

City of Chicopee Hazard Mitigation Plan Update



Adopted by the City Council of the City of Chicopee on _____

The Chicopee Hazard Mitigation Committee

and

Pioneer Valley Planning Commission

60 Congress Street
Springfield, MA 01104

(413) 781-6045

www.pvpc.org

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Glenn X. Joslyn- Emergency Management Director
Jeffrey Neece- DPW Director
Ela Soja- Assistant to the DPW Director
Edward Marcoux- Deputy Fire Chief
Lee M. Pouliot, ASLA- Director of Planning and Development
Laurie Benoit- Junior Engineer/GIS Technician
Carl Dietz- Building Commissioner
Michelle Santerre- GIS Coordinator

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The Pioneer Valley Planning Commission

60 Congress Street,
Springfield Ma, 01104
(413) 781-6045

Catherine Ratté, Principal Planner/Project Manager
Ashley Eaton, Planner
Jake Dolinger, GIS Specialist

Cover Photo: Robert B. Johnson

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1: PLANNING PROCESS

Introduction

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

Planning efforts, like the one undertaken by the City of Chicopee 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 hazard mitigation plan and updating it every 5 years to preempt a disaster, can save the community money and facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the plan.

FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding. For example, the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation Program require a pre-disaster mitigation plan for a community to access each of the program's resources.

Hazard Mitigation Committee

Updating the City of Chicopee's Hazard Mitigation plan involved an 8-member committee:

- Glenn X. Joslyn- Emergency Management Director
- Jeffrey Neece- DPW Director
- Ela Soja- Assistant to the DPW Director
- Edward Marcoux- Deputy Fire Chief
- Lee M. Pouliot, ASLA- Director of Planning and Development
- Laurie Benoit- Junior Engineer/GIS Technician
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The Hazard Mitigation Planning process update for the City included the following tasks:

- Reviewing and incorporating existing plans and other information including new development and changes in land use patterns in the last five years since approval of the City's first Hazard Mitigation plan.
- Updating the community's assessment of natural hazards conditions (threats) from the previous plan
- Conducting a Vulnerability/Risk Assessment to identify infrastructure at the highest risk for being damaged by the identified natural hazards, including analysis of costs associated with the scale and scope of the damage.
- Identifying and assessing the policies, programs, and regulations the City is currently implementing to protect against future disaster damages
- Identifying deficiencies in current Hazard Mitigation strategies and establishing goals for updating, revising or adopting new strategies
- Adopting and implementing the final updated Hazard Mitigation Plan

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

Committee Meetings

Meetings of the Hazard Mitigation Committee were held on the dates listed below, and took place at the Chicopee Department of Public Works. Agendas for these meetings are included in Appendix B.

February 24, 2017

Work Group meeting included an overview of the Hazard Mitigation plan process and the scheduling of additional committee meetings.

March 2, 2017

Work Group updated the City's Hazard Identification and Risk Assessment section of the plan. The Group also worked through updates of the community profile to highlight changes that have occurred since their last hazard mitigation plan was finalized.

March 9, 2017

Work Group finalized the Hazard Identification and Risk Assessment section of the plan and updated the Critical Facilities list and map.

March 16, 2017

Work Group completed the Capabilities Assessment worksheet provided by FEMA, reviewed the mitigation strategies selected in the previous plan to assess their status, and began to identify mitigation strategies The Group plans to pursue over the course outlined in this plan. The Work Group also prepared for the first public meeting.

March 30, 2017

Work Group prioritized the identified mitigation strategies, defined plan implementation process and discussed public outreach process.

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

Participation by Stakeholders

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

Local and Regional Agencies involved in hazard mitigation activities and surrounding community engagement and input

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

- Developing the Pioneer Valley Regional Land Use Plan, Valley Vision 2, which advocates for sustainable land use throughout the region and consideration for the impact of flooding and other natural hazards on development.
- Developing the Pioneer Valley Climate Action and Clean Energy Plan, which assesses the impact that climate change will have on the region and recommends strategies for mitigation that can be implemented by local municipalities and businesses.

- Collaborating with state agencies, such as the Department of Conservation and Recreation, to maintain inventories of critical infrastructure throughout the region.
- Developing the Westover Air Reserve Base Joint Land Use Study, which assesses the compatibility of land uses in the local communities around the military operation. Out of this, zoning changes are often recommended to limit incompatible uses.

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

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

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

Agencies That Have the Authority to Regulate Development

The Chicopee Planning Board administers Subdivision regulations and all developments requiring site plan review. They are also responsible for reviewing and administering permits under the Stormwater Management Ordinance. Thus, most decisions about development in the City are regulated by the Board. Feedback to the Planning Board was ensured through the participation of the City's Planning Director on the Hazard Mitigation Committee. In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Chicopee, including the municipal entities listed above and state agencies, such as Department of Conservation and Recreation (DCR) and the Massachusetts Department of Transportation (MassDOT). This regular involvement ensured that during the development of the Chicopee Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan.

Participation by the Public, Businesses, and Neighboring Communities

Two public planning sessions were held as part of the development of the Chicopee plan – on March 27, 2017 and April 11, 2017. The two public meetings were strategically planned to ensure the Hazard Mitigation Planning Committee had made sufficient progress on the plan. Meetings were held once the initial Hazard and Risk Assessment were completed and after a draft of the Hazard Mitigation Action

Plan was created. Notice of both public meetings was posted at Chicopee City Hall in compliance with the Commonwealth of Massachusetts' open meeting law. Public meeting agendas and notices can be found in Appendix B.

The Hazard Mitigation Committee determined that the most effective outreach strategy for engaging with the public, businesses and neighboring communities was through a press release targeting all three groups of stakeholders. The press release indicated that residents, business representative and other stakeholders in Chicopee, as well as surrounding communities were invited to attend the events.

Businesses and neighboring communities were also provided with an opportunity to provide feedback through the Pioneer Valley Planning Commission. PVPC is regularly involved in land use, transportation, and environmental planning initiatives in Chicopee and surrounding communities. Regular feedback received from these other initiatives was incorporated into the hazard mitigation planning process. Abutting communities that were provided an opportunity to comment included: Granby, Holyoke, South Hadley, Springfield and West Springfield. These communities were invited to view the plan and attend the public meetings via the press releases.

Meeting #1- March 27, 2017

On March 13, 2017 the Pioneer Valley Planning Commission sent a press release to relevant media outlets to announce that there would be a first public outreach meeting about the plan on March 27, 2017. This release was sent to those media identified by the Hazard Mitigation Committee as most relevant to the development of the plan. An article about the meeting was published on MassLive. Additionally informational fliers were made advertising the meeting. Chicopee's planner distributed them to relevant places in the City.

The first public meeting introduced participants to the Hazard Mitigation Planning process and reviewed the relevant hazards in the City. Participants had the opportunity to talk about their experiences with hazards in the past and offer up suggestions for what the City could do to mitigate some of these issues. Participants discussed how Chicopee has been lucky in recent years. While the region has seen significant damages from a tornado and early snow storms, Chicopee has been spared in many instances. Residents shared that maintaining the levee system along the Connecticut River is extremely important.

Meeting #2- April 11, 2017

On March 30, 2017, PVPC sent out a press release indicating that a second public outreach meeting would take place on April 11, 2017 and also to inform the public that a draft of the Chicopee Hazard Mitigation Plan had been placed on PVPC's website. The release also indicated that hard copies were available at PVPC's offices and Chicopee City Hall. Residents, businesses and other concerned parties of Chicopee were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or the City.

At the second public meeting, participants were given a brief overview of the planning process to date. They were then given time to review the variety of mitigation strategies that the City had chosen to pursue during this plan implementation period. Participants had the opportunity to weigh in on these strategies and offer ideas for consideration. Input was limited. Most participants were content with the strategies that the City is planning to pursue and felt it addressed their concerns.

Limited feedback was received from the public, businesses, or neighboring communities during the planning process. Any future input received from the public, as well as any other stakeholders, will be incorporated into the plan during future regular updates. Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all future meetings in accordance with Massachusetts Open Meeting Laws. In addition, the public will be invited to provide comments through e-mail. The comments will be reviewed by the Hazard Mitigation Committee and incorporated, as appropriate.

City Council Meeting

In 2014, the City Council agreed to begin the process of developing a Hazard Mitigation Plan. Once the plan was provisionally approved by FEMA in 2017, the City Council held a public hearing on the plan and then adopted it.

2: LOCAL PROFILE

Community Setting

Chicopee is located along the Connecticut River in a section of Western Massachusetts popularly known as the Pioneer Valley. The City is bordered on the south by Springfield, on the east by Ludlow, and on the north by South Hadley and Granby. The Connecticut River separates Chicopee from its western neighbors -- West Springfield and Holyoke. Chicopee, one of the first settled areas in Western Massachusetts, is the second largest city in the Pioneer Valley.

Chicopee followed a pattern of urban development shared by many mill towns. In the 1600s the area that became Chicopee had an agrarian based economy supplemented by fledgling mills to serve local needs.

Scattered farmsteads became the nuclei for village development. These villages were incorporated into the Town of Chicopee in 1848 but maintained much of their original identity. The neighborhoods of Chicopee Center, Willimansett, Chicopee Falls, Fairview, and Aldenville referred to in this plan are based on those old villages. By the 1800s manufacturing supplanted agriculture and there was an elaboration of residential and commercial development. Chicopee is now classified as 100% urban and retains only remnants of its agricultural past.

Industrial and commercial pockets surrounded by residential use characterize land use patterns inherited from previous generations. This was further reinforced by zoning, which, when adopted in 1940, tended to be descriptive of existing conditions rather than designed to direct change.

Today, Chicopee is a thriving commercial, residential, and industrial center. The City is home to the Westover Industrial Airparks, developed following the deactivation of Chicopee's Westover Field, built in 1940. Despite its reserve status, Westover Air Reserve Base is a major contributor to the region's economy, and served as the nation's deployment center for troops during the Persian Gulf War, a demonstration of this area's strategic advantage of overseas transport.

Chicopee is also headquarters for Callaway Golf and home to one of the largest printing plants of Wall Street Journal (Dow Jones & Co.) publisher, as well as Elms College. The Chicopee Provision Company is a major producer of Polish kielbasa under the Blue Seal brand.

Population Characteristics

According to the U.S. Census, there are 56,186 residents and a total of 24,798 housing units. The median household income is \$47,684 with 13.3% percent of residents living below the poverty line (American Community Survey 2011-2015). The City of Chicopee's population is expected to continue to grow at a steady rate, with approximately 61,325 residents by 2035 (UMass Donahue Institute population projections.)

Development

Chicopee evolved from a collection of agricultural villages on the Chicopee and Connecticut Rivers to one industrialized political unit. Clusters of business/industrial and residential uses characterized the earliest developed areas. When the City adopted its first zoning map in 1940 it appears it was more a description of the existing situation rather than a serious attempt to direct future growth. Since few areas of the City had not experience some kind of development by that time, the mixing of uses continued to characterize its appearance. The location of Westover Field in Chicopee in 1939 tipped the balance of Chicopee's economy to urban-industrial and created an additional need for housing. All of these development periods have shaped the landscape of the City and are still visible today.

Zoning

Chicopee's pattern of land use has evolved from its industrial heritage through late 20th century suburbanization. In turn, Chicopee's topography and rivers constrain these culturally determined land use patterns. In addition to other factors, zoning and other land use regulations constitute Chicopee's "blueprint" for its future. Land use patterns over time will continue to look more and more like the City's zoning map until the City is finally "built-out"—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the City focus not on the current use and physical build-out today, but on the potential future uses and build-out that are allowed under the City's zoning map and zoning ordinances. Zoning is the primary land use tool that the City may use to manage development and direct growth to suitable and desired areas while also protecting critical resources and ensuring that development is in keeping with the City's character.

The Chicopee Zoning Ordinance establishes 14 base zones, and two overlay zones:

Four residential zones – Residential A, B, C, and D Districts;

Two commercial zones – Commercial A and A-1 Districts;

Three business zones – Business A, B, and C Districts;

Three industrial zones – Industrial, Garden Industrial Planned Unit Development (IPUD) Type 1, IPUD Type 2;

Two mixed use zone – Mixed Use (MXD) District and Central Business District (CBD);

Overlay Zone #1 – Floodplain Overlay District.

Overlay Zone #2 – Mill Conversion and Commercial Center Overlay District (also mixed use)

Although appropriate zoning is all relevant to protecting the health and safety of the City residents, Chicopee's Floodplain Overlay District is specifically relevant to natural hazard mitigation. It applies to those areas within the boundary of the 100-year flood that are considered hazardous according to FEMA. It limits and restricts some uses to prevent potential flood damage.

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

Current Development Trends

Currently, development in Chicopee is encouraged by existing zoning and other land use regulations. Chicopee is significantly built out, so these land use regulations should focus on redevelopment efforts. Given the limited quantity and quality of suitable land for development, future growth is expected to follow the pattern of recent years including infill of existing developed areas and reuse and rehabilitation of existing land and structures. This trend of infill development and adaptive reuse of existing structures are not expected to increase the City's vulnerability to hazards, because these sections of town are already developed.

National Flood Insurance Program Status

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

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file in the Planning and Engineering Departments.
- FIRMs have been effective since September 29, 1978 with the current map in effect since July 16, 2013.
- Chicopee has 101 policies in effect for a total of \$79,683 in insurance premiums and \$29,954,300 worth of insurance coverage.
- There have been 7 claims paid out since 1978, totaling \$1,494.
- As of January 2016, there have been no Repetitive Loss Properties in Chicopee
- The City will maintain compliance with the NFIP throughout the next 5-year Hazard Mitigation Planning cycle by monitoring its Flood Plain Overlay District and ensuring that the district accurately reflects the 100-year flood plain and FEMA Flood Insurance Rate Map (FIRM).

Infrastructure

Chicopee's infrastructure reflects its industrial roots, its location in the urban core of the Pioneer Valley, and its historical growth from separate villages.

Roads and Highways

Dubbed the "Crossroads of New England," Chicopee is located at the intersection of I-91 and the Mass Pike, providing convenient access to anywhere within the greater region. It is also served by the I-391 and I-291 byways, as well as several smaller regional transportation arteries – Route 141, Route 116, Route 33, and Route 20 and 20A. Additionally, the City is served by a dense network of streets, reflecting its urban character.

Bicycle and Pedestrian Network

Chicopee has a well-developed network of sidewalks throughout most neighborhoods. Recently, the City of Chicopee also worked with graduate students at the University of Massachusetts-Amherst on plan that identified ways to improve walking and bicycling in the City through the creation of bicycle and pedestrian networks. There are also two significant public riverwalk projects in various stages of design and construction: Chicopee Riverwalk Phase I and II and the Connecticut Riverwalk and Bikeway.

Chicopee Riverwalk – Phase I and II - Phase I is a short strip of former railroad right-of-way extends from the eastern side of the Davitt Bridge to Grape Street and is owned by the Conservation Commission. Set on the bank of the Chicopee River, users enjoy fantastic views of the river set against historic mill buildings in the city center that once fueled Chicopee's economic engine. Phase II is a planned to begin at Grape Street and terminate at RiverMills (former Uniroyal site), including a connection to Szot Park. The terminus shall include amenities including security from the industrial area. The connection to Szot Park will include improved parking facilities at the Park's Department offices and an at-grade crossing to the park entrance including walkways. Additional connections will include a path to the Chicopee Public Library.

Connecticut Riverwalk and Bikeway - Communities are rediscovering nearby rivers and improving the environment by instilling an appreciation of them through improved access to rivers and education about them. As part of a regional effort in Hampden County, the communities of Agawam, Chicopee, Holyoke, Springfield and West Springfield, together with the Pioneer Valley Planning Commission, have developed a plan for a 21 mile pedestrian and bicycle path along the banks of the Connecticut River. With the goals of revitalizing the riverfront and improving the quality of life for residents, this plan promotes numerous user types (strolling, jogging, biking, roller blading, etc.), provides overlooks and rest stops, and connects each community to the river and each other. Chicopee has approximately seven miles of Riverwalk in design phases.

Rail

A rail line runs north-south through Chicopee, closely following I-91, and hugging the Connecticut River banks. Amtrak operates trains out of Springfield and Amherst which pass through Chicopee. Amtrak is expected to increase service on the line that currently travels through Chicopee

Air

Westover Air Reserve Base is located within Chicopee. It is home to the 439th Airlift Wing. The base is home to C-5As, the largest military aircraft. Westover Metropolitan Airport shares the runway with Westover Air Reserve Base. The airport offers private passenger and cargo service.

Public Transportation

The Pioneer Valley Transit Authority (PVRTA) provides extensive bus service throughout Chicopee and its neighboring towns. PVRTA contracts with MV Transportation (based in Chicopee) to also offer paratransit, a door-to-door demand responsive van service.

Water Supply

The Chicopee Water Department was established in 1892 as a public water supply. Chicopee once supported its own reservoir. The former reservoir is now part of Chicopee Memorial State Park and is used for recreational purposes only. Since the completion of the Chicopee Valley Aqueduct in 1950, Chicopee has received all of its water from the Quabbin Reservoir.

Construction on the Quabbin Reservoir began in 1936. Filling commenced on August 14, 1939 and was completed in 1946 when water first flowed over the spillway. The Quabbin Reservoir was filled with water from the Swift River and flood skimming from the Ware River during eight months of the year. At the time, the 412 billion-gallon reservoir was the largest man-made reservoir in the world that was devoted solely to water supply.

Starting at the Quabbin Reservoir, water supplied to Chicopee travels approximately 11 miles through the Chicopee Valley Aqueduct to Nash Hill Reservoir, an intermediate holding reservoir containing 24 million gallons of water. From the Nash Hill facility the water travels another 1.8 miles to the Chicopee Water Treatment Plant on Burnett Road at the Chicopee/Ludlow city line. After treatment, which includes chlorinating to disinfect the water and corrosion control, the water travels through the water distribution system, a labyrinth of over 240 miles of water mains ranging in size from 4 to 36 inches.

A one million-gallon water storage tank has been constructed in the Fairview section of the City to correct pressure problems. The tank, working in conjunction with a booster pumping station maintains water pressure in an area of the City that previously experienced water supply and pressure problems during the summer months. In addition, the tank insures that an adequate water supply is available for fire protection. The water tank was put into service in June of 1992 and has made a significant difference in water availability for the residents of Fairview and for the growing industrial base in the northeastern section of the City.

The City is currently undertaking two projects that will ensure safe access to public drinking water. They are currently building a redundant water line (30in) that will be able to transport water from the Quabbin if the original line were to fail. The water department is also updating its disinfection system, which is currently using technology from the 1950s. The gaseous chlorine system, which is difficult to contain in the event of a malfunction, is being replaced with a sodium hypo-chloride drip system. Both of these projects are expected to be complete within the next year.

Water Treatment

The MWRA completed construction of the Quabbin Water Treatment Plant in March of 2000 to improve the quality of drinking water delivered to Chicopee, Wilbraham, and South Hadley Fire District #1 -- the three communities serviced by the Chicopee Valley Aqueduct. The plant is located in Ludlow.

Covered Storage for Distribution Reservoirs

Uncovered distribution reservoirs allow pathways for contaminants to enter the drinking water, result in higher water temperatures that favor bacteria growth, allow sunlight to promote plant and algae growth, and limit options for corrosion control. Almost all of the cities and towns of Massachusetts currently have covered distribution storage tanks. As part of the Integrated Water Supply Improvement Program, MWRA had phased out five active open distribution storage reservoirs throughout the service area and constructed new covered tanks to provide the necessary distribution storage for peak demands and emergency service. Water quality problems caused by algae and other natural occurrences should be all but eliminated.

The Chicopee's Nash Hill storage reservoir was completed in 1999. The project includes construction of two 12.5 million gallon tanks for total of 25 million gallons of covered storage. The existing open reservoir has been drained and modified to serve as on-site detention basin. (Source: WMBRA website, 2005. Visit for updates, maps and photographs.)

Sewers

Chicopee's sewer service is being upgraded to meet federal and state mandates and City demands. Combined sanitary and storm sewers throughout the older sections of the City result in a lack of capacity during storms. Consequently raw sewage is dumped into the rivers during high discharge periods. All new development is required to separate storm and sanitary sewer systems in order to limit pressure on the existing City systems. City policy is to separate sanitary and storm systems whenever they are exposed such as during street reconstruction.

In July 2006, EPA issued a Consent Decree to Chicopee which outlines the schedule for finalizing the City's Long Term CSO Control Plan (FLTCP). The FLTCP was submitted to EPA and MassDEP in April of 2009. The CSO removal method envisioned in the FLTCP largely consisted of separating sewers throughout the City, providing a new sanitary sewer pipe and utilizing the old combined pipe as the new storm drain. Complete separation provides the City with new infrastructure while also eliminating sewer backups into homes, which is a significant health issue the City is facing.

The plan identifies eight phases, each to begin two years after the prior phase, with the first phase finished prior to the FLTCP being completed. Each phase of the work was prioritized both to eliminate the greatest concentrations of sewer backups in the City and according to the cost effectiveness (cost per million gallons of overflow removed). As such, the first three phases of work in the FLTCP accounted for more than 75% of the total annual overflow volume, but only about 54% of the total cost as estimated in 2007.

Upon completion of Phase 5A, or the Hampden and Cochran Street Areas Sewer Separation project, which began construction in June 2016, the City will have removed 77% of its average annual untreated volume and spent over 100% of the financial commitment made in the FLTCP. As of 2017, the City is obligated to spend \$208 million on this effort.

At the time the FLTCP was developed, economic conditions and estimated construction costs indicated that the City would be able to eliminate its CSOs by the 2026 deadline without overburdening residential rate payers. The 2008 economic crisis, rising construction costs, and unanticipated construction challenges have resulted in a very different financial climate than anticipated in 2009. The City has spent more than anticipated, and the financial capability of the City's residents is lower than was projected

during the development of the FLTCP. It is currently estimated that an additional \$223 million is required to complete the work of the FLTCP.

In the 1990's, Chicopee received a federal grant through EPA to study an innovative natural filtering system to be located near the confluence of the Chicopee and Connecticut Rivers. The system, known as a constructed wetland, would be designed to mimic the function of a natural wetland system. The design and engineering plans for this system were completed but no funds are currently available for its construction. It was hoped that the system would be included as an educational feature in a park proposed for the same site.

Solid Waste

The City of Chicopee currently contracts with Waste Management for solid waste collection services. Waste Management also operates the Connecticut Valley Landfill – Chicopee in the City. This landfill is almost at capacity and the City will need to look for other ways to dispose of their waste. To extend the lifespan of the landfill, Chicopee recently switched to automated trash pickup and is limiting the allowable amount of waste picked up per week. The City is also encouraging increased participation in recycling.

Municipal Electric Light District

The City of Chicopee is served by an Electric Light Plant, Chicopee Electric Light District (CELD). CELD has provided power to residents and business owners within the City since 1896. A point of pride in CELD's history is the fact that they were able to continue providing power to some residents in the aftermath of the 1938 hurricane and were able to restore power to those that lost it much quicker than the surrounding towns.

Schools

Chicopee has 15 schools within its public school system. It includes a pre-k school, nine (9) elementary schools, two (2) middle schools and three (3) high schools. Chicopee is also home to three (3) parochial schools, one (1) charter school, Elms College and the Salter School.

Natural Resources

Water Resources

Surface Water

Chicopee's greatest natural asset is its location along two rivers. The Connecticut and Chicopee Rivers provide the City with a total of about nine (9) miles of riverfront land. Both rivers offer views, flora and fauna, power generation and recreational opportunities such as boating, fishing and informal trails along dikes and natural banks.

Chicopee River

The Chicopee River Watershed - the largest of the 27 major drainage basins in Massachusetts - drains more than 720 square miles of central Massachusetts before joining the Connecticut River in the City of

Chicopee. It incorporates all or part of 39 cities and towns, 842 miles of brooks and streams including three major river systems: the Swift, Ware, and Quabog Rivers, and 170 lakes, ponds, and reservoirs.

European settlers of the early 1600s recognized the potential of the river's steep gradient, which drops from 100' to 50' in the two and a half mile stretch between Chicopee Falls and the upper confluence. These newcomers harnessed this source of waterpower for mills in the late seventeenth century. The river sustained industrial development well into the 1900s when the availability of electricity liberated manufacturing from the confines of the riverbanks.

There is no formal public access to the Chicopee River. Most of the riverfront is privately owned. Settlers seemed to have turned their backs on the river early on and the pattern has persisted. For example, older homes sited on or near the river are not designed to maximize views or access. Accessory buildings are often located in such a manner that further limits views and access. Access on the south bank between the confluence and Chicopee Falls was once limited by railroad tracks. The railroad has since abandoned the line and the land is owned variously by several private companies and the City. Steep slopes limit access to the north bank. East of Chicopee Falls the north bank is primarily privately owned but sparsely developed due to the potential for flooding. The south bank is essentially built out.

Connecticut River

On June 27, 1998, President Clinton named the Connecticut River one of only fourteen American Heritage Rivers in the nation. The American Heritage River designation is intended to bring recognition, assistance and possible funding from the federal government to aid communities and institutions in the four-state valley in achieving their economic revitalization, environmental conservation and cultural preservation goals. The heart of the nomination is an Action Plan comprised of 29 projects, which include riverfront revitalization initiatives, access initiatives for people and for spawning fish, CSO abatement, riverbank erosion abatement and restoration, scenic views promotion in farming areas and watershed-based initiatives to prevent and mitigate non-point source pollution to the river.

The Connecticut River north of the Holyoke Dam flows through a pastoral setting only recently affected by the pressures of residential development. The riverbanks south of the dam have been subjected to the effects of urban industrial development since the early nineteenth century.

The Holyoke Dam delimits a change in water quality. North of the dam, the river (once infamous for its pollution) has been reclaimed. This section of the river currently is used extensively for boating, fishing, swimming and other forms of water based recreation. South of the dam, despite reduction of industrial wastes, combined sewer overflows continue to contaminate the water.

PVPC continues efforts to bring this problem to the forefront. Working with several Connecticut River communities (including Chicopee) PVPC has structured a "Connecticut River 2020 Strategy" to promote coordinated action on river clean up, resource protection and economic development. The revitalization of Connecticut River is also identified as a key strategy in PVPC's regional Plan for Progress.

Flood Hazards

The Connecticut River's natural floodplain is developed with residential, commercial and industrial properties. Access to the Connecticut River along its Chicopee traverse is limited by three miles of flood protection dike constructed by the Army Corps of Engineers following a severe flood in 1936. The dike's location minimizes the flood hazard areas along the Connecticut River to a narrow strip between the dike and the river.

Recreation

Recreational use of both the Connecticut River and the Chicopee River along Chicopee shorefronts currently is limited. Boating on the Connecticut, accessed from the Medina and Syrek Streets boat ramps, is common and both rivers are used for fishing. The shoals on the Chicopee River near Chicopee Center are a favorite fishing spot. There are opportunities for enhancement of informal hiking trails and picnic areas along the rivers, as well as formal bicycle and pedestrian infrastructure.

Chicopee is one of many Pioneer Valley communities working on plans for bike and pedestrian paths along its riverfronts. Most of these paths are federally funded as transportation enhancements. These paths will provide additional river access, recreational opportunities, and alternative commuting routes.

Management of Water Supply

Management of the upper reaches of the Chicopee River watershed is of critical importance to the areas downstream. The City of Chicopee relies on the Quabbin Reservoir, created by the impoundment of the Swift River's three branches in 1938, for its water supply. Additionally, Class A water from the Ware River is seasonally diverted to the Quabbin. Class A water is water source that can provide an excellent habitat for fish, other aquatic life, and wildlife, and is suitable for recreation, including swimming boating, and fishing" (MGL 314 CMR 4.05).

The Massachusetts Water Resource Authority (MWRA) manages the Quabbin water supply, but water management at the local level is the responsibility of the Chicopee Water Department under the direction of the Chicopee Board of Water Commissioners.

Water Quality

The most current Water Quality Assessment Report for the Chicopee River basin is posted on Massachusetts' Department of Environmental Protection website. Overall, water quality on the Chicopee River is improving, but there is still substantial work to be done before the river will support harvesting of fish for consumption and use of the water that involves direct contact.

Confluence Area

The Chicopee River/Connecticut River confluence area contains a total of 135 acres, 96 of which are part of Chicopee flood control system. Some of the area is associated with the Hampden Steam Plant acquired by the City of Chicopee in 1985 as a taking for failure to pay back taxes. On September 9, 1992 the City and the Department of Environmental Protection (DEP) signed an agreement to demolish the building and dedicate the site as permanent open space and conservation land. The building has since been removed.

Brooks: Chicopee River Tributaries.

Bisbee Brook originates in Springfield and flows north as an intermittent stream to empty into the Chicopee River a short distance from the mouth of Abbey Brook. This short brook drains a developed area and has marginal value as an open space resource.

Poor Brook also originates in Springfield flowing northward across Springfield conservation land, residential subdivisions, and the Chicopee River Business Park into the Chicopee River adjacent to Oxford Marsh.

Cooley Brook's headwaters originate within a 200-acre wetland and inland meadow in the Town of Ludlow. Much of the watershed is included within the boundaries of the Chicopee Municipal Golf Course off Burnett Road. Cooley Brook is the main feeder of the Chicopee Reservoir, the City's main water supply until Chicopee tied into the Quabbin Reservoir in 1949. The old reservoir is now part of the Chicopee Memorial State Park and has been developed as a high-use, active recreation area. The total acreage is 575 acres including two 25-acre ponds. Cooley Brook's associated marsh almost is completely contained by the park boundaries and offers protection for wildlife and opportunities for the more intrepid hiker to explore a relatively unspoiled natural environment. Cooley Brook continues from the reservoir southwest to its junction with the Chicopee River approximately three-fourths of a mile above Chicopee Falls.

Fuller Brook originates in Ludlow where it is called Higher Brook. It winds through the southeast corner of Chicopee to meet the Chicopee River at Bircham Bend, a meander located where the river crosses the boundary between the cities of Springfield and Chicopee. Much of this stream is steeply banked and undeveloped. Fuller Brook is regularly monitored for possible effects from either of the large landfills flanking its banks on either side. The Oregon Sportsmen's Club, a private club controlling 49.6 acres of residentially zoned land, is located on the southern bank of Fuller Brook.

Abbey Brook originates in the City of Springfield. The brook flows through Szot Park, a 69.7-acre recreational area, and into the Chicopee River. The brook was dammed in the past to create an ice pond. Once suitable for swimming, Bemis Pond would require extensive work to return to active recreational use but is suitable for passive recreational uses such as hiking and picnicking along its banks.

Hearthstone Brook flows NW - SE into the Chicopee River. Hearthstone Brook was the subject of an award for a successful bioengineering stream restoration project.

Brooks: Connecticut River Tributaries:

Chicopee River described previously in this narrative.

Willimansett Brook crosses Chicopee from east to west. It is channeled, piped and dammed at various places along its course to finally flow into the Connecticut north of the Willimansett/Holyoke Bridge.

Theroux Brook flows into the Connecticut close to Chicopee's northern boundary. In the late 1990s this brook was subject of a reclamation project discussed elsewhere in this narrative.

Stony Brook, which is part of an extensive watershed that includes parts of Chicopee, Granby, Ludlow and South Hadley. The Chicopee section is located within the Westover ARB and is not accessible to the public.

Girl Scout Brook is an old brook with a new name that is located east of the Chicopee reservoir.

Ponds and Lakes

Chicopee Reservoir, formerly known as the Cooley Brook Reservoir, is located in Chicopee Memorial State Park. The reservoir is 25 acres in size and used to provide drinking water for the City of Chicopee. Today the reservoir is a popular recreation spot for both swimming and fishing.

Coburn Pond is a shallow one-and-a-half acre private pond located off Coburn Street in Willimansett. The pond is used for fishing and skating and could be made suitable for public use. The pond is fed by a small stream that has cut a deep ravine into the Willimansett bluffs from an area off Montgomery Street.

Pond Lily is a local designation for a large swamp located on the northern fringe of the City. This wetland system crosses into the Town of Granby to the north and is probably connected to wetlands in the Town of Ludlow to the east. The system appears to have been interrupted by the construction of Westover Air Force Base in the late 1930's. The marsh is crossed by New Ludlow Road and Old Ludlow Road and is adjacent to the Granby landfill facility. Although a large section of this system appears to be undisturbed there is some development in the area. Most disturbing on the Chicopee side, is a junk yard that is sufficiently out of the way as to escape regular monitoring for wetlands impacts and expansion into resource areas.

Roberts Pond (aka Mountain Lake) in earlier open space plans has been described as “a large, attractive, and potentially problematic area in north central Chicopee.” Roberts Pond was created by damming the Willimansett Brook as part of a flood control project after devastating area floods in the 1930s. The pond was once a private recreation area but more recently the property has been vacated and in various ownerships. In 2005 the dam was breached and the lake was drawn down by order of the Office of Dam Safety. Willimansett Brook is now reestablishing itself in the former lake bed while the owner decides his next course of action. The City is interested in acquiring the property to create a park but there are legal issues to resolve.

Langewald Pond is upstream from Roberts Pond and is also part of the Willimansett Brook drainage system. The pond is almost completely filled with sediment.

Wanda Pond is a small pond located in the Sandy Hill area of the City off Szetela Drive and Wanda Street. It may have been once used as an ice pond.

Wade Lake is a lake that Chicopee shares with Ludlow and Granby. It is located on Westover ARB at the northeast corner of Chicopee. Source is Muddy Brook which flows south from Granby. Muddy Brook becomes Stony Brook when it crosses the Chicopee line. This is a manmade feature -- originally a reservoir -- and now used mostly for fishing.

Aquifer Recharge

Although Chicopee does not supply water through any public well system, the majority of the land is an aquifer recharge area with potential for ground water supply. Ground water can be found in the beds of sand and gravel that underlie the Chicopee River. Pollution of the river, however, poses problems with this source. Small quantities of fresh water can be extracted from the bedrock and from a thin layer of gravel found on top of the bedrock. Given the costs associated with such operations, it is unlikely that any of these methods of groundwater extraction ever will be used. There are some private wells in Chicopee but the water is not used for domestic supply.

Forests

During the early days of settlement, the City's forests were cleared for agricultural production. As populations grew and further development occurs, additional forested areas were cleared to support a growing population. Through the Industrial Revolution and the development of the Westover Air Reserve Base (WARB) and a rush of mid-century subdivision of former agricultural land, the City has

experienced the severe fragmentation and isolation of these once dominant forests and agricultural lands.

Today, this fragmentation is quite apparent in Chicopee, often described as land poor. Chicopee has experienced the development of the most buildable land throughout the City—leaving undeveloped, forested areas surrounding steep slopes, water resources, and wetland areas. Today almost one quarter (23%) of Chicopee’s land is forested.

The City’s Urban Forestry Department is responsible for the management and care of the trees located on City owned property. The City’s tree management plan, completed in January of 2014, includes an overview of a recently completed public tree inventory and identifies both long and short term maintenance needs. The recent inventory found that Chicopee’s public trees are in fair condition. Currently, maple trees make up approximately 40% of Chicopee’s street trees threatening biodiversity. Recommendations in the report include new plantings, tree pruning and tree removal. It is recommended that at least 116 trees be planted a year in order to maintain the existing tree canopy. This accounts for trees that will be removed or lost due to natural mortality and those that will be affected by other causes (invasive pests, natural hazards, etc.) In addition, the Massachusetts Department of Conservation and Recreation manages the forestland in Chicopee State Park. The City should coordinate with DCR to ensure that the trees planted by both agencies continue to promote a diverse tree inventory.

There are a number of invasive species that threaten Chicopee’s already limited urban forest. An infestation could result in a loss of trees, which could have a number of consequences including:

- Exacerbated heat island effect in Chicopee’s most dense neighborhoods
- Soil destabilization
- Habitat loss
- Decreased ability to slow and capture storm water before it enters the storm drain
- Decreased ability to capture carbon emissions, quickening the pace of climate change

Because there are no remedies or pre-treatments available to stop the spread of these invasive pests, arborists suggest that the best way to mitigate impacts of these pests is to have a well diversified urban forest. As outlined in the City’s tree management plan, continued diversification is needed. The following pests likely pose the biggest threat to Chicopee:

Emerald Ash Borer

The Emerald Ash Borer (EAB) is a small insect native to Asia. The first official identification of EAB in the United States was in 2002. In the 15 years since, EAB has been responsible for the death of tens of millions of trees across the Midwest and Northeast. EAB attacks native Ash trees. Their larvae tunnel into the ash trees and feed on the inner bark. This tunneling cuts off nutrients to the tree. Trees typically die within 2 years of an infestation. There have been confirmed cases of EAB in Dalton. In Chicopee’s most recent tree inventory included the assessment of 89 ash trees in the street tree inventory. Seven of these trees had symptoms similar to an EAB outbreak. An infestation of the Emerald Ash Borer could result in an up to 2% loss of Chicopee’s urban forest.

Gypsy Moth

Gypsy moths, which are native to Europe, have been in Massachusetts since 1869. The gypsy moth is especially problematic, because in caterpillar form they have the ability to defoliate trees. The impact of a gypsy moth infestation is usually not limited to one species of trees, but the caterpillar has instead

been known to munch on over 300 species including oak, birch, cedar, and willow trees. Unlike most invasive pests, gypsy moths have a naturally occurring deterrent. There is a fungus that kills the caterpillars before they are able to defoliate trees. This fungus, however, requires a wet spring and early summer to take root. Gypsy moth infestations are becoming more common, especially as the likelihood of drought continues. While a gypsy moth infestation alone isn't likely to kill the trees, it will leave them far more susceptible to other diseases and pests.

Asian Longhorned Beetle

The Asian Longhorned Beetle (ALB) is a large beetle native to Asia. They are a major threat to a wide variety of hardwood trees in North America including Norway maples, Silver maples, red maples, sugar maples and elms. The larvae of the ALB tunnel into the trees to feed and kill them in the process. The ALB has been found in Worcester and Suffolk Counties in Massachusetts. The USDA's Animal and Plant Health Inspection Service is brought in to management the infestation and minimize the impact and spread of the ALB.

3: HAZARD IDENTIFICATION AND ANALYSIS

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

The Hazard Mitigation Committee referred to the 2013 Massachusetts Hazard Mitigation list of hazards as a starting point for determining the relevant hazards in Chicopee. The table below illustrates a comparison between the relevant hazards identified in the Massachusetts State-wide Hazard Mitigation Plan and in Chicopee’s local Hazard Mitigation Plan.

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

Additionally, the hazards identified in Chicopee’s 2009 plan and those detailed in this plan update are compared below.

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

Natural Hazard Analysis Methodology

This chapter examines the hazards in the Massachusetts State Hazard Mitigation Plan which are identified as likely to affect Chicopee. The analysis is organized into the following sections:

- Hazard Description
- Location
- Extent,
- Previous Occurrences
- Probability of Future Events
- Impact
- Vulnerability

A description of each of these analysis categories is provided below.

Hazard Description

The natural hazards identified for Chicopee include:

- floods
- severe snowstorms/ice storms
- hurricanes
- severe thunderstorms/wind/tornadoes/microburst
- wildfire/brushfire
- earthquakes
- dam failure/levee breach
- drought

Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

Location

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

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

Extent

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

Previous Occurrences

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

Probability of Future Events

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

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

Impact

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

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

Additionally, estimated damage costs associated with the impact of each hazard use the following assumptions regarding the level of damage to structures:

- 100% structural damage- Tornado/Microburst/Wind, Wildfire, Earthquake, Levee/Dam Failure and Landslides. These hazards are most likely to completely damage a structure they impact.
- 25% structural damage- Flooding and Hurricanes. These hazards are likely to cause some structural damage, but not completely damage them.
- 1% structural damage- Severe Snowstorm/Ice Storms. Structural damage from snow and ice is typically very limited.
- 0% structural damage- Drought and Extreme Temperatures. These hazards are highly unlikely to cause structural damage.

The calculations use these assumptions and the impact of the hazards, as defined above, to derive an estimated cost.

Vulnerability

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

Vulnerability Hazard Index Rating	
Ranking	Risk Level
1	Very High Risk
2	High Risk
3	Medium Risk
4	Low Risk
5	Very Low Risk

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

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

Flooding

Hazard Description

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

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

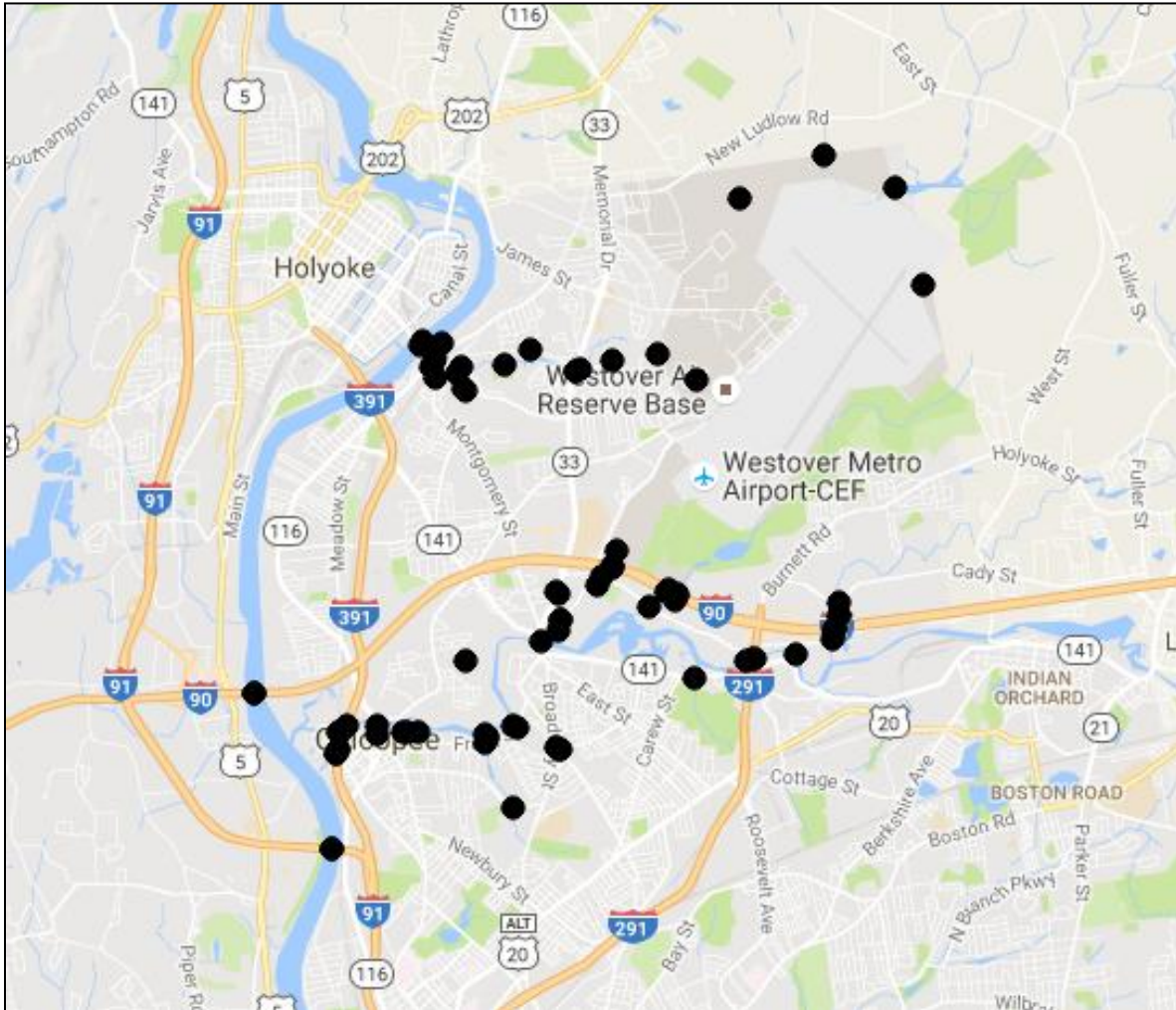
A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into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

Location

There are approximately 611 acres of land within FEMA mapped areas subject to inundation by a 1-percent annual chance flood, commonly called a 100-year floodplain and 85 acres of land within areas subject to inundation by a 0.2-percent annual chance flood, commonly called the 500-year floodplain within the City of Chicopee. According to the Community Information System (CIS) of FEMA, there were 25 structures located within the Special Flood Hazard Area (SFHA) in Chicopee as of August 1999, the most current records in the CIS for the City of Chicopee. The Special Flood Hazard Area is broad term used to describe the land that will be covered by floodwaters in a base flood. These areas are where floodplain regulations must be enforced and where flood insurance is mandatory.

In Chicopee, the flood plain of the Connecticut River is a narrow band that follows the City’s western border. The 500-year floodplain for the Connecticut River is slightly larger than the 100-year floodplain and located north of Bolduc Lane along Route 116. There are several residential structures within the Connecticut River’s 500–year floodplain. The floodplain for the Chicopee River is larger than that of the Connecticut River. The mouth of the Chicopee River has the second largest amount of floodplain land in Chicopee; is the floodplain area downstream from Dwight Dam, sections of the Interstate-391 on/off-ramp are located. The largest amount of floodplain land in Chicopee is upstream from the Chicopee Dam. Here, the floodplain can be located by finding the intersection of Morton Lane and Fuller Road.

In addition to major flooding, the City has noted a few areas that are prone to localized flooding. These areas are typically low-lying areas or areas where basements can flood. They are typically flooded during external rain events over a short amount of time. These areas include Steadman and Lorraine Streets, Roy Street/Shaw Park Avenue, Fuller Road, Chicopee Street/Buckley Boulevard and East Main Street. As the Combined Sewer Overflow Replacement work moves forward, the City anticipates the drainage issues in these areas will be remedied. Undersized culverts can also cause localized flooding across the City. Below is a map of culverts and stream crossings in Chicopee.



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

Extent

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

Flash floods are the products of heavy, localized precipitation in a short time period over a given location. Flash flooding events typically occur within minutes or hours after a period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In

rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).

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

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

Previous Occurrences

The major floods recorded in Chicopee have been the result of rainfall alone or rainfall combined with snowmelt. Key floods that have impacted Chicopee include:

- The Great Flood of 1936
- Flooding from 1938 Hurricane

The City has not been impacted by major flooding in recent history. This is mainly due to the levee systems functioning as they were designed. There are, however, concerns that the conditions of Springfield's levee system could negatively impact land in Chicopee. Springfield's part of the shared system was recently assessed and found to be in disrepair.

Probability of Future Events

Based on previous occurrences discussed above and local knowledge, the probability of large scale flooding, a 100- or 500-year flood, in Chicopee is "Low," with a less than 10 percent probability in any given year. (Localized flooding, flooding of streets or areas with poor drainage typically associated with rainfall, is much more likely to happen on an annual basis, with a "Very High" or 70-100 percent probability in any given year. Flooding frequencies for the various floodplains in Chicopee are defined by FEMA as the following:

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

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

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

Impact

Based on local knowledge and previous experience, the Hazard Mitigation Committee believes the impact of a flood event would fall between “Minor” and “Limited,” dependent on event severity and precise location. This equates to approximately 10 percent or more of property in the affected area being damaged. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all structures in the City, \$2,732,438,215, is used.

An estimated 25 percent of damage would occur to 10 percent of structures, resulting in a total of \$68,310,955 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above analysis, Chicopee faces a “very high” vulnerability of from localized flooding and a “Low” vulnerability from 100-year flood events.

Many of the City’s critical facilities and development is located at the convergence of the Chicopee and Connecticut River and/or along either of the rivers. Currently this development is protected by the levee system. If the levee were to fail, flooding could be catastrophic.

Severe Snowstorms / Ice Storms

Hazard Description

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

Ice storms are liquid rain that falls and freezes upon contact with cold objects. There must be an ice build-up of greater than ¼ inch for it to be considered an ice storm. When more than a ½ inch of ice build-up is forecasted a winter storm warning can be triggered.

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

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

Location

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

- Britton Street, New Ludlow Road, James Street & Buckley Blvd: These streets are located in the northern part of Chicopee. The western most sections of Britton, New Ludlow, James, and Buckley at the edge of the Connecticut River Bluffs can be hazardous in winter due to the combination of snow, ice and grade.
- Granby Road: Granby Road more or less parallels the north side of the Chicopee River Bluffs. The western most section of the road can be hazardous in winter due to the combination of snow, ice, grade and one particularly tight curve.
- Memorial Drive: Memorial Drive (Route 33) runs north south, bisecting the City at midpoint. The southern section of the road as it makes the grade from the Chicopee River can be hazardous in winter.
- McKinstry Avenue: McKinstry Avenue runs east west through a portion of the City. It is a known area for ice buildup.
- Chicopee Center: The tight grid network and narrow streets of Chicopee Center make snow management an issue. There are limited places to pile the snow after plowing and these snow piles can narrow the streets making emergency vehicle access challenging.

Extent

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

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

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

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

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

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

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

Previous Occurrences

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

Based on data available from the National Oceanic and Atmospheric Administration, there have been 58 winter storms since 1958 that registered on the NESIS scale. Of these, approximately 28 storms resulted in snow falls in the Pioneer Valley of at least 10 inches. These storms are listed in the table on the next page, in order of their NESIS severity.

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

Most recently, in October 2011, heavy snow, paired with trees still in full foliage caused widespread damage across New England. Thousands of trees were downed causing widespread power outages. In Chicopee, many residents lost power, but the Chicopee Electric Light District (CELD), Chicopee’s municipal electric company, was able to restore power to most of the City within 3-4 days. Chicopee also saw a significant amount of snow throughout the winter of 2015. Many large storms moved through the region in succession. While there were no power outages or damage in Chicopee, the City struggled with the management of the vast amount of snow.

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

Winter Storms Producing Over 10 inches of Snow in the Pioneer Valley, 1958-2013			
Date	NESIS Value	NASIS Category	NESIS Classification
3/12/1993	13.2	5	Extreme
3/2/1960	8.77	4	Crippling
2/15/2003	7.5	4	Crippling
2/2/1961	7.06	4	Crippling
1/21/2005	6.8	4	Crippling
1/19/1978	6.53	4	Crippling
12/25/1969	6.29	4	Crippling
2/10/1983	6.25	4	Crippling
2/14/1958	6.25	4	Crippling
2/5/1978	5.78	3	Major
2/23/2010	5.46	3	Major
1/29/2015	5.42	3	Major
2/8/1994	5.39	3	Major
1/9/2011	5.31	3	Major
2/11/2014	5.28	3	Major
2/18/1972	4.77	3	Major
12/11/1960	4.53	3	Major
2/7/2013	4.35	3	Major
2/22/1969	4.29	3	Major
1/18/1961	4.04	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.5	2	Significant
4/6/1982	3.35	2	Significant
3/4/2013	3.05	2	Significant
3/15/2007	2.54	2	Significant
3/31/1997	2.29	1	Notable
2/2/1995	1.43	1	Notable
1/25/1987	1.19	1	Notable

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

Probability of Future Events

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

Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases.

Impact

Based on local knowledge and previous experience, the Hazard Mitigation Committee believes the impact of an event would be "Limited," with no more than 10 percent of property in the affected area damaged. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all structures in the City, \$2,732,438,215, is used.

An estimated 1 percent of damage would occur to 10 percent of structures, resulting in a total of \$2,732,438 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Chicopee faces a ("1- Very High") vulnerability from severe snow and ice storms.

The City's power and communication infrastructure could be vulnerable to the impacts of a severe snow or ice storm. This could cause residents and businesses to lose power and could impact the City's ability operate normally. Additionally, buildings with flat roofs are especially vulnerable to damage, especially when the snow is wet and heavy. Many of Chicopee's municipal buildings and schools have large, flat roofs. Lastly, ice buildup on the roads and/or large snow banks could create difficult driving situations, which could lead to an increased number of crashes.

Hurricanes / Tropical Storms

Hazard Description

Hurricanes are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour and which generate large amounts of precipitation. Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities. A tropical storm, while similar to a hurricane, is characterized by sustained surface winds ranging from 39-to 73 miles per hour.

Location

Hurricanes and Tropical Storms are regional in nature, which means all of Chicopee is at risk. The location of occurrence is “large,” with over 50 percent of land area affected. Additionally, ridge tops are more susceptible to wind damage.

Extent

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

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

Source: National Hurricane Center, 2012

Previous Occurrences

Hurricanes that have affected Chicopee are shown in the following table. Rainfall associated with hurricanes has caused flooding in the City of Chicopee.

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

Source: National Hurricane Center, 2012

According to the National Oceanic and Atmospheric Administration’s historical hurricane data, five hurricanes have tracked directly through Chicopee. They include two unnamed hurricanes in 1876 and 1945, Hurricane Brenda (1960), Hurricane Belle (1976) and Hurricane Gloria (1985). These hurricanes did not cause significant damage in Chicopee. The Great New England Hurricane of 1938 caused widespread damage across the region and in Chicopee, despite not tracking directly through Chicopee. The flood control systems in place today were built by the U.S. Army Corp of Engineers in response to this flooding and the Great New England Flood of 1936. In recent history, Chicopee has not been severely impacted by any hurricanes.

Probability of Future Events

Chicopee’s location in western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience other high wind events. Based upon past occurrences, it is reasonable to say that there is a “moderate” probability of hurricanes or tropical storms, or a 10 to 40 percent probability in any given year.

Impact

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

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

Source: National Oceanic and Atmospheric Administration. <<http://www.nhc.noaa.gov/pdf/sshs.pdf>>

Based on local knowledge and previous experience, the Hazard Mitigation Committee believes the City faces a "Limited" impact from hurricanes, with less than 10 percent of property in the affected area damaged.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the City, \$2,732,438,215 is used. An estimated 25% of damage (20% associated with flooding and 5% associated with wind damage) to 10% of structures would result in an estimated \$68,310,955 of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above analysis, Chicopee faces a "3-Medium" vulnerability from hurricanes and tropical storms.

The entire City would be vulnerable to the impact of a hurricane. Areas prone to flooding are particularly at risk. Additionally, high winds could impact the City's communication and energy infrastructure. Further, City Hall and its clock tower are not structurally sound and may not withstand high winds.

Severe Thunderstorms / Wind / Tornadoes / Microbursts

Hazard Description

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

Wind is air in motion relative to surface of the Earth. For non-tropical events over land, the NWS issues a Wind Advisory (sustained winds of 31 to 39 mph for at least one hour or any gusts 46 to 57 mph) or a High Wind Warning (sustained winds 40+ mph or any gusts 58+ mph). For non-tropical events over water, the NWS issues a small craft advisory (sustained winds 25-33 knots), a gale warning (sustained winds 34-47 knots), a storm warning (sustained winds 48 to 63 knots), or a hurricane force wind warning (sustained winds 64+ knots). For tropical systems, the NWS issues a tropical storm warning for any areas (inland or coastal) that are expected to experience sustained winds from 39 to 73 mph. A hurricane warning is issued for any areas (inland or coastal) that are expected to experience sustained winds of 74 mph. Effects from high winds can include downed trees and/or power lines and damage to roofs, windows, etc. High winds can cause scattered power outages. High winds are also a hazard for the boating, shipping, and aviation industry sectors.

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

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

Location

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

Extent

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

Tornadoes are measured using the enhanced Fujita Scale of Tornado Intensity, shown with the following categories and corresponding descriptions of damage:

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

Source: National Oceanic and Atmospheric Administration. < <http://www.spc.noaa.gov/faq/tornado/f-scale.html>>

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

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

Source: <http://www.myforecast.com/bin/climate.m?city=19342&metric=false>

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

Hail Extent	
Hail Size	Object Analog
.50	Marble, Moth Ball
.75	Penny
.88	Nickel
1.00	Quarter
1.25	Half Dollar
1.50	Walnut, Ping Pong Ball
1.75	Golf Ball
2.00	Hen Egg
2.50	Tennis Ball
2.75	Baseball
3.00	Tea Cup
4.00	Grapefruit
4.50	Softball

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

Previous Occurrences

As thunderstorms and wind affect the City regularly on an annual basis, there are not significant records available for these events. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Most occur in the late afternoon and evening hours, when heating is the greatest.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester. The most common months are June, July, and August, but the Great

Barrington, MA tornado (1995) occurred in May and the Windsor Locks, CT tornado (1979) occurred in October. In 2011, a tornado ranked F3 (Severe Damage) on the Fujita Scale of Tornado Intensity, blew through the region, impacting West Springfield, Westfield, Springfield, Monson, Wilbraham, Brimfield, Sturbridge, and Southbridge. The tornado and related storm killed 3 people and resulted in hundreds of injuries across the state. It also left widespread property damage in its wake. While Chicopee was not impacted by this tornado, the City did see a significant amount of hail and lightning. Most recently, on February 25, 2017, an EF1 tornado touched down in Conway and Goshen, Massachusetts. The tornado damaged dozens of homes, hundreds of trees and left 75% of the residents without power. This was the first tornado in Massachusetts to touch down in February since record keeping started in the 1950s. Nine incidents of tornado activity (F3 or less) have occurred in Hampden County since 1954 and no known tornadoes have touched down or tracked through Chicopee.

The Hazard Mitigation Committee reports that in 2011 there was a microburst in Chicopee. It downed a number of trees and caused some minor property damage to buildings and automobiles. Microbursts appear to be happening more frequently in surrounding communities.

Probability of Future Events

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

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

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

Based upon the available historical record, the estimated probability of a tornado/microburst in Chicopee is "High," or between 40 and 70 percent in any given year. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Thus, there is a "Very High" probability 70 percent to 100 percent change in any given year of a severe thunderstorm or winds affecting the City.

Impact

Based on local knowledge and previous experience, the Hazard Mitigation Committee believes the City faces a "limited" impact from severe thunderstorms and winds, with 10 percent or more of the City affected and a "critical" impact from tornadoes and microbursts, with 25 percent or more of the City affected. The potential for locally catastrophic damage is a factor in any severe weather event. In Chicopee, a tornado that hit residential areas would leave much more damage than a tornado with a travel path that ran along the City's forested areas, where little settlement has occurred. Chicopee is mainly built out at this point, so these areas in the City are quite limited. Most buildings in the City have

not been built to Zone 1, Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, with most of the city's housing built before this date.

To approximate the potential impact to property and people that could be affected by severe weather, tornado, or wind, the total value of all residential property in the City, \$2,732,438,215 is used. An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$27,324,382 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate. If a tornado, similar to the one that touched down in Springfield in 2011, were to hit Chicopee damage would be significant more widespread and costly.

Vulnerability

Based on the above assessment, Chicopee has a vulnerability of "3-Medium" from severe thunderstorms, and a "2-High" vulnerability from tornadoes and severe winds.

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

Wildfire / Brushfire

Hazard Description

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

FEMA has classifications for 3 different classes of wildfires:

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

Location

Approximately 3,484 acres of Chicopee (22% percent) is forested and therefore at risk of wildfire. Because most of the land in Chicopee is developed, only isolated parts of the City are at risk. The neighboring town of Ludlow has large forested areas. A wildfire in Ludlow could impact Chicopee. The potential location of occurrence is "Medium," with between 10 and 50 percent of land area affected.

The following areas of the City are considered to be most prone to wildfires/brush fires:

- Slate Road
- East Main Street
- Willimansett Point
- The Connecticut River and Chicopee River Corridor
- Burnett Road
- Chicopee State Park

Extent

Wildfires can cause widespread damage to areas affected. A wildfire can spread very rapidly, depending on local wind speeds and be very difficult to control. Fires can last for several hours up to several days.

In Chicopee, 22% of the land is forested (3,484 acres), and is therefore at risk of fire. A large wildfire could damage almost all of the city's land mass in a short period of time. However, Massachusetts receives more than 40 inches of rain per year and much of the landscape is fragmented. Together these two traits make wildfires uncommon in Massachusetts. Nevertheless, in drought conditions a brushfire or wildfire would be a matter of concern.

Previous Occurrences

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

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

Most recently in Chicopee, there was a brushfire in the area of Slate Road. The burn lasted for 2-3 days. Dry conditions caused by drought impacted the intensity of this fire. Chicopee does not allow open burning in the City. This ban includes the use of fire pits. The Fire Department, however, responds to a number of illegal burns annually.

Probability of Future Events

In accordance with the Massachusetts Hazard Mitigation Plan, the Hazard Mitigation Committee found it is difficult to predict the likelihood of wildfires in a probabilistic manner because of the number of variables involved. However, given the proximity of previous wildfires, and those events' proximity to the City, the likelihood of a future wildfire is determined to be "Low," or between a 1 and 10 percent probability in any given year.

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

Impact

Chicopee faces a "minor" impact from wildfires, with minimal damage anticipated in such an event. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the City, \$2,732,438,215 is used.

An estimated 100 percent of damage would occur to 1 percent of structures. While 20% of Chicopee is forested, these areas are typically isolate from structures. Thus the number of impacted structures would be quite low. This would result in a total of \$27,324,382 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Chicopee faces a "5-Very Low" vulnerability from wildfire and brushfires.

Most of the City's critical infrastructure is not located near forested areas. The Water Treatment Plant and the Burnett Road Fire Station are located in forested areas near Westover Air Reserve Base. Additionally, the Westover Air Reserve Base is bordered by the most forested areas of Chicopee and could be at risk if a wildfire were to occur.

Earthquakes

Hazard Description

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people.¹ 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.²

Location

As earthquakes are considered regional in nature, the entire City is susceptible to earthquakes, and the location of occurrence is "large," with over 50 percent of land affected.

Extent

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

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

Source: Massachusetts Emergency Management Agency. "2013 State Hazard Mitigation Plan."

¹ Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm.

² Federal Emergency Management Agency Web site: www.fema.gov/hazards/earthquakes/quake.shtm.

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

Source: US Geological Survey. < https://earthquake.usgs.gov/learn/topics/mag_vs_int.php>

Previous Occurrences

The most recent earthquakes in the region that could have affected the City of Chicopee are shown in the table below. There is no record of any damage to the City of Chicopee as a result of these earthquakes. The Hazard Mitigation Committee noted the potential experience of an earthquake in 2011. Members noted experiencing wide-spread shaking throughout the City. This shaking is believed to be a result of the earthquake that hit Virginia and Washington, DC.

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

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

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

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

Probability of Future Events

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

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

Based upon existing records, there is a "Very Low" probability of earthquakes in Chicopee, with less than a 1 percent chance of an earthquake in any given year.

Impact

Massachusetts introduced earthquake design requirements into the State Building Code in 1975 and further improved the building code for seismic reasons in the 1980s and 1990s. However, these specifications apply only to new buildings or extensively-modified existing buildings. Buildings, bridges, water supply lines, electrical power lines, and facilities built before the 1980s may not have been designed to withstand the forces of an earthquake.

Liquefaction is the process by which loose, water-saturated sediments lose their strength and function more like a liquid than a solid. The shaking of the earthquakes destabilizes the soils and can undermine structural foundations causing extensive destruction. This is most likely to happen on lands near watercourses. Liquefaction accompanying an earthquake further exacerbates the

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the City, \$2,732,438,215 is used.

An estimated 100 percent of damage would occur to 25 percent of structures, resulting in a total of \$683,109,553 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on this analysis, Chicopee maintains a "5-Very Low" vulnerability from earthquakes.

Older buildings are particularly vulnerable to earthquakes as construction practices pre-date building codes that included strong seismic consideration. The City has a number of historical buildings that could be damaged or destroyed if a large enough earthquake were to occur. A loss of these historic buildings could represent a loss of Chicopee's history and culture. There have been no studies done to determine how Chicopee's critical infrastructure, such as the Public Safety Complex, City Hall or Department of Public Works would fair in an earthquake. Finally, all of the City's evacuation routes contain either bridges or underpasses, and could be obstructed if a bridge were to fall as a result of an earthquake.

Dam and Levee Failure

Hazard Description

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

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

The Massachusetts Department of Conservation and Recreation’s (DCR) Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the Commonwealth of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

Location

Chicopee has 4 dams located within its boundaries. The location of these dams can be found on Chicopee’s Hazard Mitigation Map. The location of occurrence for a dam failure has been determined to be "Small," with less than 10 percent of land area affected.

Dams and Levees in Chicopee			
Dam	Hazard Level	Purpose	Condition
Chicopee Reservoir Dam	High	Recreation	Fair
Lower Bemis Pond Dam (1862)	Significant	Recreation	Poor
Wade Lake Dam	Significant	Recreation	Fair
Upper Bemis Pond Dam (1954)	Low	Recreation	Fair

The City is not concerned about the potential of dam failure beyond its borders. There are not significant hazard dams with inundation zones in the City. It is, however, likely that if the Quabbin Reservoir Dam were to fail, Chicopee’s waterways would experience some flooding, especially at the confluence of the Chicopee and Connecticut River, and the City’s water supply

would be depleted. Land on the northern banks of the Chicopee River would also be vulnerable. The City's water treatment plant is located here and could be impacted by the flooding.

A six mile system of flood walls and earthen levees, the Connecticut River Levee System, runs along the Connecticut River in Chicopee. This system was built by the U.S. Army Corp of Engineers after major floods early in the 20th century. Many of Chicopee's most densely populated neighborhoods are concentrated along the Connecticut River and would be at risk of flood damage. Recently, the City performed extensive maintenance and upgrades and was recertified by the U.S. Army Corp of Engineers. This recertification indicates that the levee system should function properly in the case of a severe flood.

Extent

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

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

Previous Occurrences

There have been two past dam failures in Chicopee. On July 17, 1922 the concrete dam at Langwald Pond "gave way and the freed torrent burst a wooden dam at Robert's Pond." Damage was estimated at \$300,000 (New York Times, July 18, 1922). The wooden dam at Robert's Pond (also, known as Mountain Lake) was replaced with an earthen structure. This structure failed in 2006, but there was no damage to property or injuries recorded. The dam has since been removed.

Probability of Future Events

If maintenance is deferred as Chicopee's dams age, the likelihood of a dam failure will increase. Currently however the frequency of dam failures is "very low" with a less than 1 percent chance of a dam failing in any given year.

As described in the Massachusetts Hazard Mitigation Plan, dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or all of its entire designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream. Throughout the west, communities downstream of dams are already seeing

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

Impact

Impact from a dam failure event could range from “limited” to “catastrophic,” with approximately 20 percent of property in the affected area damaged or destroyed. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in City, \$2,732,438,215 is used. An estimated 100 percent of damage would occur to 20 percent of structures, resulting in a total of \$546,487,643 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on this analysis, Chicopee has a "5-Very Low" vulnerability from dam or levee failure.

While there are no readily available studies highlighting the inundation zones of the dams in Chicopee, it is estimated that most critical infrastructure would not be impacted by. The dams located within the Chicopee State Park would likely impact conservation land.

Some of the most densely populated areas of Chicopee are current protected the Connecticut River Levee System. If this system were to fail during a major flooding event, critical facilities, people and buildings could all be severely impacted. The extent of the damage that could occur if the levee system were to fail is unknown, because these areas are no longer considered as part of the 100- or 500- year floodplains on the City’s FIRMs.

Drought

Hazard Description

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

Location

As this hazard is regional in nature, a drought could impact the entire city, resulting in a “large” location of occurrence, or more than 50 percent of total land area affected.

Extent

The severity of a drought determines the scale of the event and would vary among residents depending on whether the residents’ water supply is derived from a private well or the public water system. Massachusetts’ wells are permitted according to their ability to meet demand for 180 days at maximum capacity with no recharge; if these conditions extended beyond the thresholds that determine supply capacity the damage from a drought could be widespread due to depleted groundwater supplies. The U.S. Drought Monitor also records information on historical drought occurrence. Data is only available at the State level. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

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

Source: University of Nebraska-Lincoln-The National Drought Mitigation Center.
<<http://droughtmonitor.unl.edu/aboutus/classificationscheme.aspx>>

Previous Occurrences

In Massachusetts, 6 major droughts have occurred statewide since 1930.³ They range in severity and length, from 3 to 8 years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the U.S. Drought Monitor:

Annual Drought Status	
Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 99% of the state
2003	No drought
2004	D0 conditions in 44% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 57% of the state
2009	D0 conditions in 44% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state
2013	D1 conditions in 60% of the state
2014	D1 conditions in 54% of the state
2015	D1 conditions in 100% of the state
2016	D3 conditions in 52% of the state

Source: US Drought Monitor

To date, Chicopee has not been impacted by any previous droughts in the Commonwealth. The City has not experienced a threat to its water supply, and does not anticipate any severe water shortages throughout the City. However, the conditions at the Quabbin Reservoir dictate the City's water supply. A severe drought, coupled with sustained demand from eastern Massachusetts, could impact the amount of water available to the City.

During the summer of 2016, the Pioneer Valley and large portions of the Commonwealth were impacted by drought. Many communities instituted water bans on non-essential uses in order to conserve water. Communities that received water from the Quabbin were, however, not impacted and water bans were not put in place, including Chicopee.

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

Probability of Future Events

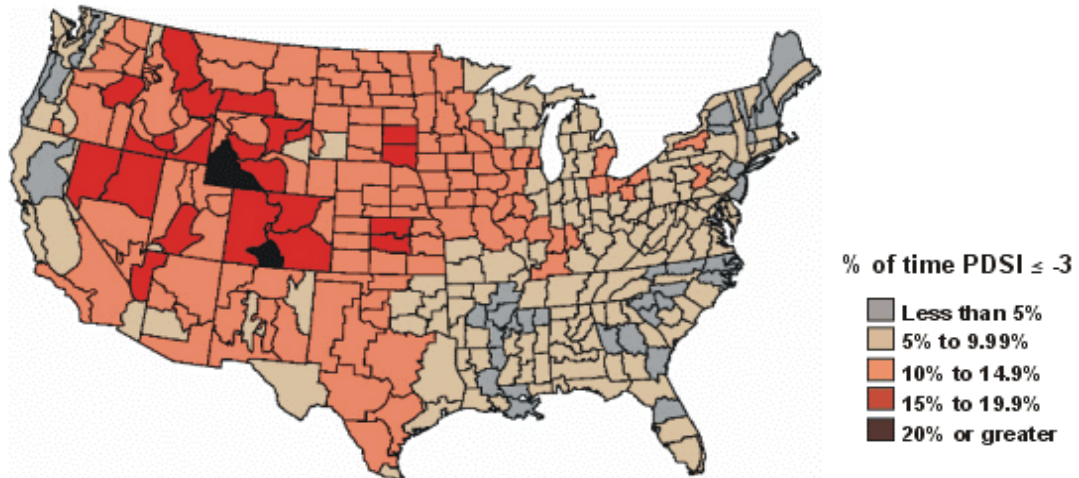
In Chicopee, as in the rest of the Commonwealth, drought has a “Very High” probability of future occurrence, or between 70 and 100 percent in any given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event. When evaluating the region’s risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought.⁴

Palmer Drought Severity Index

1895–1995

Percent of time in severe and extreme drought



Source: University of Nebraska-Lincoln-The National Drought Mitigation Center.
<<http://drought.unl.edu/Planning/Monitoring/HistoricalPDSIMaps.aspx>>

Impact

Due to the water richness of western Massachusetts, Chicopee is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard. As a result, the impact of a drought would be “minor,” with only minor property damage, disruption on quality of life, and the slight potential for increased wildfire and brushfires.

⁴ National Drought Mitigation Center – <http://drought.unl.edu>

Vulnerability

Based on the above assessment, Chicopee has a vulnerability of "4-Low" from drought. While a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard.

Extreme Temperature

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

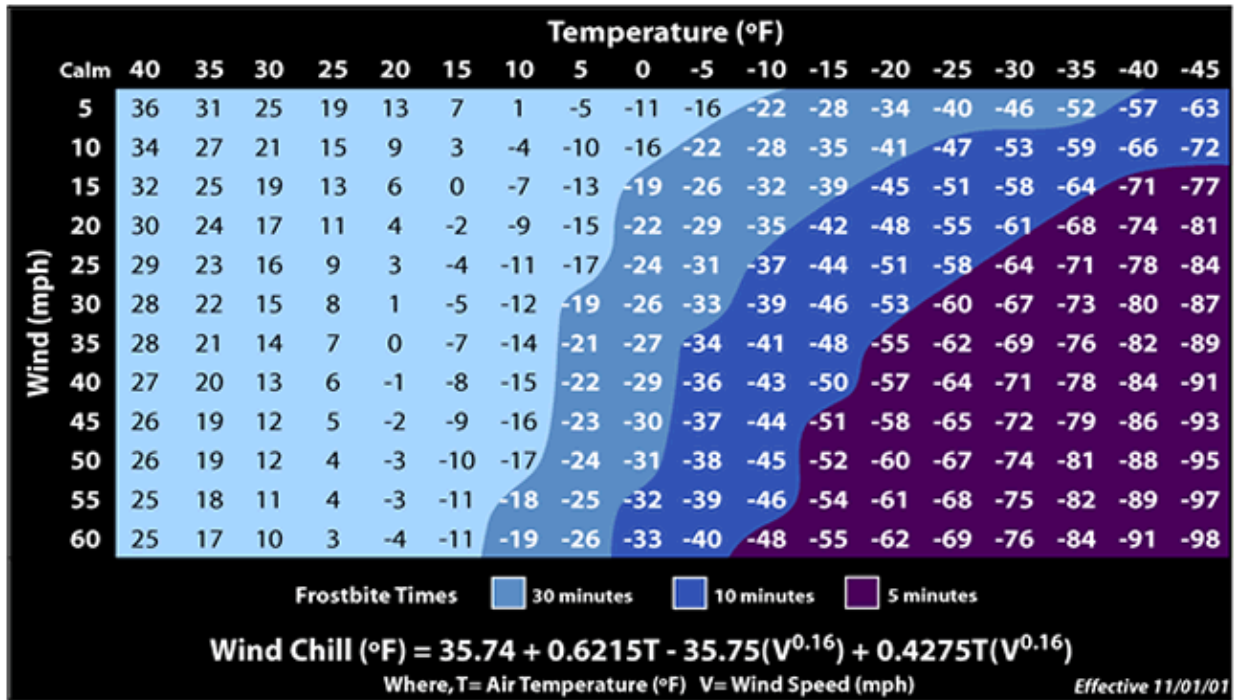
Location

As this hazard is regional in nature, extreme temperatures would affect the whole community resulting in a “large” location of occurrence with more than 50 percent of total land area affected.

Extent

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

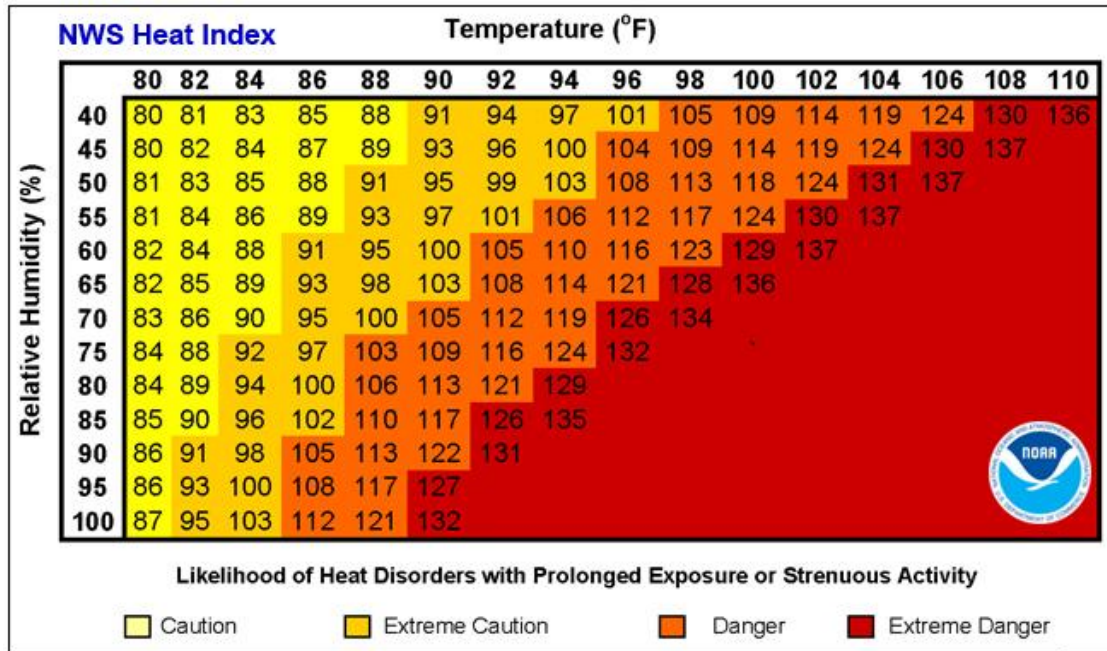
Wind Chills Temperature Index



Source: National Oceanic and Atmospheric Administration.
 <http://www.nws.noaa.gov/om/cold/wind_chill.shtml>

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

Heat Index



Source: National Oceanic and Atmospheric Administration, http://www.nws.noaa.gov/om/heat/heat_index.shtml

Previous Occurrences

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

The following are some of the lowest temperatures recorded in parts of Massachusetts for the period from 1895 to present⁵:

- Taunton, MA: -35°F (January 5, 1904)
- Barre, MA: -35°F (January 12, 1943)
- Chester, MA: -35°F (January 12, 1981)

The following are some of the highest temperatures recorded for the period from 1895 to present:

- New Bedford, MA: 107°F (August 2, 1975)
- Chester, MA : 107°F (August 2, 1975)

Probability of Future Events

The probability of future extreme heat and extreme cold is considered to be "low," or between 1 and 10 percent in any given year. The Hazard Mitigation Committee is concerned, however, that with climate change the probability of future events will increase.

⁵ State Climate Extremes Committee (SCEC), Records Data. <https://www.ncdc.noaa.gov/extremes/scec/records>

Impact

Extreme cold and extreme heat are dangerous situations that can result in health emergencies for susceptible people such as those:

- without shelter or who are stranded or
- who live in homes that are poorly insulated
- without heat or air conditioning or some other way to stay cool.

The impact of extreme temperatures, the impact of extreme heat or cold in Chicopee is considered to be "minor," with no property damage and very limited affect on humans. Extreme temperatures could put a strain on City resources as public facilities need to be used more frequently as heating and cooling stations or emergency shelters.

Vulnerability

Chicopee's vulnerability from extreme heat and cold is considered to be "5-Very Low."

Structures and infrastructure within the City are not at risk for damage due to extreme temperatures, but populations that are not prepared to contend with these temperature extremes could be most vulnerable. Extended periods of extreme heat and cold could also impact the electricity supply. An increased demand placed on the grid by people increasing the heat or air conditioning in their homes could result in an unmet demand or rising costs. With rising costs, the typically vulnerable populations would be put further at risk.

Landslides

Hazard Description

“The term “landslide” includes a wide range of ground movements, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors (USGS, 2013). According to the Massachusetts State Geologist, Steve Mabee, slope saturation by water is a primary cause of landslides in the Commonwealth. This effect can be in the form of intense rainfall, snowmelt, changes in groundwater level, water level changes along coastlines, earth dams, and the banks of lakes, rivers and reservoirs. Water added to a slope can not only add weight to the slope which increases the driving force, but also can increase the pore pressure in fractures and soil pores, which decreases the internal strength of the earth materials needed to resist driving forces.

Landslides in Massachusetts can be divided into four general groups:

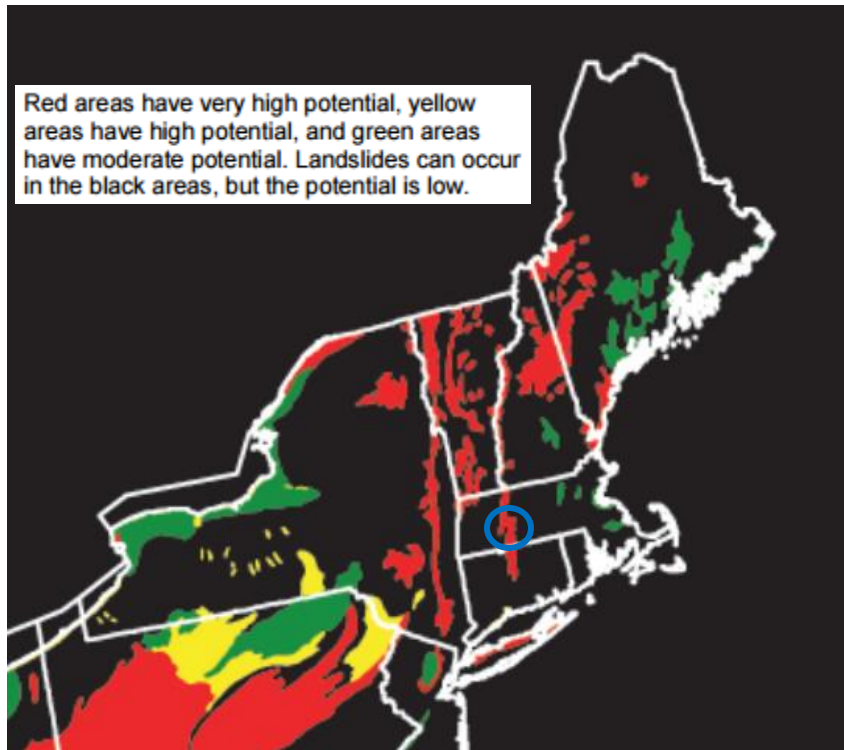
- construction related
- over steepened slopes caused by undercutting due to flooding or wave action
- adverse geologic conditions
- slope saturation

Construction related failures occur predominantly in road cuts excavated into glacial till where topsoil has been placed on top of the till. This juxtaposition of materials with different permeability levels often causes a failure plane to develop along the interface between the two materials resulting in sliding following heavy rains. [...] Other construction related failures occur in utility trenches excavated in materials that have very low cohesive strength and an associated high water table (usually within a few feet of the surface). The clays often formed in the deepest parts of many of the glacial lakes that existed in Massachusetts following the last glaciation. Some of the major glacial lakes are Bascom, Hitchcock [which encompassed the area of present-day Hadley], Nashua, Sudbury, Concord, and Merrimack (Mabee, 2010).” (Massachusetts Hazard Mitigation Plan pg 12-1).

Location

The entire U.S. experiences landslides, with 36 states having moderate to highly severe landslide hazards. Expansion of urban and recreational developments into hillside areas leads to more people being threatened by landslides each year. The figure below (U.S. Northeast Landslide Incidence and Susceptibility Map) shows landslide potential mapped by the United States Geological Survey (USGS) for the eastern U.S. Landslides are common throughout the Appalachian region and New England. The greatest eastern hazard is from sliding of clay-rich soils. Based on the U.S. data set for landslides, it appears that areas along the Connecticut River in western Massachusetts (circled in blue), and the greater Boston area have the highest risk of landslide.

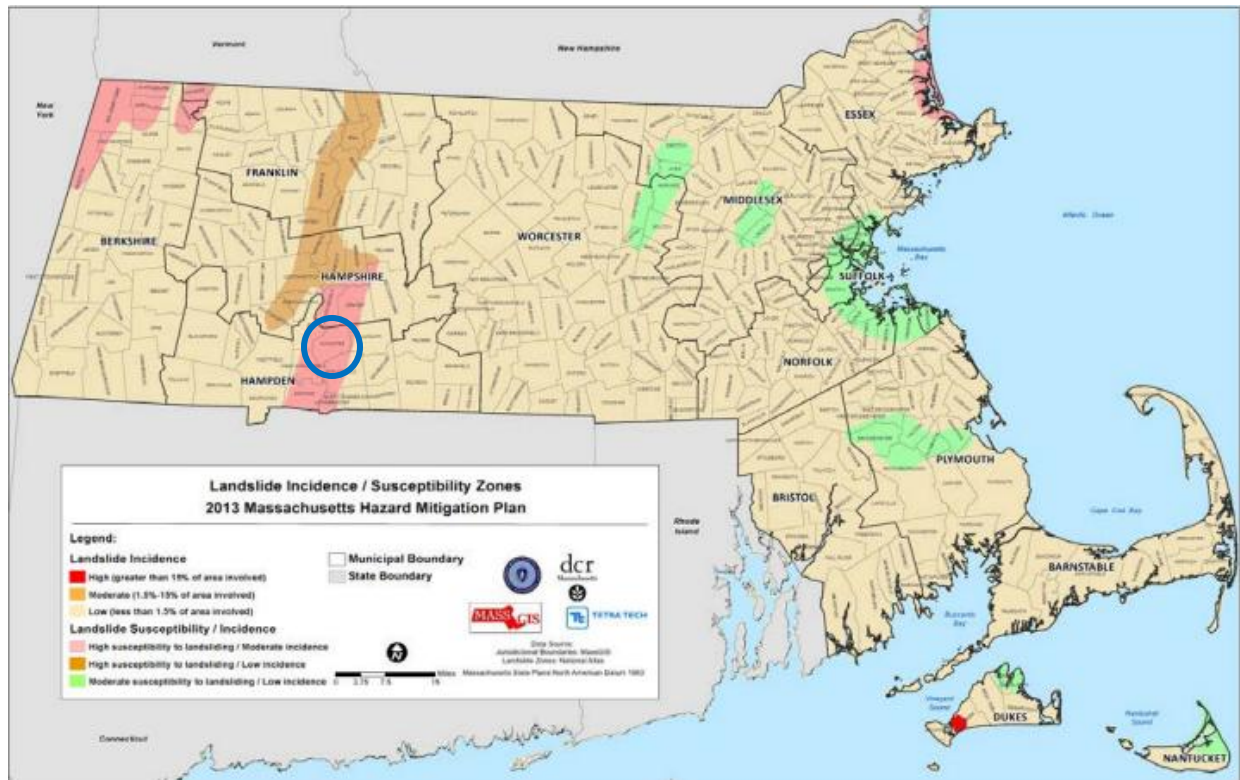
U.S. Northeast Landslide Incidence and Susceptibility Map



Source: <http://geology.com/usgs/landslides/>

The figure below (2013 Massachusetts Landslide Incidence and Susceptibility Zones) illustrates the landslide incidence and susceptibility zones in Massachusetts. Note that parts of Chicopee, circled in blue, are located within the pink band of “high” landslide susceptibility and “low” incidence that passes through the region.

2013 Massachusetts Landslide Incidence and Susceptibility Zones



Source: Massachusetts Department of Conservation Resources

Terrace escarpment slopes pose the most significant risk, in terms of landslides for Chicopee. Terrace escarpments are characterized by steep slopes with specific mixtures of soils that are easily disturbed. These areas, which are often prone to erosion, are typically located along rivers and streams. In Chicopee, these soils have been identified along Interstate 391, in a northwestern section of the City near the Connecticut River and in a southwestern section of the City near the Chicopee River. The Chicopee Conservation Commission is responsible for the regulations regarding development on these soil types.

Extent

To determine the extent of a landslide hazard, the affected areas need to be identified and the probability of the landslide occurring within some time period needs to be assessed. Natural variables that contribute to the overall extent of potential landslide activity in any particular area include soil properties, topographic position and slope, and historical incidence. Predicting a landslide is difficult, even under ideal conditions. As a result, the landslide hazard is often represented by landslide incidence and/or susceptibility, defined below:

“Landslide incidence is the number of landslides that have occurred in a given geographic area. High incidence means greater than 15% of a given area has been involved in landslides; medium incidence means that 1.5% to 15% of an area has been involved; and low incidence means that less than 1.5% of an area has been involved.”

-Massachusetts “2013 State Hazard Mitigation Plan.”

Landslide susceptibility is defined as the probable degree of response of geologic formations to natural or artificial cutting, to loading of slopes, or to unusually high precipitation. It can be assumed that unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. Landslide susceptibility depends on slope angle and the geologic material underlying the slope. Landslide susceptibility only identifies areas potentially affected and does not imply a time frame when a landslide might occur. “High,” “Medium,” and “Low” susceptibility are delimited by the same percentages used for classifying the incidence of landslides.

Previous Occurrences

To date there has not been a landslide in Chicopee. However, there are some areas of the City have experienced significant erosion.

Probability of Future Events

Increasing short-term heavy precipitation events will increase the potential risk of landslides in Chicopee. There is a “low” probability or a 10 to 40% chance of a landslide happening in the next year.

Impact

The impact of a landslide in Chicopee would be “limited” with minimal damage to structures in the City. To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in the City, \$2,732,438,215 is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$273,243,821 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Vulnerability

Based on the above assessment, Chicopee has a hazard index rating of “3 –moderate” from landslides.

Homes located on lots with significant slopes (i.e., 10% or greater) are at greater risk of impacts from landslides and roadways are also likely to be the most impacted by landslides. In Chicopee, a number of critical facilities have been built in areas with terrace escarpment soils. These include the South Hadley Water Treatment Plant, which serves South Hadley and Granby, and a number of schools. If soil erosion were to be severe, these structures could be largely impacted.

Impacts of Climate Change

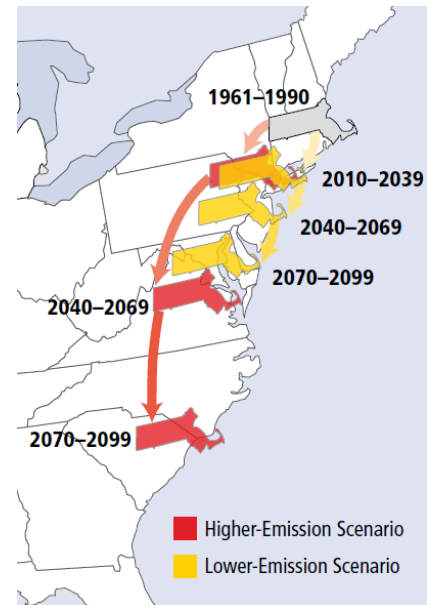
According to the U.S. Environmental Protection Agency, climate change refers to any significant change in the measures of climate—temperature, precipitation, wind patterns, etc—lasting for an extended period of time. Climate change is already causing natural hazards to have more of an impact on Chicopee, with hotter summers, wetter winters, more severe storms, and more frequent flooding. In the future, general climatic changes are projected to result in Chicopee experiencing higher temperatures and more precipitation. There will also be wider variability in weather extremes and more days of extreme heat above 90 degrees, more heat waves, more floods, more droughts, and more tornados, hurricanes and heavy storms.

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

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

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

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



At current rates of greenhouse gas accumulation and temperature increases, the climate of Massachusetts will become similar to those of present-day New Jersey or Virginia by 2040-2069, depending on future GHG emissions.
Source: NECIA 2006

Expected Climatic Variations Due to Climate Change

Category	Current (1961-1990 avg.)	Predicted Change 2040-2069	Predicted Change 2070-2099
Average Annual Temperature (°F)	46°	50° to 51°	51° to 56°
Average Winter Temperature (°F)	23°	25.5° to 27°	31° to 35°
Average Summer Temperature (°F)	68°	69.5° to 71.5°	74° to 82°
Days over 90 °F	5 to 20 days	-	30 to 60 days
Days over 100 °F	0 to 2 days	-	3 to 28 days
Annual Precipitation	41 inches	43 to 44 inches	44 to 47 inches
Winter Precipitation	8 inches	8.5 to 9 inches	9 to 10.4 inches
Summer Precipitation	11 inches	10.9 to 10.7 inches	10.9 to 11 inches

Sources: Massachusetts Climate Adaptation Report 2011, NECIA

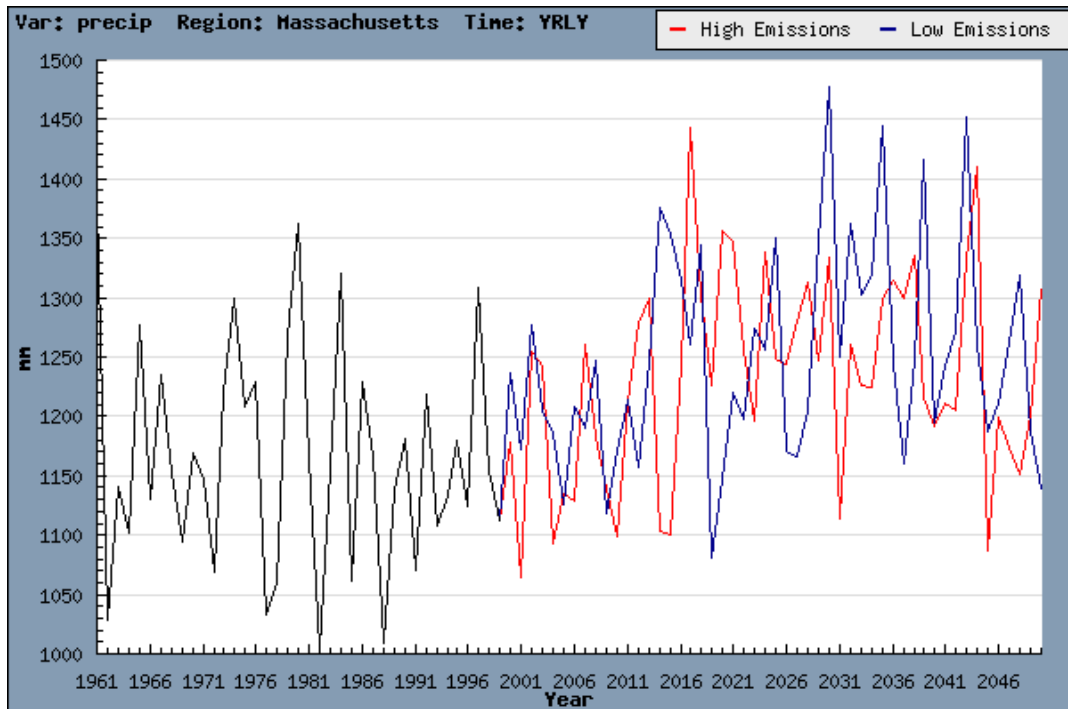
Increased Flooding

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

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

- Currently designated 10-year, 25-year, 100-year and 500-year floodplains will flood more frequently.
- More damage to areas too small to have FEMA floodplain designation and not already zoned floodplain. Many of these areas already flood consistently, and so climate change will be potentially very damaging to these areas.
- Increased occurrences of localized flooding, in areas designated on the Hazard Identification Map.
- Increased stress on the City’s flood pumps and levee system.
- Increased instances of standing water will lead to increased mosquito populations and greater risk of disease vectors.

Massachusetts Rainfall 1961-2050



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

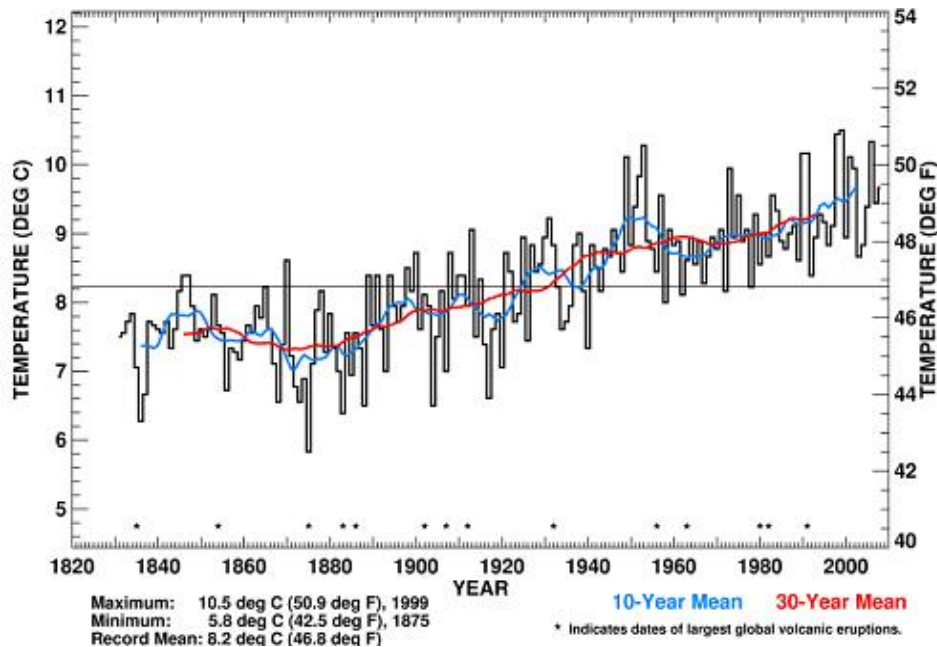
Source: NECIA

Increased Temperatures

Average temperatures in the Pioneer Valley have been increasing over time due to climate change and this trend is likely to continue in the future. Higher temperatures due to climate change will likely have an effect on future drought risk in Chicopee. The climate of the Pioneer Valley is strongly influenced by the weather patterns of the Northeast United States, a region ranging from Pennsylvania to Maine. Average temperatures in the Northeast have been increasing since the late 1800s. The overall average annual temperature increase in this area has been approximately 0.9°C (1.5°F) since approximately 1900. Recent regional data released by the Northeast Climate Science Center suggests that the Northeast is warming at a faster rate than the rest of the United State. The region is projected to hit the 2°C threshold a full 20 years (2040) before the rest of the world.

According to records of the United States Historical Climatology Network, most of this temperature increase has occurred recently, with an average increase of about 0.2 degrees C (0.5°F) per decade since 1970. These higher average temperatures have primarily been the result of warmer winters (December through March), during which there has been an increase of 1.3°F per decade since 1970. In addition to average temperature increases, the number of extremely hot and record heat days has also increased: the number of days with temperatures of 90°F and higher throughout the Northeast has doubled during the past 45 years. The northern parts of the New England currently see about five days per year with temperatures over 90°F and no days over 100°F, while the southern portion sees up to 20 days over 90°F and 2 days over 100°F. The National Climate Assessment (2014) predicts that between 2041 and 2070, the region will experience 30-40 days a year above 90°F.

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



From 1831 to 2008, there was a trend in temperatures steadily increasing at the National Weather Service's Blue Hill Observatory, the home of the oldest continuously recorded weather records in the U.S.

Source: Michael J. Iacono, Atmospheric and Environmental Research, Inc./ Blue Hill Observatory, MA. Plot includes temperature data for 1831–1884 from Milton and Canton that were adjusted to the Blue Hill summit location.

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

- Increased temperatures will put stress on current food production and require farming operations to adjust by planting new varieties of crops and/or changing their irrigation methods.
- Changes are likely to introduce new insect species, pests, and invasive plant species to the region, which will result in further threats to food production and the forests across the region. Additional prominence of ticks may potentially also lead to more occurrence of Lyme disease.
- Increased energy usage in order to cool buildings in the summer and long-term electrical needs will increase.
- Greater stress on special populations, such as senior citizens, without access to air conditioning during heat waves.

Severe Weather

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

- Slight decrease in summer precipitation that will result in an increase in the number of droughts. Short-term (1 to 3 month) droughts are likely to increase in frequency in the Northeast to the level of one per year. According to the Connecticut Climate Adaptation

Report, "Facing Our Future," the occurrence of drought in that state is already increasing, with shallower lakes drying up.⁶

- Decreased rainfalls in the summer months will potentially create more occurrences of wildfires.
- Less dependable rainfall will also impact the Pioneer Valley's food systems, in the form of less dependable rainfall and require the region's farming operations to evolve.
- Increased occurrences of major snowstorms, especially during times previously considered unseasonably warm. Should storms occur when there are still leaves on trees, there could be great damage due to broken limbs, as happened during the Snowstorm of 2011
- Increased occurrences of severe thunderstorms and hurricanes, which will result in more wind damage from major storms and greater flooding.
- Increase occurrence of microbursts and/or tornadoes, which will result in significant damage to structures, infrastructure, people and the environment.

Secondary Effects

Secondary effects tied to the impact of climate change include:

- Disruption of communications services due to damage to cellular phone towers and other communications devices.
- Increased costs of home ownership due to higher flood insurance premiums, which will disproportionately affect low income residents.
- Higher difficulty in the ability of residents to obtain basic services that are heavily reliant on electricity after severe weather events, including gasoline and perishable food items.
- Changing temperature and precipitation patterns could cause stress to trees or lead to the presence of new invasive species which threaten the City's urban forest. The loss of trees would further exacerbate the urban heat island effect and diminish the ability to treat stormwater locally.

⁶ State of Connecticut Department of Environmental Protection. Facing Our Future: Adapting to Connecticut's Changing Climate. March 2009.

Other Hazards

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

4: CRITICAL FACILITIES

Facility Classification

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

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

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

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

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

Category 1 – Emergency Response Services

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

Emergency Operations Center

Primary: Public Safety Complex – 80-110 Church Street

Alternate: Department of Public Works- 115 Baskin Drive

Fire Stations

Public Safety Complex – 80-110 Church Street

Station 3 – 96 Cabot Street

Station 4 – 654 Burnett Road

Station 5 – 580 Chicopee Street

Station 7 – 739 Grattan Street

Station 8 – 900 James Street

Police Station

Public Safety Complex – 80-110 Church Street

Downtown Sub-Station – 264 Exchange Street

Willimansett Sub-Station – 803 Chicopee Street (Willimansett Area)

Department of Public Works

Offices- 115 Baskin Drive

Water Department

115 Baskin Drive- Offices

27 Tremont Street- Equipment

Emergency Fuel Stations

All City Vehicles other than Police and Fire

Chicopee Department of Public Works- 115 Baskin Drive

Police and Fire Department Vehicles

Public Safety Complex- 80-110 Church Street

Emergency Electrical Power Facility

Public Safety Complex – 80-110 Church Street

Fire Station 3 – 96 Cabot Street

Fire Station 4 – 654 Burnett Road

Fire Station 5 – 580 Chicopee Street

Fire Station 7 – 739 Grattan Street

Fire Station 8 – 900 James Street

Chicopee High School- 820 Front Street

Chicopee Comprehensive High School- 617 Montgomery Street

Chicopee Senior Center (River Mills Center)-5 West Main Street*

Chicopee Electric Light District- 725 Front Street

Westover Air Reserve Base-57 Patriot Avenue

* Chicopee Senior Center has the infrastructure in place for a generator, but currently does not have a generator for the facility.

Emergency Shelters

Chicopee Comprehensive High School – 617 Montgomery Street

Chicopee High School – 820 Front Street

Chicopee Senior Center (River Mills Center) –5 West Main Street

Chicopee Public Library—449 Front Street

Church of the New Covenant in Willimansett-780 Chicopee Street (Tentative)

Utilities

Chicopee Electric Light District

Columbia Gas of New England

Eversource

Water Treatment Facilities

Water Treatment Plant- Burnett Road

Water Treatment Plan- Jones Ferry Road

Wastewater Treatment Plant- Medina Street

Helicopter Landing Sites

Chicopee Armory -- 371 Armory Drive
Chicopee High School – 820 Front Street
Chicopee Comprehensive High School – 617 Montgomery Street
Szot Park -687 Front Street

Communications

Radio Towers

739 Grattan Street
15 Court Street
332 Chicopee Street
80-110 Church Street

Cellular

739 Grattan Street
Safety Complex-110 Church Street
Near Salter College- Shawinigan Drive-
Storage Facility-31 Jamrog Drive
2 Valier Ave
ACE Broadcasting-326 Chicopee Street
Cabotville-165 Front Street
Dupont Middle School-650 Front Street
Chicopee High School-820 Front Street-
Montgomery Street entrance to BJs-515 Montgomery Street
City Hall-17 Springfield Street
Broadcast Center- News 22- 1 Broadcast Center

Primary Evacuation Routes

Interstate 90 (Massachusetts Turnpike)
Route 141
Route 391
Interstate 291
Route 33- Memorial Drive
Route 116

Bridges Located on Evacuation Routes

Interstate 90 Massachusetts Turnpike (Bridges) – Cooley Brook, Fuller Brook, Connecticut River,
Chicopee River
Route 141 (Culvert/Bridges) – Poor Brook, Chicopee River
Route 391 (Bridges) – Chicopee River, Connecticut River
Route 116 (Bridge) – Chicopee River
Route 33 (Culvert) – Willimansett Brook

Category 2 – Non Emergency Response Facilities

The City has identified these facilities as non-emergency facilities; however, they are considered essential for everyday operations in Chicopee.

Problem Culverts/Bridges/Underpasses

Railroad Bridge @ Chicopee Street and Buckley Boulevard

Depot Street near Delta Park (underpasses too low for emergency vehicles to pass)

Water Supply

Chicopee purchases its water from the Massachusetts Water Resources Authority (MWRA) and sells a portion of its water to Westover Air Reserve Base. Water flows 14.72 miles from MWRA sources along the Chicopee Valley Aqueduct. A redundant line is currently under construction to ensure a back-up access to the water supply.

Landfill

Waste Management-Chicopee Landfill -161 New Lombard Road (Slated to close in 2018)-

Category 3 – Facilities/Populations to Protect

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

Special Needs Population

Birch Manor Rehabilitation and Skilled Nursing Center- 44 New Lombard Road

Willimansett Center West- 546 Chicopee Street

Willimansett Center East- 11 St. Anthony Street

Harmony House- 66 View Street

The Arbors Assisted Living- 929 Memorial Drive

Cabot Manor (VOC)- 1 Stonina Drive

Dom Polski Housing-136-144 Cabot Street

McKinley House-70 Asinof Avenue

Sunshine Village- 75 Litwin Lane

There are ten groups homes spread across the City. Addresses have been withheld for privacy purposes.

Public Buildings/Areas

City Hall- 17 Springfield Street

City Hall Annex- 274 Front Street

Department of Public Works (DPW)- 115 Baskin Drive

School Department Administration- 180 Broadway

Parks & Recreation Department- 687 Front Street

Water Department-27 Tremont St

Chicopee Electric Light-743 Front Street

Emily L Partyka Library-449 Front Street

Former Chicopee Public Library- 31 Springfield Street

Falls Branch Library-216 Broadway
Registry of Motor Vehicles- 1011 Chicopee Street
Chicopee District Court- 30 Church Street
Community Development/Veterans Affairs- 34 Center Street
School Facilities Office-816 James Street
Central Maintenance Garage (CMG)- 677 Meadow Street
Senior Center(River Mills)- 5 West Main Street

Recreation Facilities

Szot Park-Front Street
Preston Park-Access Road
Rivers Park-Meadow Street
Sarah Jane Sherman Park-Chicopee Street
Ray Ash Memorial Park-Arcade Street
Garrity Grove Park-Connell Street
Szetela Park-Macek Drive
Litwin Field-Litwin Lane
Fairview Park-Broad Street
Lincoln Grove-Broadway Street
Nash Field-Ferry Street
Ike Alpert Field-Beauchamp Terrace
Dana Park-Newbury Street
Bellamy School Field-Pendleton Avenue
Mandalay Road Park-Mandalay Road
Field of Dreams-Dare Way
Lucy Wisniowski Park-School Street
Sheridan Street Mini Park-Sheridan Street
Williams Park-Burnett Road
Aldenville Commons-Grattan Street
Bowe School Fields-Hampden Street
Bullens Park-Center Street
WWII Memorial-Front Street
Westover Industrial Gate Park-Westover Road
Vietnam Veterans Park-Chicopee Street
Chicopee Municipal Golf Course-1290 Burnett Road
Chicopee State Park-570 Burnett Road
Chicopee Canal Walk-Front Street

Schools

Public Schools

Barry School- 44 Connell Street
Belcher School-125 Montgomery Street
Bellamy School -314 Pendleton Avenue

Bowe School-115 Hampden Street
Bowie School-80 Dare Way
Chicopee Academy-12 Dare Way
Chicopee Comprehensive High School-617 Montgomery Street
Chicopee High School-820 Front Street
Dupont Middle School-650 Front Street
Fairview Elementary School-26 Memorial Avenue
Lambert Lavoie Elementary School-99 Kendall Street
Litwin Elementary School-165 Litwin Lane
Stefanik Elementary School-720 Meadow Street
Streiber Elementary School-40 Streiber Drive
Szetela Early Childhood Development Center-66 Macek Drive
Telecommunications Center -816 James Street

Charter Schools

Hampden Charter School of Science-20 Johnson Road
Valley West School-269 Moore Street

Parochial Schools

Pope Francis High School- 134 Springfield Street (Moving to Springfield in Sept 2017)
St. Joan of Arc/St. George School-587 Grattan Street
St. Stanislaus School- 534 Front Street

Colleges

Elms College-291 Springfield Street
Salter School- 645 Shawingan Drive
Porter and Chester-134 Dulong Circle

Day Care Centers

Angela Oconnor-146 Blanchard Street
Solsirys Antonetty-45 Meetinghouse Road
Debra Barnes-61 Yvette Street
Bernist Berrios-Velez-376 Britton Street
Paula Boutin-10 Olea Street
Lisa Broer-137 Gilbert Avenue
Jeanna Casey-1240 Montgomery Street
Casper-580 Meadow Street
Carmen Castellano-17 Chestnut Street
Center for Martial Arts & Fitness-115 Hampden Street
Chicopee Child Development Center, Inc-989 James Street
Children's Creative Corner-249 Broadway Street
Laurie Choquette-155 Hampden Street
Michelle Clark-54 Dobek Avenue
Lauren Comtois-176 Silvin Road
Crickets Corner-254 Hampden Street
Melissa Dassie-40 Stephens Street

Gail Daviau-572 Granby Road
Shawna Desjeans-53-55 Gladdu Avenue
Maureen Dingee-233 Basil Road
Margaret Drobiak-35 Dewey Street
Laura Dupont-24 Haven Avenue
Michelle Lynn Dusza-128 Acrebrook Drive
Stacey Elliott-95 Thaddeus Street
Vilma Figueroa-140 Skeelee Street
Tiffany Fitzpatrick-96 Providence Street
Zuleica Gil-74 Mary Street
Tarah Gilpatrick-56 Ravine Street
Mary Goulette-56 Sesame Drive
Karen Gregoire-32 Dawn Street
Kenya Guerra Cesino-124 Mandalay Road
Robin Hernandez-101 Frontenac Street
Karen Hoar-164 Mayflower Street
Carol Hoskins-1097 Memorial Drive
Samantha Jackson-14 Mellinger Lane
Jennifer Jones-47 Shaban Drive
Olga Kaletin-79 Langevin Street
Maribeth Kapinos-1045 Granby Road
Alicia Kisielewicz-59 McKinstry Avenue
Julia LaBoy-721 Chicopee Street
Linda LaCroix-71 Czepiel Street
Nora LaRoche-158 Summit Avenue
Jennifer Malanowski-17 Martha Street
Tammy Messier-120 Wilson Avenue
Susan Missildine-94 Pine Street
Linda Nawracaj-40 Clark Street
Marysol Ortiz-28 Wheatland Avenue
Diane Page-26 Sampson Street
Brenda Perreault-29 College Street
Angela Pike-90 Jefferson Avenue
Katlyn Post-30 Nash Street
Lynn Riopelli-32 Chester Street
Daisy Rivera-8 Briere Drive
Sheila Rodriguez-36 Summer Street
Jennifer Roy-30 Hansen Street
Lisa Rubner-73 Maple Street
Rose Sbrega-38 Hansen Street
School's Out – Bellamy-314 Pendleton Avenue
School's Out - Litwin -135 Litwin Lane
Side by Side Preschool, Inc-27 Strieber Drive

Liubov Sosnina-78 Willwood Street
Olga Sosnina-39 Yvonne Street
Elizabeth Stebbins-220 Arcade Street
The Arbors Kids-999 Memorial Drive
The Arbors Kids at Bowie-80 Dare Way
The Arbors Kids at Lambert-Lavoie-99 Kendall Street
The Arbors Kids at Stefanik-720 Meadow Street
The Arbors Kids at Streiber-40 Strieber Drive
US Tae Kwon Do Center-1487 Memorial Drive
VOC Child Care-374 Montgomery Street
Margery Varelas-30 Dewey Street
Aura Vazquez-53 Chestnut Street
Nancy Vazquez-58 Mt Carmel Avenue
VOC Cabot Manor Child Care-106 Stonina Drive
VOC Early Education & Care-35 Mt Carmel Avenue
Jennifer Wall-224 Blanchard Street
Westover Early Childhood Center-30 Griffith Road
Westover Job Corps Head Start-103 Johnson Road
Anastasia Yanyuk-19 Willette Street
YMCA SchoolsOut Program – Belcher-125 Montgomery Street

Religious Institutions

St. Stanislaus Church-566 Front Street
Holy Mother of Rosary / Polish National Catholic -26 Bell Street
Federated Church of Chicopee-103 Springfield Street
Assumption Church-104 Springfield Street
Grace Church Episcopal-156 Springfield Street
United Presbyterian Church-40 Newbury Street
St. Patrick's Church (limited use)-319 Broadway Street
First Central Baptist Church-50 Broadway Street
Society Methodist Episcopal Church-55 Broadway Street
Church of Christ-284 Montgomery Street
St. Constantine & St. Helen Greek Orthodox-30 Grattan Street
St. Rose de Lima Church-600 Grattan Street
St. Joan of Arc School-587 Grattan Street
St. Anthony of Padua-56 St. Anthony Street
Church of Nativity-Chicopee Street
Church of God-993 Chicopee Street
St. Christopher Episcopal Church-Telegraph Avenue
Beulah Baptist Church-755 Prospect Street
Faith United Church-191 Montcalm Street
Tabernacle Baptist Church-603 New Ludlow Road
Church of Christ-306 Chicopee Street

St. George's Church-202 East Main Street
Church of the New Covenant-938 Chicopee Street
Holy Name Church-33 South Street
New Beginning Church of God-17 Quarry Avenue
Pioneer Valley Baptist-56 Perkins Street
St Anne's Catholic Church-30 College Street
Asamblea de Inglesias-12 Britton Street
Chicopee Congregation Of Jehovah's Witnesses-113 Old Lyman Road
Faith Methodist Church-181 Montcalm Street
Grace Slavic Pentecostal-5 Meadow Street
Inglesia Pentecostal la Senda-842 Chicopee Street
Movimiento Misionero Mundial Inc-680 Chicopee Street
Pioneer Valley Church-85 Montcalm Street
Rushing Waters Assembly of God-465 Granby Road
Society First Congregational Church-302 Chicopee Street

Cemeteries

Rosary Cemetery-Bennett Road
Calvary Cemetery-Hampden Street
St. Patrick's Cemetery-Fuller Road
St. Rose Cemetery-Christopher Street
St. Stanislaus Cemetery- Montgomery Street
Shalom Cemetery-Pendleton Avenue
Sons of Zion Cemetery-New Ludlow Road

Historic Buildings/Sites

There are 805 historical sites listed in Chicopee per Massachusetts Cultural Resources Information System (MACRIS). Chicopee Center has the largest concentration of these structures. Historic Districts include the Dwight Mills Historic District, Cabotville Commons Historic District, Springfield Street Historic District and the Church Street Historic District.

Apartment Complexes/Condominium Developments (over 8 units)

Apartments

Ames Privilege-1 Springfield Street
Private Structure-1060 Chicopee Street
Falls View Housing-132 EAST Main Street
Briarwood One-139-145 Meetinghouse Road
Maplewood Apartments-14-18 America Street
Simard Apartments-14-64 Simard Drive
Dom Polski Housing-136-144 Cabot Street
Hillside Estates-15 New Ludlow Road
Eagle Crest Property Management-15 Railroad Row
Private Structure-16 Chapman Street
Private Structure-16-24 GRAPE ST & 14-20 Parshley Ave

Brigid LLC-17-35 Coolidge Road
Brigid LLC-18 Gardner Road
Private Structure-189 Center Street
Beacon Square-1892 Memorial Drive
Granby Road Arms Apartments-199-213 Granby Road
Private Structure-2 Dwight Street
Court View Commons-2053 Memorial Drive
McCarthy Ave Apartments-213-215, 219-221 McCarthy Avenue & 260-264 College Street
Private Structure-231 Grove Street
Private Structure-24 Lafayette Street
Private Structure-26 Belcher Street
Bayberry Arms Apartments-265-269 College Street
Mason Manor Apartment-265 New Ludlow Road
Sunrise Court Apartments-300 East Main Street
Townhouse Garden Apartments-24-187 Theroux Drive
Dale View Apartments-33 Homer Avenue
B&D Apartment Rentals-356 Meadow Street
Chateau Harmonie Apartments-359 Dale Street
Dionne Real Estate LLC-37 School Street
McKinley House Apartments-38 Asinof Avenue
Private Structure-38 Cochran Street
The Kendall Apartments-4A Springfield Street
Chapin School Veterans Housing-40 Meadow Street
Montcalm Heights Apartments-419 Montcalm Street & 185 New Ludlow Rd
River's Edge Apartments-43 Grattan Street
Hilltop Garden Apartments-46 Columba Street
Briarwood Fourteen LLC-470 Memorial Drive
Private Structure-48 West Street
Private Structure-50 Linden Street
Eaglecrest Property Management-508 Chicopee Street
Alden Edge Apartments-510 McKinstry Avenue
Spring Oak Realty Trust-53 Cross Street
Regency Commons-53 Empire Street
Falls View Family Housing-42-96 Grove Street
Patridge Hollow-59 New Ludlow Road
The Myvet Realty Trust-590 Front Street
VOC Apartments-63 West Street
Fairfield Apartments-627-633 & 635-639 Pendelton Avenue
Cabotville Common Limited Partnership-640 Chicopee Street
Mass Edgewood Court-649 Prospect Street
Mall Apartments-68-91 Edbert Street

Private Structure-70 Maple Street
Acclaim Properties Inc-78 Front Street
Columba Court Apartments-80 & 92 Columba Street
Private Structure-805 Chicopee Street
Private Structure-818 Chicopee Street
Private Structure-94 Prospect Street
Private Structure-96 Exchange Street
Valentine Apartments-97-109 Grape Street
Townhouse Court Apartments-1241 Granby Road
Chicopee Village Townhomes-68 Eastern Drive
Sheridan Circle-1 Central Ave
MacArthur Terrace-70 Broadway Street

Condominiums

Park Place Condos-61 Abbey Memorial Drive
Ridgewood Village-James Street
Doverbrook Estates-Pendleton Avenue
Deerfield Commons-180 Beauchamp Terrace
Parkview Condominiums-265-269 Chicopee Street
Cedarwood Condominiums-343 Chicopee Street
Pioneer Valley Condos-44 Colonial Circle
Jamestown Condos-Richmond Way & Curry Lane
Aldenville Estate Condominiums-149 Dale Street
Grandview Estates-Elmcrest Dr & Maplecrest Circle
Empire Park Condos-55 Empire Street
Fairview Village Condos-Fairview Village Court
Oxford Valley Estates-283-289 Fuller Road
Pleasant Haven Condominiums-6 Gerard Lane
Westwoods Condominiums-210 Johnson Road
Lambert Terrace Condos-200 Lambert Terrace
Kirby Schoolhouse Condominiums-90 McKinstry Avenue
Oakhill Estates-Oakhill Circle
Pine Crest Condos-Pine Crest Drive
Hamel Estates Condominiums-Regency Court
Sheridan Estates-585 Sheridan Street
115 South-115 South Street
Yorktown Condos-Yorktown Court

Chicopee Housing Authority

Leo Senecal Apartments-Meetinghouse Road
Governor George D. Robinson Apartments -Meetinghouse Road
Edward J. Bury Apartments-4-52 Benoit Circle

Corporal Edmund W. Kida Apartments-42-94 Riverview Terrace
Fairhaven Apartments -400 Britton St
Valley View Apartments-7 Valley View Ct
Birch Bark Place Apartments -630 Chicopee St
Cabot Manor Apartments -Stonina Drive
Memorial Apartments-1312-1330 Memorial Dr & 78-100 Debra Dr
Canterbury Arms Apartments -165 East Main St

Mobile Home Parks

Bluebird Acres-Lombard Road
Westover Trailer Park-1246 Granby Road
Knollwood Park-135 Edbert Street
Kontiki Mobile Homes-Kontiki Circle & Maui Drive
Harmony Homes-735 Memorial Dr
Holiday Circle Mobile Home Park-Holiday Circle
Gill Park-1760 Westover Road

Category 4 – Potential Resources

Potential Resource Facilities include those that provide potential resources for services and/or supplies.

Food/Water

Fruit Fair-398 Front Street
Stop and Shop-672 Memorial Drive
Big Y-650 Memorial Drive
Aldi-505 Memorial Drive
Walmart-591 Memorial Drive
Price Rite-1600 Memorial Drive
J. Polep's Distribution Center- 705 Meadow Street
Bimbo Bakery-21 Taxiway Drive

Hospitals/Medical Supplies

Hospitals

Holyoke Medical Center- 575 Beech Street, Holyoke
Baystate Hospital- 759 Chestnut Street, Springfield
Mercy Medical Center- 175 Carew Street, Springfield

Urgent Care

Riverbend Medical Group-444 Montgomery Street
Med Express-1505 Memorial Drive

Gas/Heating Oil

Gasoline

Westover Air Reserve Base-57 Patriot Avenue

Heating Oil

Central Oil -206 Center Street
Noonan's Oil -731 James Street

Building Materials Suppliers

Westover Building Supply- 37 Telegraph Avenue
Home Depot- 655 Memorial Drive
Grossman's Bargain Outlet-1956 Memorial Drive
Ondrick's Natural Earth-729 Fuller Road

Heavy & Small Equipment Suppliers

Department of Public Works-115 Baskin Drive
Home Depot-655 Memorial Drive
Ondrick's Natural Earth- 729 Fuller Road

Gravel Pits

Ondrick's Natural Earth-729 Fuller Road

Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding	Along the Connecticut River and the Chicopee River	Many critical facilities and populations are located at the convergence of the two rivers and/or along the rivers. Areas are currently protected by the levee system. A failure could result in extreme damage.	Interstate 391, Route 116 and 141
Severe Snowstorms/Ice Storms	Whole City. Specific areas with known issues mentioned Severe snowstorms/ Ice Storms section.	Many facilities have large flat roofs. Power and communication lines.	Potentially All
Severe Thunderstorms/Wind/ Tornadoes/ Microbursts	Whole City	Areas impacted by flooding, older structures not built to withstand high wind (ex. City Hall and Clock Tower), and energy and communication infrastructure.	Potentially All
Hurricanes	Whole City	Areas impacted by flooding, older structures not built to withstand high wind (ex. City Hall and Clock Tower), and energy and communication infrastructure.	Potentially All
Wildfire/Brushfire	Along Chicopee and Connecticut River and land along the eastern border of Westover Air Reserve Base	Westover Air Reserve Base	Interstate 90 (runs through most forested parts of Chicopee) and Route 141
Earthquakes	Whole City	Older buildings built before seismic standards and bridges and culverts	Interstate 90 and 391, Route 116 and 33. (All have bridges)
Dam Failures	Dams in Chicopee State Park and Mountain Lake	Failures of the dams in the State Park are likely to impact conservation lands	Route 33
Drought	Whole City	None	None
Landslides	Areas with terrace escarpment soils most prone to erosion (Primarily along I-391, land in NW of City near Connecticut River, and land in SW of City near Chicopee River)	South Hadley Water Treatment Plant, Barry Elementary School and Belcher Elementary School	Interstate 391

5: MITIGATION CAPABILITIES & STRATEGIES

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

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

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

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

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

Goal Statement

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

Overview of Mitigation Strategies by Hazard

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

Flooding

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

Severe Snowstorms / Ice Storms

Winter storms can be especially challenging for emergency management personnel. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected. Even when a storm has 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 snowstorm and/or ice storm.

The City's current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. To the extent that some of the damages from a winter storm can be caused by flooding, flood protection mitigation measures also assist with severe snowstorms and ice storms. The City has adopted the State Building Stretch Code, which ensures minimum snow load requirements for roofs on new buildings.

Hurricanes

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

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

Severe Thunderstorms / Winds / Tornadoes

Most damage from tornadoes and severe thunderstorms come from high winds that can fell trees and electrical wires, generate hurtling debris and possibly, hail. According to the Institute for Business and Home Safety, the wind speeds in most tornadoes are at or below design speeds that are used in current building codes, making strict adherence to building codes a primary mitigation strategy. In addition,

current land development regulations, such as restrictions on the height of telecommunications towers, can also help prevent wind damages.

Wildfires / Brushfires

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

Earthquakes

Although there are five (5) mapped seismological faults in Massachusetts, there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard for which to plan. Most buildings and structures in the state were constructed without specific earthquake resistant design features. In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the City's recovery from an earthquake.

Dam Failure

Dam failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. Dam failures are often caused by flooding occurrences, so the impacts of a failure can be multiplied with the presence of this additional water. The only mitigation measures currently in place are the state regulations governing the construction, inspection, and maintenance of dams. This is managed through the Office of Dam Safety at the Department of Conservation and Recreation.

Drought

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and periodic drought. Currently, the City does not have strategies in place to mitigate drought.

Landslides

Landslides in Massachusetts are a highly infrequent occurrence, but could have serious impacts if one occurs. The best mitigation strategy for dealing with this hazard is ensuring that regulations prohibit development on soils and steep slopes that would be prone to slides. Chicopee currently regulates development on terrace escarpment soils through the Conservation Commission.

Existing Mitigation Capabilities

The City of Chicopee had numerous policies, plans, practices, programs and regulations in place, prior to the update of this plan. These existing efforts serve to mitigate the impact of natural hazards throughout the City. These various initiatives are summarized, described and assessed on the following pages and have been evaluated in the “Effectiveness” column. For a status report of completed strategies that were identified in the City’s 2009 Hazard Mitigation Plan, see the table of “Completed and Deleted Mitigation Strategies” later in this section, as well as the completed FEMA Capability Assessment worksheet included in Appendix E.

Existing Mitigation Capabilities				
Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Flood Control Structures	Capital	Extensive system of levees along the Connecticut and Chicopee Rivers	Flooding	Very Effective.
Culvert Replacement	Capital	Priority list of necessary culvert replacements and other construction projects to effectively manage flooding.	Flooding	Very Effective. Seeking funding from Hazard Mitigation Grant Program (HMGP) for top-priority projects.
Zoning-Flood Overlay District	Regulation	Areas delineated as part of the 100-year flood plain are protected by strict use regulations	Flooding	Very Effective. No Changes.
Zoning- Garden Industrial Planned Unit Development (IPUD)	Regulation	Restricts development to maximum of 70% impervious surface	Flooding/Drought	Somewhat Effective. Consider adding additional stormwater management regulations.
Zoning- Garden Industrial Planned Unit Development (IPUD)	Regulation	Restricts development to maximum 70% impervious surface, and includes strict regulations for stormwater management on-site.	Flooding/ Drought	Effective. No Changes.
Zoning- Soil Removal and Landfill	Regulation	Permits required for any grading or fill. Emphasizes environmental concerns.	Flooding	Somewhat effective. Consider creating more performance-based evaluations.
Zoning-Site Plan Approval	Regulation	Proposed uses must meet requirements for drainage and grading	Flooding	Somewhat effective for managing impacts of development.

Existing Mitigation Capabilities

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Zoning- Mobile Homes	Regulations	Mobile homes are permitted in Residential D Districts with regulations on density, required open space, etc. Mobile Homes are prohibited in the Floodplain Overlay District	Flooding/ Severe Thunderstorms/ Hurricane/ Severe Wind/ Tornadoes/ Microbursts/	Somewhat Effective.
Subdivision- Impact and Limitations	Regulation	Chicopee Conservation Commission reviews all development projects for wetland impacts	Flooding/Drought	Effective. No Changes.
Subdivision- Minimum Standards for Development	Regulation	Drainage System requirements; Control of erosion and sedimentation; Flood prone areas development restrictions	Flooding	Effective. No Changes.
Chicopee Open Space and Recreation Plan (OSRP)	Planning Document	The OSRP inventories natural features and promotes natural resource preservation in the town, including the floodplain; wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks. The Plan also identifies key goals and strategies to protect open space.	Flooding/Drought	Effective in identifying sensitive resource areas. Need to implement plan.
National Flood Insurance Program Participation	Program	As of January 2016, there were 101 homeowners with flood insurance policies	Flooding	Somewhat Effective. Could explore becoming a part of FEMA's Community Rating System and could better educate homeowners on the NFIP.
Subdivision- Minimum Standards for Development	Regulation	Street grade regulations (minimum 0.5%, maximum 8%) and intersections grade regulations (maximum 2%)	Severe Snow/Ice Storm/ Hurricane/ Severe Wind/ Tornadoes/ Microbursts/ Severe Thunderstorms	Somewhat Effective. Should be amended to require that Telephone and electrical utilities be placed underground
State Building Code	Regulation	The City of Chicopee has adopted the Massachusetts State Building Stretch Code. This version of the building code requires more energy efficient construction than the standard State Building Code.	Severe Snow/ Ice Storm Hurricane/ Severe Wind/ Tornadoes/ Microbursts/ Earthquakes	Effective. No Changes.

Existing Mitigation Capabilities

Strategy	Action Type	Description	Hazards Mitigated	Effectiveness / Improvements
Back up Electric Power	Operational	Shelters have back up power, three mobile generators	Severe Snow/ Ice Storm	Effective. No Changes.
Zoning- Wireless Communications Facilities	Regulations	Wireless communication towers/facilities need special permit. Standards restrict height and setbacks.	Hurricane/ Severe Wind/ Severe Thunderstorms/ Tornadoes/ Microbursts/ Earthquake	Effective. No Changes
Tree Management	Operational	List of dangerous trees created annually by WMECO and in the City's Urban Forest Management Plan	Severe Snow/ Ice Storm /Hurricane/ Severe Wind/ Severe Thunderstorms/ Tornadoes/ Microbursts	Effective. No Changes.
Zoning-Site Plan Review	Regulation	Fire Department inspects/reviews all site plan reviews.	Wildfire/Brushfire	Effective. No Changes.
Zoning- General Regulations	Regulation	Prohibited uses and performance standards. Fire Chief must approve any and all flammable and explosive materials	Wildfire/Brushfire	Effective. No Changes.
Burn Permits	Operational	No residential burning allowed.	Wildfire/Brushfire	Effective. No Changes.
Public Education regarding fire	Education/ Outreach	The Fire Department has ongoing education programs in the schools and for seniors.	Wildfire/Brushfire	Effective. No Changes.
New Dam Construction Permits	Regulation	State law requires a permit for the construction of any dam.	Dam Failure	Effective. No Changes.
Dam Inspections	Operational	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Dam Failure	Ineffective. Dam owner, who may not have sufficient funding, is responsible for inspection. Incorporate dam safety into development review process.
Water Department Drought Protocol	Operational	Water Department has plan for water use reductions during droughts	Drought	Effective. No Changes.

2009 Mitigation Actions Status

The Hazard Mitigation Committee reviewed the mitigation actions prioritized in the 2009 plan. Several strategies listed in the 2009 plan have been completed or removed from this update. The table below is taken from the 2009 plan. Each description includes a brief summary regarding the status of the action item. Some of the mitigation strategies that have not been completed will be forwarded into the 2016 action strategy. They are highlighted in grey.

Priority	Mitigation Action	Responsible Department/Board	Proposed Completion Date	2016 Status	Effectiveness
1	Obtain all most recent maps of inundation areas and evacuation routes for high hazard dams.	EMD Planning Department	2010	Not Complete	---
2	Work to certify Local Emergency Planning Committee with full status for Hazardous Materials emergency planning.	Local Emergency Planning Committee EMD	2011-13	Complete	LEPC is certified and meets monthly.
3	Work with maps of inundation zones for high hazard dams and analyze development trends in these locations, pending availability of funding.	Planning Department	2010-11	Not Complete	--
4	Establish system to inventory supplies at existing shelters and develop a needs list and storage requirements. Establish arrangements with local or neighboring vendors for supplying shelters with food and first aid supplies in the event of a natural disaster.	Local Emergency Planning Committee	2011	Not Complete	--
5	Educate citizens living in inundation zones about evacuation routes in case of dam failure, pending the availability of funding.	Local Emergency Planning Committee Fire Department Police Department	2010-11	Not Complete	Outreach done around the levy systems.
6	Implement the goals and strategies of the Chicopee Open Space and Recreation Plan (OSRP) dealing with protection of natural resources, particularly those dealing with protection of water bodies.	Conservation Commission Planning Department Parks and Recreation	2010-11	Attempt at implementation. Grant not secured. OSRP updated in 2015.	Work to implement is ongoing and typically dependent on funding availability.

7	Collect, periodically update, and disseminate information on emergency information, what to include in a 'home survival kit,' how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.	Local Emergency Planning Committee	2011	Completed and Ongoing	Mailing was sent to residents in 2015 about how to prepare both people and pets for natural disasters.
8	Examine current notification system including feasibility of new siren warning system, internet radio system, or Reverse 911. Develop a preliminary project proposal and cost estimate.	City Council, Local Emergency Planning Committee, Fire Department, Police Department, Information Technology	2012	Completed	City has Swift 911, which pushes alerts out to residents that have registered.
9	Culvert Replacements	DPW	Ongoing	Completed	Typically are updated as they become problematic.
10	Commit to continuing to enforce local zoning, including site plan review to potentially flag and eliminate development in potentially hazardous areas.	Planning Board, Conservation Commission	Ongoing	Completed	Boards received training on regulations and adequately enforce them.
11	Continue to seek funding for a full time conservation agent to enforce Wetlands Protection Act and the River Protection Act	Planning Department, Community Development Department	Ongoing	Not Complete	No longer relevant. Staff that works on this part time is adequate.
12	Consider adding additional stormwater management regulations to Garden Industrial Planned Unit Development (IPUD) zoning	Planning Department	2013	Not Complete	No longer relevant. District is held to the same standard as stormwater utility.
13	Consider creating more performance-based evaluations for soil removal and landfill zoning ordinances.	Planning Department	2013	Not Complete	No longer relevant.
15	Work with CEL to facilitate underground utilities as allowed.	DPW	Ongoing	Ongoing	As roads and utilities are updated wires placed underground underground when feasible.
16	Evaluate older structures categorized as critical facilities to determine earthquake resistance	Building Department	Ongoing	Not Complete	General idea is that not many City buildings will do well because of

					unreinforced masonry design.
17	Incorporate dam safety into local development review process.	Planning Department	2012	Not Complete	Robert's Pond Dam was the major concern during the last planning process. It was removed. Dam Failure no longer a major issue.
18	Update Water Department drought protocols as new technology is available.	Water Department	Ongoing	Not Complete	Chicopee is covered in the drought management plan for the Quabbin Reservoir.

In addition to the projects completed above, the City of Chicopee implemented a number of projects since the original Hazard Mitigation Plan was adopted that have assisted in mitigating the impacts of natural hazards. They include:

- Combine Sewer Overflow (CSO) projects require replanting of trees. Two trees must be replanted for every 1 tree the City removes.
- New developments are required to plant a certain number of trees or pay the City to plant those trees off site.
- Participation in a US Forest Service project that aims to reduce CSO discharges into the Connecticut and Chicopee Rivers through tree planting and other green infrastructure.
- Roberts Pond Dam, which was in extremely poor condition, was removed.
- The Connecticut River Levee system received significant maintenance and upgrades. The system was recertified through the US Army Corp of Engineers.
- Urban Forestry Inventory and Management Plan was created and the Forestry Department has been actively working on implementing recommendations.
- A number of Combined Sewer Overflow projects have been completed, improving drainage across the City.
- Photovoltaic Solar Systems have been constructed and connected CEL's grid.
- GIS capabilities have been expanded into the City's Police, Fire and Planning Departments.
- Eight(8) streets have undergone a full depth reconstruction, which included improved drainage. (These streets include Bonneville Avenue, School Street, Chicopee Street, Grattan Street, Springfield Street, Hampden Street, Front Street and Meadow Street.)
- The Jones Ferry Combined Sewer Overflow treatment facility was constructed.
- The Facemate and Uniroyal properties, both which have structurally unsound buildings are being demolished. To date, thirteen (13) buildings—4 from Facemate and 9 from Uniroyal—have been demolished.

Prioritized Implementation Plan

Several of the action items previously identified in the 2009 Hazard Mitigation Plan are currently continuing, either because these efforts require more time to secure funding or the construction process is ongoing. In addition, the Hazard Mitigation Committee identified several new strategies that are being pursued. These new strategies are based on experience with implemented strategies, as well as the hazard identification and risk assessment in this plan update.

Prioritization Methodology

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

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

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

- **Low** – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical.
- **Medium** – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people.

- **High** – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete.
- **Very High** – Extremely beneficial projects that will greatly contribute to mitigation of multiple hazards and the protection of people and property. These projects are also given a numeric ranking within the category.

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

Cost Estimates

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

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

Cost estimates take into account the following resources:

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

Project Timeline

The following chart is a completed list of projects recommended by the Committee. The following action plan identifies Responsibility, Funding, and Time Frame for the mitigation projects recommended. The actions will begin as soon as the Plan is approved and the community is eligible for funding, unless otherwise stated.

New and Continuing Mitigation Strategies to be Implemented

Status	Action Type	Description	Hazards Addressed	Responsibility /Oversight	Priority	Estimated Cost	Funding Source	Time Frame
New	Local Plans and Regulations	Create a comprehensive vision plan for the City that outlines how the community advances future development. This plan would incorporate information from recently completed plans. (Open Space and Recreation Plan, Urban Forestry Plan, Hazard Mitigation Plan Update, etc...).	All Hazards	Planning Department	High	Medium	Local Funds Grants	1-3 years
New	Local Plans and Regulations	Comprehensive zoning overhaul to ensure that the City's zoning guides development towards the overall comprehensive vision. (Development standards and regulations that mitigate hazards would remain and/or be updated with new information).	All Hazards	Planning Department	High	Medium	Local Funds Grants	2-4 years
New	Local Plans and Regulations	Review and update local Site Plan and Subdivision regulations.	All Hazards	Planning Building Engineering	Medium	Low	Local Funds	2-4 years
New	Structure and Infrastructure	Implement Combined Sewer Overflow (CSO) Separation Projects planned for Hampden Street and Springfield Street	Flooding, Hurricane, Severe Thunderstorm	Engineering Water Pollution Control (WPC)	High	High	Local Funds Local Bonds State & Federal resources	Ongoing
New	Structure and Infrastructure	Use a comprehensive pavement management system to assess pavement quality (Thickness, groundwater and soil conditions, etc.) and prioritize street repaving based off of analysis.	Flooding	Engineering	High	Medium	Local Funds Chapter 90	1 year
New	Structure and Infrastructure	Stabilize City Hall and the Clock Tower, which is currently structurally compromised.	Severe Wind, Tornadoes, Microburst	Planning, Mayor's Office	High	High	Local Funds Local Bonds Grants	1-3 years
New	Structure and Infrastructure	Feasibility study to analyze wastewater/ stormwater management at the current plant and the capacity to do so in the future or to regionalize.	Flooding, Hurricane, Severe Thunderstorm, Snow	WPC	High	Medium	Local Funds	1-3 years

New and Continuing Mitigation Strategies to be Implemented

Status	Action Type	Description	Hazards Addressed	Responsibility /Oversight	Priority	Estimated Cost	Funding Source	Time Frame
New	Structure and Infrastructure	Follow up with City of Springfield to ensure that flood control system is repaired and recertified. If not maintained, some Chicopee residents could be at risk if it were to fail.	Flooding	WPC Flood Control	High	Low	Local Funds	1-2 years
Pulled Forward	Preparedness	Inventory shelter supplies to ensure that shelters have equipment needed to function.	All Hazards	Emergency Management	Medium	Low	Local Funds	1 year
New	Structure and Infrastructure	Complete an aerial flyover to capture detailed imagery of the City at a level that is more fine-grained than the Massachusetts State data, in order to analyze development trends, infrastructure needs and progress, etc. (Potential to collaborate with surrounding communities to share cost of flight).	All Hazards	Planning, Engineering CEL	Medium	High	Local Department Budgets	1-2 years
Pulled Forward	Education And Awareness	Analyze populations living in inundation zone for high hazard dams and inform residents/businesses of risk and evacuation routes.	Dam Failure	GIS-Analysis, Emergency Management-Dissemination	Medium	Low	Local Funds	1-2 years
New	Local Plans and Regulations	Complete a comprehensive 5-year long range capital improvements plan. Work to prioritize projects that have co-benefits across multiple departments and address hazards.	All Hazards	All Departments	Medium	Low	Local Funds	1-2 years
New	Natural Systems Protection	Continue to diversify trees that make up the urban forest to ensure their resiliency to pests and climate change.	Extreme Temperatures	Forestry, Planning	Medium	Medium	Local Funds Grants	Ongoing
Pulled Forward Ongoing	Education and Awareness	Disseminate information on hazards on a seasonal basis through the municipal electric bill	All Hazards	Emergency Management	Medium	Low	Local Funds	Ongoing

New and Continuing Mitigation Strategies to be Implemented

Status	Action Type	Description	Hazards Addressed	Responsibility /Oversight	Priority	Estimated Cost	Funding Source	Time Frame
New	Local Plans and Regulations	Expand e-permit systems to all City departments that review developments. Reword (All Depts. on a unified system will help ensure that everyone has the same information when enforcing regulations)	All Hazards	Information Technology, All Site Plan Reviewing Departments	Medium	Medium	Local Funds	Ongoing
New	Structure and Infrastructure	Improve access at the Exchange Street railroad underpass. (Currently emergency vehicles have limited access capabilities to respond to properties on the western side of the railroad).	Flooding, Wildfire	Engineering Planning	Low	High	Local Funds State Federal Grants	3-5 years
New	Structure and Infrastructure	Improve access at the Depot Street railroad underpass. (Delta Park currently not programmed because of the lack of emergency access. Would also be difficult to get fire trucks in if wildfires.)	Wildfire	Engineering Planning	Low	High	Local Funds State Federal Grants	5+ Years
Pulled Forward Ongoing	Natural Systems Protection	Implement the goals in the Open Space and Recreation Plan (OSRP).	All Hazards	Parks and Recreation, Planning, Conservation Commission	Low	High	Local Funds State Federal Grants	Ongoing
New	Structure and Infrastructure	Complete design and construction of Stormwater Green Infrastructure on Dwight & Cabot Streets per Urban Forestry Grant with PVPC	Flooding	Planning, WPC, Engineering	Medium	Medium	Local Funds Grants	2-3 years
New	Structure and Infrastructure	Continued Brownfields building demo and environmental cleanup	Flooding, Hurricane, Severe Thunderstorm Severe Wind	Planning, Community Development	Medium	High	State Federal Grants	ongoing
New	Local Plans and Regulations	Review and update local Wetland Protection and Terrace Escarpment Ordinances	Flooding and Landslides	Conservation Commission, Planning	Medium	Low	Local Funds	2-4 years

6: PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

Upon completion of the draft Hazard Mitigation Plan, a public meeting was held by City staff and the Pioneer Valley Planning Commission (PVPC) on April 11, 2017 to present and request comments from the public. The Hazard Mitigation Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency for review. Upon receiving conditional approval of the Plan by FEMA, the plan was presented to the City Council and adopted.

Plan Implementation

The implementation of this Plan began upon its formal adoption by the City Council and approval by MEMA and FEMA. Those City Departments, Boards and Commissions responsible for ensuring the development of policies, bylaw revisions, and programs as described in this Plan will be notified of these responsibilities immediately following approval. The City's Hazard Mitigation Committee will oversee the implementation of the Plan.

Incorporation with Other Planning Documents

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

- **Chicopee Comprehensive Emergency Management Plan** (particularly the Critical Infrastructure Section) – The Critical Infrastructure section was used to identify those infrastructure components in Chicopee that have been identified as crucial to the function of the City; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
- **Chicopee Open Space, Recreation Plan** – This Plan was used to identify the natural context within which the Chicopee mitigation planning would take place. This proved useful insofar as it identified water bodies, rivers, streams, infrastructure components (i.e. water and sewer, or the lack thereof), as well as population trends. This was incorporated to ensure that the City's mitigation efforts would be sensitive to the surrounding environment.
- **Chicopee's Zoning Ordinance and Subdivision Regulations** – Chicopee's Zoning Code and Subdivision Regulations were used to identify those actions that the City is already taking to reduce the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts.
- **Chicopee Urban Forest Management Plan** – The Management Plan was used to inform the sections of the plan related to trees and the City's Urban Forest. It also served as the basis for identifying invasive species that could impact Chicopee's urban forest.

- **Massachusetts' State Hazard Mitigation Plan** - This plan was used to insure that the City's Hazard Mitigation Plan was consistent with the State Plan.

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

The Hazard Mitigation Committee will also review current City programs and policies to ensure consistency with the described mitigation strategies.

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

Plan Monitoring and Evaluation

The City's Emergency Management Director will call meetings of all responsible parties to review plan progress as needed, based on occurrence of hazard events. The public will be notified of these meetings in advance through a posting of the agenda at City Hall in accordance with Massachusetts Open Meeting Regulations. Responsible parties identified for specific mitigation actions will be asked to submit reports in advance of the meeting.

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

Plan Mission and Goal

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

Hazard Identification and Risk Assessment

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

Existing Mitigation Strategies

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

Proposed Mitigation Strategies

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

Review of the Plan and Integration with Other Planning Documents

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

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

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



CITY OF CHICOPEE
MASSACHUSETTS

CITY CLERK'S OFFICE
CITY OF CHICOPEE

SEP 05 2017 P 2:11

SEPTEMBER 5, 2017

CERTIFICATE OF ADOPTION
City of Chicopee, Massachusetts

City Council

A RESOLUTION ADOPTING THE CITY OF CHICOPEE HAZARD MITIGATION PLAN UPDATE

WHEREAS, the City of Chicopee established a Committee to update the City's local Hazard Mitigation plan; and
WHEREAS, the City of Chicopee participated in the update of the City of Chicopee's local Hazard Mitigation Plan;
and WHEREAS, the City of Chicopee Hazard Mitigation Plan Update contains several potential future projects to mitigate potential impacts from natural hazards in the City of Chicopee, and
WHEREAS, duly-noticed public meetings were held by the Hazard Mitigation Committee on March 27, 2017 and April 11, 2017 for the public and municipality to review prior to consideration of this resolution; and
WHEREAS, the City of Chicopee authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and
NOW, THEREFORE BE IT RESOLVED that the City of Chicopee City Council formally approves and adopts the City of Chicopee Hazard Mitigation Plan Update, in accordance with M.G.L. c. 40

Recommended by _____

Mayor

Introduced by Councilor _____

City Council Action: 9/5/17: Motion made by Councilor Labrie to receive and the resolution adopted.
Motion passed through a unanimous roll call vote. Councilor Brooks absent.

Presented to the Mayor for approval _____

SEP 8 2017

Date

Approved _____

9/8/17

Mayor

Returned to City Clerk _____

SEP 12 2017

Date

Attest _____

City Clerk

7: APPENDICES

Appendix A - Technical Resources

1) Agencies

Massachusetts Emergency Management Agency (MEMA).....	508/820-2000
Hazard Mitigation Section	617/626-1356
Federal Emergency Management Agency (FEMA)	617/223-4175

MA Regional Planning Commissions:

Berkshire Regional Planning Commission (BRPC).....	413/442-1521
Cape Cod Commission (CCC).....	508/362-3828
Central Massachusetts Regional Planning Commission (CMRPC).....	508/693-3453
Franklin Regional Council of Governments (FRCOG).....	413/774-3167
Martha’s Vineyard Commission (MVC).....	508/693-3453
Merrimack Valley Planning Commission (MVPC).....	978/374-0519
Metropolitan Area Planning Council (MAPC).....	617/451-2770
Montachusett Regional Planning Commission (MRPC).....	978/345-7376
Nantucket Planning and Economic Development Commission (NP&EDC).....	508/228-7236
Northern Middlesex Council of Governments (NMCOG).....	978/454-8021
Old Colony Planning Council (OCPC).....	508/583-1833
Pioneer Valley Planning Commission (PVPC).....	413/781-6045
Southeastern Regional Planning and Economic Development District (SRPED).....	508/823-1803
MA Board of Building Regulations & Standards (BBRS).....	617/227-1754
MA Coastal Zone Management (CZM).....	617/626-1200
DCR Water Supply Protection.....	617/626-1379
DCR Waterways.....	617/626-1371
DCR Office of Dam Safety.....	508/792-7716
DFW Riverways.....	617/626-1540
MA Dept. of Housing & Community Development.....	617/573-1100
Woods Hole Oceanographic Institute.....	508/457-2180
UMass-Amherst Cooperative Extension.....	413/545-4800
National Fire Protection Association (NFPA).....	617/770-3000
New England Disaster Recovery Information X-Change (NEDRIX) –	781/485-0279
MA Board of Library Commissioners.....	617/725-1860
MA Highway Dept, District 2.....	413/582-0599
MA Division of Marine Fisheries.....	617/626-1520
MA Division of Capital & Asset Management and Maintenance (DCAMM).....	617/727-4050
University of Massachusetts/Amherst.....	413/545-0111
Natural Resources Conservation Services (NRCS).....	413/253-4350
MA Historical Commission.....	617/727-8470
U.S. Army Corps of Engineers.....	978/318-8502
Northeast States Emergency Consortium, Inc. (NESEC).....	781/224-9876
National Oceanic and Atmospheric Administration: National Weather Service.....	508/824-5116
US Department of the Interior: US Fish and Wildlife Service	413/253-8200

2) Mitigation Funding Resources

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

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

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

3) Internet Resources

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

Appendix B-Documentation of the Planning Process

Chicopee Hazard Mitigation Committee Meeting #1 Agenda

February 24, 2016

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

Chicopee Hazard Mitigation Committee Meeting #1- Sign In

Date: February 24, 2016 at 9:00 am
 Location: Chicopee DPW- Baskin Drive

Name	Position	Email
Lee M. Paultic	Planning Director	lpaultic@chicopeema.gov
Jeffrey A. Neece	DPW DIRECTOR	JNEECE@CHICOPEEMA.GOV
Glenn K. Joslyn	E.M. Director	gjoslyn@chicopeema.gov

**Chicopee Hazard Mitigation Committee
Meeting #2 Agenda**

**March 2, 2017 -9am
Chicopee Department of Public Works- 15 Baskin Drive**

4. Review Community Profile Section for updates
5. Complete Hazard Identification and Risk Assessment

Planning process and requirements

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

Chicopee Hazard Mitigation Committee Meeting #2- Sign In

Location: Chicopee DPW
Date: March 2, 2017 @ 9:00am

Name	Position
Glenn X. Joslyn	Chicopee EMD
Lee M. Pauliot	Planning Director
Jeffrey Neese	DPW Superintendent
Edward Marcoux	Deputy Fire Chief

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

**March 9, 2017- 9am
Department of Public Works- 15 Baskin Drive**

1. Finalize Risk Assessment
2. Identification of Critical Infrastructure (Chapter 4)
 - a. Review and Edit Map

Chicopee Hazard Mitigation Committee Meeting #3- Sign In

Location: Chicopee DPW

Date: March 9, 2017 9:00am

Name	Position
Glenn & Jordyn	Chicopee EMD.
Ela Soja	Asst to the DPW Superintendent
Lee Paulist	Planning Director

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

**March 16, 2017 @ 9am
Department of Public Work- 15 Baskin Drive**

1. Administrative: Hours worked thus far outside of meetings
2. Complete FEMA Capabilities Assessment
3. Review strategies from previous plan to update status
4. Prep for Public Meeting #1

Chicopee Hazard Mitigation Committee Meeting #4- Sign In

Location: Chicopee DPW

Date: March 16, 2017 @ 9:00am

Name	Position
Laurie Benoit	X Engineer
Glenn X. Joslyn	GIS Technician
Carl Dietz	Chicopee E.M.D.
Ace Pauliot	Building Dept.
Jeffrey A. Neese	Planning Dept.
→ imbenoit@chicopeema.gov	Public Works
cdietz @ Chicopeema.gov	

**Chicopee Hazard Mitigation Committee
Meeting #5 Agenda**

**March 30, 2017 @ 9am
Chicopee Department of Public Works- 15 Baskin Drive**

6. Debrief Public Meeting #1
7. Select and prioritize new mitigation strategies
8. Set up plan implementation and review procedures
9. Prepare for second public meeting

Planning process and requirements

- I. 3-5 committee meetings
- II. 2 public outreach meetings
- III. MEMA / FEMA review and conditional approval
- IV. City Council adoption
- V. FEMA final approval

Chicopee Hazard Mitigation Committee Meeting #5- Sign In

Location: Chicopee DPW

Date: March 30, 2017 @ 9:00am

Name	Position
Shelly Santore	Planning Dept. - GIS Coordinator
Glenn X-Torlyn	Chicopee E.M.D.
Louise Benoit	Engineering
Ela Soja	Asst. DPW Superintendent

MEDIA RELEASE

CONTACT: Ashley Eaton, PVPC Planner, (413) 781-6045 or aeaton@pvpc.org, or Glenn X. Joslyn, City of Chicopee Emergency Management Director, (413) 594-1698 or gjoslyn@chicopeema.gov

FOR IMMEDIATE RELEASE
March 13, 2017

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

Chicopee residents, business owners, stakeholders and representatives from surrounding communities are invited to provide comments on the update of the City of Chicopee's Hazard Mitigation Plan on Monday, March 27 at 6:30 p.m. at the Chicopee Library. All members of the public are welcome to attend the event. Local businesses, residents of neighboring communities, and municipal officials of neighboring communities are also encouraged to attend and provide their feedback.

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

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

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



Planning for Disasters

Come learn about and share your thoughts
on Chicopee's Hazard Mitigation Plan.

March 27, 2017 @ 6:30pm
Chicopee Public Library
Community Room
449 Front Street, Chicopee

The City's hazard mitigation plan outlines ways the City could
become less vulnerable to damage caused by natural hazards such
as flooding, winter storms and tornadoes.

Contact Ashley Eaton with questions or ideas:
aeaton@pvpc.org or 413-781-6045



Chicopee Hazard Mitigation Plan Update Public Meeting 1
 Sign-in
 March 27, 2016 6:30pm
 Chicopee Library Meeting Room

Name	Email (if want to be notified of second meeting)	Affiliation and/or Neighborhood
Shelly Sutherell	msutherell@chicopee.ma.gov	Planning Dept.
Loo Toulhot	ltoulhot@chicopee.ma.gov	Planning Dept / Wiscasset
Anna Kaczor		Ferry Lane
Gem Toulhot		Chicopee Falls / EMD

1 Chicopee to hold hazard mitigation plan meeting

Facebook
Twitter
Email
5 shares



By Jeanette DeForge | jdeforge@repub.com
Follow on Twitter
on March 15, 2017 at 2:44 PM

CHICOPEE - The city will hold a meeting to discuss the city's Hazard Mitigation Plan and is asking residents, business owners and representatives from surrounding communities to attend to give their input about lessening the impact of natural hazards.

See lowest prices from 200+ sites

Save 18%* Hilton Garden Inn Devens Common Devens
From \$127 [View Deals >](#)

Save 11%* Boxboro Regency Hotel & Conference Center Boxborough
From \$125 [View Deals >](#)

MASSLIVE ON SOCIAL MEDIA

BREAKING NEWS NEWSLETTER

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

Enter your e-mail address OPTIONAL Enter Zip

MEDIA RELEASE

CONTACT: Ashley Eaton, PVPC Planner, (413) 781-6045 or aeaton@pvpc.org

FOR IMMEDIATE RELEASE

March 30, 2017

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

Chicopee residents, businesses, and surrounding community residents and representatives are invited to provide comments on the City of Chicopee Hazard Mitigation Plan Update on Tuesday, April 11, 2017, at 6:30pm in the Community Room at the Chicopee Library located at 449 Front Street.

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

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

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

Upon completion, the plan will be submitted to Massachusetts Emergency Management Agency (MEMA) and Federal Emergency Management Agency (FEMA) for review and approval. A FEMA approved plan makes the community eligible for federal and state mitigation grant funding.

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



Planning for Disasters

Come learn about what can be done to do to reduce risks associated with natural disasters

April 11, 2017 @ 6:30pm
Chicopee Public Library
Community Room
449 Front Street, Chicopee

This meeting is part of the City's hazard mitigation plan update, which outlines ways the City could become less vulnerable to damage caused by natural hazards such as flooding, winter storms and tornadoes.

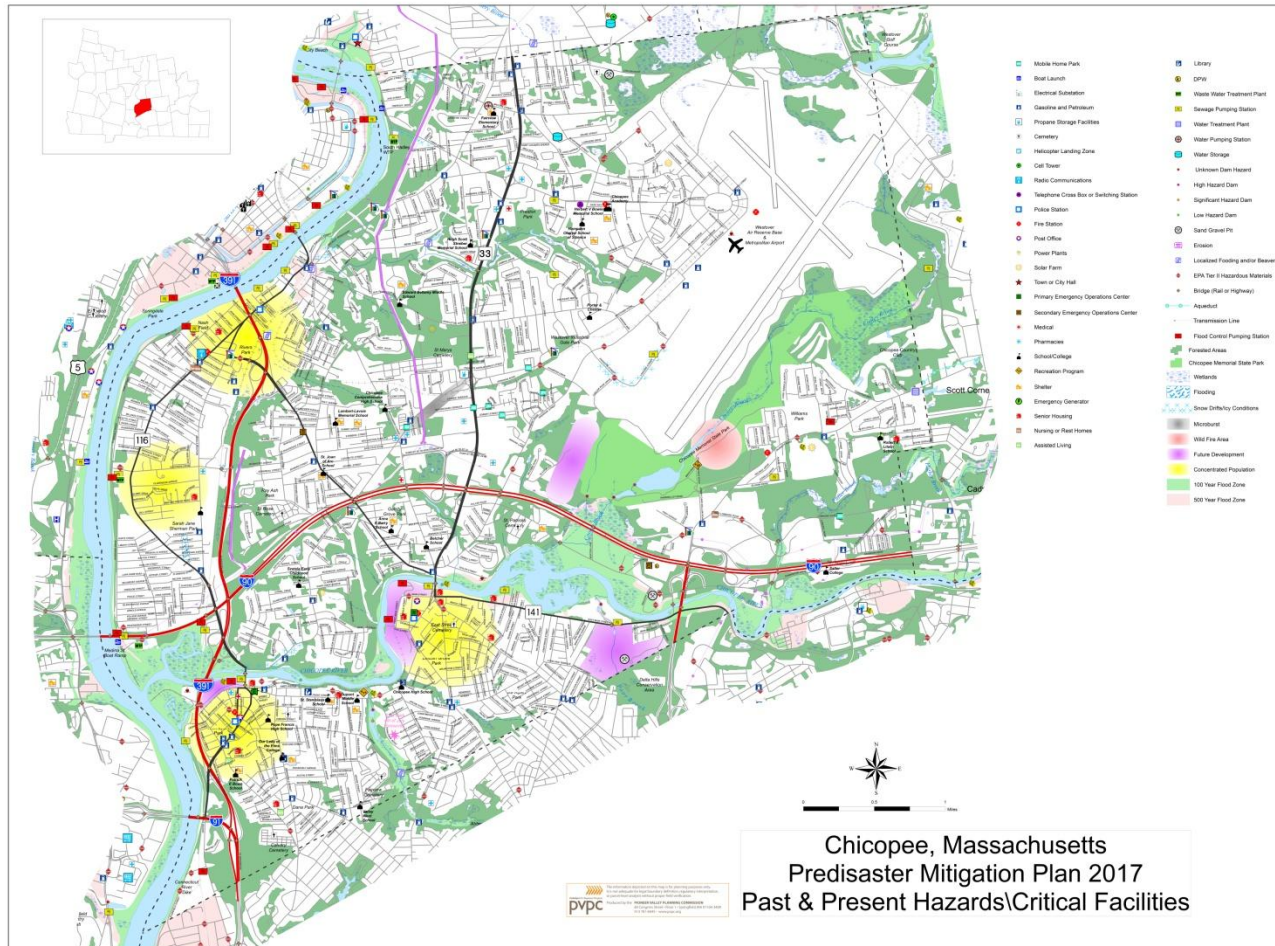
Contact Ashley Eaton with questions or ideas:
aeaton@pvpc.org or 413-781-6045



Appendix C – List of Acronyms

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

Appendix D – Past and Potential Hazards/Critical Facilities Map



Appendix E - Capability Assessment Worksheet

Worksheet 4.1

Capability Assessment Worksheet

Jurisdiction: Chicopee, Massachusetts

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

Planning and Regulatory

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

Plans	Yes/No Yr	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	No	The Planning Department is interested in a master plan and when completed would include information on hazards and climate change
Capital Improvements Plan	No	Through the budgeting process departments are asked for a 5 year list of capital needs. These are all assessed for budgeting priorities, but there isn't a comprehensive planning process to see where department needs may overlap, etc.
Economic Development Plan	No	The Community Develop Block Grant Annual Reports touch on this a bit.
Local Emergency Operations Plan	Yes	Last updated in 2005. Needs an update. Plan does look at mitigation activities for hazard
Continuity of Operations Plan	Yes	Recently Completed. (Funded through the Community Compact Program)
Transportation Plan	No	DPW compiles an annual list of problem roads Projects in the RTP and TIP
Stormwater Management Plan	Yes	Stormwater Regulations and CSO separation plan
Community Wildfire Protection Plan	No	
Other special plans (e.g. brownfields, redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Yes	Open Space and Recreation Plan, West End Brownfields Plan, River Mills vision Plan, Municipal Energy Reduction Plan, Urban Forest Management Plan

Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	Yes	Version/Year: Massachusetts State Building Code, 8 th edition. Additionally have adopted the stretch code, which requires homes to be built to higher energy efficiency standards.
Building Code Effectiveness Grading Schedule (BCEGS) Score	Yes	Score: 6 (State Score)
Fire Department ISO Rating	Yes	Rating: 3
Site plan review requirements	Yes	Site plan review is in place and adequately enforced when triggered.

Land Use Planning & Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning Ordinance	Yes	The zoning ordinance for the City was written in the 1940s. It went through a major edit in the 1970s, thus quite outdated. (For example, high parking requirements result in high impervious surface coverage, which exacerbates localized flooding.)
Subdivision Ordinance	Yes	Not being used as much anymore because Chicopee is fairly built out. Seeing smaller subdivisions going in
Floodplain Ordinance	Yes	Floodplain overlay district
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater, Development on terrace escarpment soils is also regulations through the Conservation Commission.
Flood Insurance Rate Maps	Yes	Paper maps on file in the planning and building departments. Also available online
Acquisition of land use for open space and public recreation uses	Yes	Yes. OSRP prioritized. Most recent land acquired to the City was donated. Finding funding to acquire land is a challenge
Other		

How can these capabilities be expanded and improved to reduce risk?
<p>Better coordination on a Capital Improvement Planning process could help multiple department meet their needs while potentially tackling projects that will mitigate the impacts of hazards.</p> <p>Create a comprehensive master plan for the City and a zoning overhaul to modernize development standards in the City.</p> <p>Pursue Community Preservation Act approval (long term goal) in order to fund some of the goals in the Open Space and Recreation Plan.</p>

Administrative & Technical

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

Administration	Y/N	Describe capability Is coordination effective?
Planning Board	Yes	Planning board adequately skilled
Mitigation Planning Committee	Yes	Ad-hoc committee. Meet when needed.
Maintenance programs to reduce risk (e.g. tree trimming, clearing drainage systems)	Yes	Forestry plan that the City works through, Drainage system maintained, levy system maintenance as necessary
Mutual aid agreements	Yes	With fire, police, emergency management, state agreements. Also agreements in place with Westover

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Yes (FT)	Also acts as Zoning Enforcement
Floodplain Administrator	Yes (PT)	Conservation Agent does this work. Is a stipended position. Works as required.
Emergency Manager	Yes (PT)	
Community Planner	Yes (FT)	Full time planner, plus an assistant planner
Civil Engineer	Yes (FT)	Engineering department has 5 engineers on staff (Civil, SR, JR, Assistant, Construction Inspector)
GIS Coordinator	Yes (FT)	Planning has a full time GIS person. Engineering and CELD also have capabilities. Good coordination between the three. In the process of getting more and more information online
Other	Yes	City Forestry Department/Tree Warden (staff of 7); Highly capable DPW; Flood Control Department.

Technical	Y/N	Describe capability Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	Robo-calling and text alerts/email through Swift 911- Residents must sign themselves up.
Hazard data and information	Yes	
Grant writing	Yes	Departments responsible for writing own grants. Planning and community development have staff members with grant writing in their job description
Hazus analysis	No	

Other	Yes	LEPC- Meets monthly; CERT- Good to go in case of an emergency
-------	-----	---

How can these capabilities be expanded and improved to reduce risk?
Emergency notification system is currently limited, because residents have to know to sign themselves up. Could be a City-wide push to get people enrolled.

Financial

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

Funding Resource	Access Eligibility Y/N	Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital Improvements Project funding	Yes	Currently funded through the General Fund, Chapter 90, Sewer and water retained earnings, Stormwater utilities and CELD funding. Could fund mitigation resources.
Authority to levy taxes for specific purposes	Yes	With limitations at the state level. Historically taxes not well supported in the City.
Fees for water, sewer, gas or electric services	Yes	Water, sewer, electric and stormwater
Impact fees for new development	No	
Storm water utility fee	Yes	In the past this has paid for engineering analysis, purchasing of slope mowers and slop stabilization for the levy system.
Incur debt through general obligation bonds and/or special tax bonds	Yes	Common practice
Community development block grants	Yes	Entitlement community through HUD
Other federal funding programs	Yes	EPA Brownfield Grants; Education funding, FEMA reimbursements, CDBG/HOME
State funding programs	Yes	TIP funding, MassWorks, Green Communities Energy Efficiency work, PARK, DOER. Various federal and state funding for specific projects.
Other		

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

Education & Outreach

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

Program/Organization	Y/N	Describe program/organization and how it relates to disaster resilience and mitigation
Local citizens groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Cert, Chicopee River Watershed Council, Connecticut River Watershed Council
Ongoing public education or information program (e.g. responsible water use, fire safety, household preparedness, environmental education)	Yes	Fire safety in schools and to seniors. Pamphlets go into water and electric bills as necessary (Drought information + DEP Annual Sanitary Survey)
Natural disaster or safety related school programs	Yes	-fire safety in schools -Efforts in the past regarding evacuation routes for schools
StormReady certification	No	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	No	
Other		

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