurrence and the amount of potential damage likely to occur. The Hazard Index forms the basis for concentrating the future mitigation efforts outlined in this plan. A description of each of the matrix categories is provided below. The completed Matrix is shown as Table 3.1 (Section 3, page ??).

Location of Occurrence

The classifications are based on the area of the Town of West Springfield that would potentially be affected by the hazard. The following scale was used:

Table C.1: Location of Occurrence, Percentage of Town Impacted of Given Natural Hazard		
Location of Occurrence	Percentage of Town Impacted	
Large	More than 50% of the town affected	
Medium	10 to 50% of the town affected	
Small	Less than 10% of the town affected	

Extent of Impacts

The extent of direct impacts an affected area could potentially suffer were classified according to the following scale:

Table C.2: Extent of Impacts, Magnitude of Multiple Impacts of Given Natural Hazard		
Extent of Impacts	Magnitude of Multiple Impacts	
Catastrophic	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.	
Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.	
Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.	

³ Source: information adapted from Town of Holden Beach, NC Community-Based Hazard Mitigation Plan, July 15, 2003, and Hyde County, NC Multi-Hazard Mitigation Plan, Sept 2002; and the Massachusetts Emergency Management Agency (MEMA).

Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.
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Previous Occurrences

Whether or not previous hazard events had occurred is also included, with detailed descriptions of specific previous occurrences within the hazard identification and vulnerability assessments, if necessary.

Probability of Future Occurrence

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

Table C.3: Frequency of Occurrence and Annual Probability of GivenNatural Hazard		
Frequency of Occurrence	Probability of Future Event	
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	

Hazard Index

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

The Hazard Ratings are labeled as follows:

- 1 High Risk
- 2 Medium-High Risk
- 3 Medium Risk
- 4 Medium Low Risk
- 5 Low Risk

West Springfield Hazard Mitigation Planning Committee Meeting #1 February , 2009 ___ pm West Springfield Town Hall AGENDA

1) Introduction & Purpose of Committee

2) What is Hazard Mitigation Planning?

3) Begin Review of Draft Plan

4) Identify Critical Facilities (to be shown on Base map)

- Identify Critical Facilities on Base Map. The following list contains items that should be clearly identified on the map, as they apply to your community:
 - Emergency Operations Center Nursing Homes
 - Emergency Fuel Facilities Elderly Housing
 - Town/City Hall
 Police Station
 Day-Care Facilities
 Correctional Facilities
 - Other Congregate Care Facilities

Special Needs Populations
 Hazardous Materials Facilities

- Evacuation Routes

- Fire StationPublic Works GaragesOther CShelters
- Water Treatment Facilities
- Sewage Treatment Plants
- Water Tower/Supply Pumps
- Power Plants
- Electrical Power Substations
- Electrical Power Substations
 Schools
- Unique or Historic Resources

- Access Roads to Critical Facilities

- Commercial Economic Impact Areas
- Major Highways and Roadways Socio-Economic Impact Areas
 - Areas with Second Language Needs
 Hospitals
- Dams

and Evacuation Routes Potentially Affected By Hazard Areas

5. Hazards Analysis Methodology

- Bridges

- Identify Past Hazard Occurrences, Location and Damage Assessments
- Hazard Identification and Analysis Worksheet

6. Analyze Development Trends

Review local zoning districts. Identify planned and proposed subdivisions and other common developments. Is planned development at risk by natural hazards? Are there mitigation measures that can be taken to prevent loss of life, property damage, and disruption of governmental services and general business activities.

7. Review Vulnerability Assessment Methodology and Potential Loss Estimates

8. Schedule and Agenda for next meeting

TOWN CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23, A-C

West Springfield Hazard Mitigation Planning Committee Meeting #2, March __, 2009, ___ pm West Springfield Town Offices AGENDA

- 1. Finalize Critical Facilities and Evacuation Routes Potentially Affected By Hazard Areas
- 2. Review Vulnerability Assessment Methodology and Potential Loss Estimates
- 3. Establish Mitigation Goals and Objectives

4. Schedule and Agenda for next meeting

TOWN CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23, A-C

West Springfield Hazard Mitigation Planning Committee Meeting #3 March __, 2009 __ pm West Springfield Town Offices AGENDA

- 1. Finalize Revised Map of Critical Facilities
- 2. Final Review of plan
- 3. Affirm Action Plan of Hazard Mitigation Strategies
- 4. Review Plan Adoption and Implementation

CITY CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23B
PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE December 14, 2007

Pre-Disaster Mitigation Plans Under Development

The Pioneer Valley Planning Commission is beginning the process of drafting pre-disaster mitigation plans for the Communities of Amherst, Belchertown, Brimfield, Chicopee, Cummington, Goshen, Granby, Huntington, Palmer, Southampton, Springfield, Westfield, Westfield, Westhampton, Williamsburg, and Worthington.

This planning effort is being undertaken to help communities assess the risks they face 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.

Individuals interested in their community's Hazard Mitigation plan can contact PVPC to request information on their community's plan development. In 2006-2007, PVPC facilitated development of plans for 16 communities in Hampshire and Hampden counties. Following completion of this second round of 16 hazard mitigation plans, PVPC will be developing a regional Hazard Mitigation plan. Communities with approved plans will be eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

These pre-disaster mitigation plans are being developed with assistance from the Pioneer Valley Planning Commission with funding provided by the Massachusetts Emergency Management Agency. For additional information, please contact Catherine Miller at (413) 781-6045 or <u>cmiller@pvpc.org</u>.

PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE June 30, 2008

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission, in conjunction with local Hazard Mitigation Planning Committees, has produced drafts of Pre-disaster Mitigation Plans for the communities of Cummington, Palmer, Southampton, Westfield and Westhampton. Residents, business owners and other concerned parties of the named municipalities as well as of adjacent communities are encouraged to comment on each and all of the plans. The plans are currently able to be viewed on the Pioneer Valley Planning Commission website (under Projects and Plans) and the websites of the municipalities, where possible. Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 26 Central Street, West Springfield or at the individual City/Town Halls. The plans will be available for the next 30 days.

Over the upcoming months pre-disaster mitigation plans will be developed for Amherst, Belchertown, Brimfield, Chicopee, Goshen, Granby, Huntington, Springfield, **West Springfield**, Williamsburg, and Worthington and will also be available for public comment as they are developed.

This planning effort is being undertaken to help communities assess the risks they face 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.

In 2006-2007, PVPC facilitated development of plans for 16 communities in Hampshire and Hampden counties. Following completion of this second round of 16 hazard mitigation plans, PVPC will be developing a regional Hazard Mitigation plan. Communities with approved plans are eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

These pre-disaster mitigation plans are being developed with assistance from the Pioneer Valley Planning Commission with funding provided by the Massachusetts Emergency Management Agency. For additional information, please contact Catherine Miller at (413) 781-6045 or <u>cmiller@pvpc.org</u>.



PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE February 5, 2009

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission, in conjunction with local hazard mitigation planning committees, has produced drafts of pre-disaster mitigation plans for the communities of Huntington, Worthington, Granby, and Goshen. Residents, business owners, and other concerned parties of these municipalities and adjacent communities are encouraged to comment on these plans, which are currently available for viewing on PVPC's website at <u>www.pvpc.org</u> (under Projects and Plans) and the websites of the municipalities, where possible. Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 26 Central Street, West Springfield or at the individual city and town halls. The plans will be available for the next 30 days.

Starting this month pre-disaster mitigation plans will be developed for Amherst, Belchertown, Brimfield, Chicopee, Springfield, **West Springfield**, and Williamsburg, and will also be available for public comment as they are developed.

This planning effort is being undertaken to help communities assess the risks they face 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.

PVPC has previously facilitated development of plans for 21 communities in the Hampshire and Hampden county areas. Following completion of all 32 local hazard mitigation plans, PVPC will be developing a regional hazard mitigation plan. Communities with approved plans are eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency. These pre-disaster mitigation plans are being developed with assistance from the Pioneer Valley Planning Commission with funding provided by the Massachusetts Emergency Management Agency. For additional information, please contact PVPC's Catherine Miller at (413) 781-6045 or <u>cmiller@pvpc.org</u>.

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