~Select Board Adoption~
01-23-17

Town of Hopkinton

New Hampshire

Hazard Mitigation Plan Update 2017

Downburst Debris Removal on College Road, July 2012
Photo from WMUR U-Local

Adopted by the Hopkinton Select Board
January 23, 2017

FEMA Approved [date], 2017

Town of Hopkinton
New Hampshire

Hazard Mitigation Plan Update 2017

Adopted January 23, 2017

FEMA Approved ____, 2017

Town of Hopkinton
330 Main Street
Hopkinton, NH 03229
Phone: (603) 746-3170
web: www.hopkinton-nh.gov

Central NH Regional Planning Commission
28 Commercial Street, Suite 3
Concord, NH 03301
Phone: (603) 226-6020
Web: www.cnhrpc.org

NH Department of Safety
NH Homeland Security and Emergency Management
33 Hazen Drive
Concord, NH 03305 *(Mailing Address)*

Incident Planning and Operations Center
110 Smokey Bear Blvd
Concord, NH 03301 *(Physical Address)*
Phone: (800) 852-3792 or (603) 271-2231
Web: www.nh.gov/safety/divisions/hsem

US Department of Homeland Security
Federal Emergency Management Agency
99 High Street, Sixth Floor
Boston, Massachusetts 02110
Phone: (617) 223-9540
Web: www.fema.gov

Table of Contents

1 PLANNING PROCESS

The Town's Hazard Mitigation Committee reformed to rewrite the Plan into a more concise format and to incorporate the newest material required by FEMA in addition to updating the Town's newest information since 2011. This Planning Process Chapter contains information previously available in the Introduction Chapter of the **Plan Update 2011**. Expanded public participation steps were taken and a new plan development procedure was used as documented in the Methodology section.

Certificate of Adoption, 2017

Town of Hopkinton, New Hampshire
Select Board
Town Hall
330 Main Street
Hopkinton, NH 03229

A Resolution Adopting the Hopkinton Hazard Mitigation Plan Update 2017

WHEREAS, the Town of Hopkinton, New Hampshire has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **Hazard Mitigation Plan Update 2017** including but not limited to flooding, high wind events, severe winter weather, and fire, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Hopkinton has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **Hazard Mitigation Plan Update 2017** under the requirements of 44 CFR 201.6; and

WHEREAS, public and Committee meetings were held between September 2015 to April 2016 regarding the development and review of the **Hazard Mitigation Plan Update 2017**; and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Hopkinton; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Hopkinton with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Hopkinton eligible for funding to alleviate the effects of future hazards; now therefore be it

RESOLVED by Town of Hopkinton Select Board:

The **Hazard Mitigation Plan Update 2017** is hereby adopted as an official plan of the Town of Hopkinton; The respective officials identified in the mitigation action plan of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;

Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution; and

An annual report on the progress of the implementation elements of the Plan shall be presented to the Select Board by the Emergency Management Director or designee.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Hopkinton, New Hampshire this 23rd day of January, 2017.

ATTEST

seal

Town Clerk

Charles Gangel, Town Clerk date

Select Board

Jim O'Brien, Chair date

Ken Traum, Select Board Member date

Sue B. Strickford, Select Board Member date

Steve Lux, Jr., Select Board Member date

Robert P. Gerseny, Select Board Member date

Plan Process Acknowledgments

The Select Board-appointed Hazard Mitigation Committee was comprised of these individuals who met between September 2015 through April 2016 to develop the **Hopkinton Hazard Mitigation Plan Update 2017:**

- Dan Blanchette, Hopkinton Public Works Director
- Neal Cass, Hopkinton Town Administrator
- Deb Gallant, Hopkinton Finance Director/Staff Coordinator
- Doug Mumford, Hopkinton Fire Department Chief
- Stephen Pecora, Hopkinton Police Department Chief/Emergency Management Director
- Karen Robertson, Hopkinton Planning/Zoning Director
- Sue Strickford, Hopkinton Selectperson
- Stephen Reale, Hopkinton Fire Department Lieutenant
- David Barnard, Hopkinton Schools Facilities Director
- James Fredyma, Hopkinton Planning Board Alternate

The following Central NH Regional Planning Commission (CNHRPC) staff contributed to the development of the Hazard Mitigation Plan Update:

- Stephanie Alexander, CNHRPC Senior Planner
- Craig Tufts, CNHRPC Principal Planner (GIS mapping)

Members of the public* and other individuals attended one or more Committee meetings and/or contributed information to the content of the Plan:

* member of the public

- Carol Hooper, Hopkinton Historical Society Board Member*
- Craig Beaulac, NH Homeland Security and Emergency Management (NHHSEM)

Authority

In 2000, the President enacted the Disaster Mitigation Act 2000 (DMA) which requires states and municipalities to have local adopted and FEMA approved natural hazard mitigation plans in place to be eligible for disaster and mitigation funding programs such as the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) programs, including Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program. New Hampshire is awarded funds based upon the completeness of its State Plan and the number of local plans.

As a result of the DMA, funding was provided to state offices of emergency management, including the New Hampshire Homeland Security and Emergency Management, to produce local (municipal) hazard mitigation plans. To remain in compliance with the DMA, the Town of Hopkinton is required to submit for FEMA approval a revised **Hazard Mitigation Plan Update** every five years.

The New Hampshire Homeland Security and Emergency Management (NH HSEM) produced its latest *State of New Hampshire Hazard Mitigation Plan 2013* in 2013. The development of the State's Plan allows for New Hampshire to receive funding programs to provide to communities in the event of disasters or for mitigation.

Prior versions of the Town's Hazard Mitigation Plan are noted in the **Final Plan Dates** section.

This **Hopkinton Hazard Mitigation Plan Update 2017** has been developed in accordance with the Disaster Mitigation Act of 2000 and the *FEMA Local Mitigation Plan Review Guide, October 1, 2011* and effective one year later. The most recent Plan development standards provided by FEMA Region I have also been incorporated. The planning effort of the Town is a regular process and this Plan is considered to be a "living document."

The 2017 Hopkinton Hazard Mitigation Committee was established by the Select Board in 2015 and guided the development of the Plan. The Committee consisted of the Town's Fire Department, Town Administrator, Finance Director, Police Department, Emergency Management Director, Public Works Director, School District Facilities Director, Select Board representative, and Planning Board representative.

The attendees of the meeting process are noted in the **Acknowledgements**. The Central NH Regional Planning Commission, of which Hopkinton is a member, contributed to the development of this Plan by facilitating the meeting and technical processes, working with the Committee and its members to obtain information, preparing the document, and handling the submissions to NH Homeland Security and Emergency Management and FEMA.

Methodology

The **Hopkinton Hazard Mitigation Plan Update 2017** was developed over a six-month period, with a group of Town staff members and volunteers and the CNHRPC comprising the majority of the Hazard Mitigation Committee. The 2017 methodology for Plan development is summarized in this section. This Hazard Mitigation Plan is designed differently from the **2011 Plan** with the intent to develop a shorter, less redundant Plan for utility purposes, with easier updating and implementation while meeting FEMA's requirements. The Plan roughly follows the ***FEMA Local Mitigation Planning Handbook, 2013*** by using its terminology and some of its tasks, ensuring **Hopkinton's Plan Update 2017** begins to follow a standardized approach to Plan construction and content endorsed by FEMA. Supplementary sections of the **2017 Plan Update** will be contained in the **10 APPENDICES A-D** for easier display, usage, sharing, and update.

Meetings and Duties

The meetings and tasks of the Hazard Mitigation Committee were dictated by Agendas and activities displayed in **Table 1.** Work Sessions were designed to accomplish what could not be completed at meetings due to time constraints.

Table 1

Meeting Schedule and Agenda Activities

Meeting	Date	Agenda Activities – see Appendix C
Meeting 1	11/09/15	Discuss Process and Schedule, Hazard Risk Assessment, Critical and Community Facilities Vulnerability Assessment, Review & Revise Maps 1-2-3, Schedule Meetings
Work Session 1	11/23/15	Hazard Risk Assessment, Critical and Community Facilities Vulnerability Assessment, Review & Revise Maps 1-2-3
Meeting 2	12/14/15	Review & Update Goals and Objectives, Critical and Community Facilities Vulnerability Assessment, Review Former Existing Measures -> Now Capability Assessment, Develop List of Existing Mitigation Plans and Documents
Work Session 2	----	Finish Agenda for Meeting 2 via email assignments
Meeting 3	11/25/16	Review & Revise 2011 Actions, Develop New Actions from Problem Statements (Community Vulnerability Assessment) and Capability Assessment's Future Improvements, Determine 2011 Actions' Status, Determine Action Timeframe
Work Session 3	02/08/16	Complete Meeting 3 Agenda
Work Session 3.2	02/22/16	Determine Action Timeframe for Each Action, Prioritize Actions using STAPLEE
Meeting 4	03/14/16	Review Draft Hazard Mitigation Plan Components (onscreen), Schedule Work Session 4 and Public Information Meeting, Potential Future Hazards

Meeting	Date	Agenda Activities – see Appendix C
Work Session 4	04/04/2016	Review Entire Draft Hazard Mitigation Plan, Appendices, and Maps, Rate Hazard Severity of Recent Hazard Events, Prepare for Public Information Meeting, Review Plan Approval Process
Public Information Meeting	04/11/2016	HMC members present sections of the Plan to members of the public in a question and answer format. Maps will be available.

Source: Hopkinton Hazard Mitigation Committee Agendas, 2015-2016

For each meeting, all meeting attendees signed attendance sheets and meeting match timesheets, documenting their time at the meetings. Members of the public assisted with completing the Agendas, including developing the **Hazard Risk Assessment**, **Critical and Community Facilities Vulnerability Assessment**, **Capability Assessment**, and **Mitigation Action Plan**, completing the **STAPLEE Action Prioritization**, etc. along with the Committee members. The agendas and attendance sheets are included in **APPENDIX C** of the Plan.

The specific meeting tasks are described in detail on the Agendas in **APPENDIX C**. CNHRPC staff facilitated the Committee meetings and Work Sessions. Information needed on the Agenda Tasks indicated above was collected from any attendees present, including any members of the public, by CNHRPC, during discussions among attendees. The new and updated information was described in each Chapter under the **2017 Plan Update** section. Maps were reviewed and updated by the Committee and guests and revised in a GIS by CNHRPC.

In between meetings, Town staff and volunteers and CNHRPC staff researched and collected information for the Chapters. CNHRPC updated and rewrote Chapters, tables, and sections as appropriate. The Chapters were also updated by revising the document to the current FEMA standards.

Opportunity for Public Participation

Public Input from the Hazard Mitigation Committee Meetings

The public extensive notification is described in the Public Outreach Strategy sidebar. However, one member of the public attended the meetings as indicated in the **Acknowledgements** and by the Attendance Sheets in **APPENDIX C Meeting Information**. In this instance, "the public" means "a person who is not a Town, School, state, or federal government staff member or other staff person paid for by local tax dollars, or who is not a current Town volunteer." The public had the opportunity to attend and participate in the **10** posted meetings or to contact the Emergency Management Director for more information.

Public Input from the Public Information Meeting

The **Public Information Meeting (PIM)** was held on April 11, 2016. The Hazard Mitigation Committee members presented portions of the Plan and had the Maps available for display. The agenda and attendance sheet are included in **APPENDIX C**. The same extensive public notification described in the Public Outreach Strategy sidebar occurred to obtain review and comment from the public for the Plan. No member of the public attended the Public Information Meeting despite advertising.

Public Input from the Select Board Adoption Meeting

The Select Board meeting to adopt the **Hazard Mitigation Plan** was held on January 23, 2017. Although the Plan's APA had been received, the Board permitted public comment prior to adoption although Plan changes could not be made at this time. *More to be included as necessary*

Completion of the Plan Steps and Dates

On June 20, 2016, this Plan, Appendices and Maps were submitted to the NH Homeland Security and Emergency Management (NHHSEM) for their review and revision. In August, NHHSEM provided additional content and format revisions to streamline the Plan to conform to FEMA Region 1's new review requirements. The Plan was resubmitted to NHHSEM for review on November 16, 2016. When deemed compliant, the Plan was subsequently

Public Outreach Strategy

Many individuals were personally invited to attend and participate in the Hopkinton Hazard Mitigation Plan Committee meetings. They include the Hopkinton School District, major employers, engaged citizens, Town Library, Historical Society, Senior Center, Eversource, and Army Corps of Engineers. Emergency Management Directors from the neighboring communities of Warner, Henniker, Dunbarton, Bow, and Concord, were also specifically invited by the Town of Hopkinton's Town Administration to fully participate in the Hazard Mitigation Committee discussions and guide the Plan directions. The NH Homeland Security and Emergency Management (NHHSEM) Field Representative(s) were also invited and attended some of the meetings.

The Hazard Mitigation Committee itself was comprised of all primary Town Departments, including Town Administration, Highway, Fire, Police, and Emergency Management Department as well as the Boards of Selectmen and Planning.

The public process for this Plan included sending out media releases to the Concord Monitor, the primary (regional) newspaper serving 39 communities around the Concord area, the CM Town Crier, and local newspapers of The Villager and The Messenger. All interested parties were invited to participate, including media, residents, businesses, organizations, local communities, non-profits, and State and federal agencies. The colorful public meeting notice flyers were posted on the Town's website at www.hopkinton-nh.gov and the Town Calendar online, on the Town Hall Bulletin Board, and at the Town Library, at the Town Clerk/Tax Collector's window, at the Transfer Station, and the Slusser Senior Center, and at the Contoocook Post Office. All local interests had an opportunity to attend and participate in the meetings. Copies of publicity for the Plan are included in **APPENDIX C**.

The Central NH Regional Planning Commission, a quasi-governmental regional organization of which Hopkinton is a member, contributed to the development of this Plan by facilitating the meetings and guiding the planning process, and preparing the Plan documents, Appendices, and Maps. As a final attempt to obtain additional public input, a specially noticed Public Information Meeting was held on **April 11, 2016** with postings on the Town's website and at the Town Hall, Post Office, Library, Bates Building, Slusser Senior Center. A press release was published in the Concord Monitor. All of these meetings were publicly noticed as described.

The attendees and publicity of the public planning process are noted in the **Acknowledgements**.

transmitted by NHHSEM to FEMA for FEMA's conditional approval (APA) of the **Hopkinton Hazard Mitigation Plan Update 2017**.

On December 22, 2016, Hopkinton received an **Approvable Pending Adoption (APA)** notification from FEMA, stating the Plan will be approved by FEMA after proof of adoption by the local governing body, which is the Select Board, is submitted.

On January 23, 2017, the Select Board **adopted the Hazard Mitigation Plan Update** for the Town at a duly noticed public meeting. Copies of the Plan were made available at the Town Hall, Town Clerk's Office Building, Slusser Center, Library and Town website for public review on January 18. Copies of the public notice and flyers are included in **APPENDIX C.** The signed Certificate of Adoption was sent to NHHSEM/FEMA.

On [Month/day], 2017, Hopkinton received a **Letter of Formal Approval** from FEMA, with the Plan approval granted on [Month/day], 2017. The next Hazard Mitigation Plan update is due five (5) years from this date of approval, on [Month/day], 2022.

Final Plan Dates

The following is a summary of the required dates which guide the adoption and update of the **Hopkinton Hazard Mitigation Plan**. Included is the history of the Plan approvals and expiration dates as shown in **Table 2**.

Table 2
Plan Adoption History

Year of FEMA-Approved Hazard Mitigation Plan	Adoption by Hopkinton Select Board	FEMA's Formal Approval	Plan Expiration
Original 2004	September 13, 2004	September 21, 2004	**September 21, 2009**
Update 2011	August 16, 2010	April 28, 2011	**April 28, 2016**
Update 2017	January 23, 2017	date, 2017	**date, 2022**

2 COMMUNITY PROFILE

It has been over five years since the last Plan was written, with the new decennial Census 2010 having been taken. The best available new data has been used in this Chapter to portray the population, housing, and overall demographic picture of present day Hopkinton. The former **Relation to Natural Hazards** section has been updated within **4 HAZARD RISK ASSESSMENT**. The tables clearly identify the facilities in Town and which natural, human, and technological hazard events could most likely occur in those areas, as described in **5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION**.

A simplified description of how the Town's population and housing have grown within the last four decades follows. Relationships of the locations of people and buildings to natural hazard events are generally explored. Examination of this information will allow the Town to better understand the land use and demographic trends within its borders and how emergency and preventative services can best serve the growing and changing population and landscape.

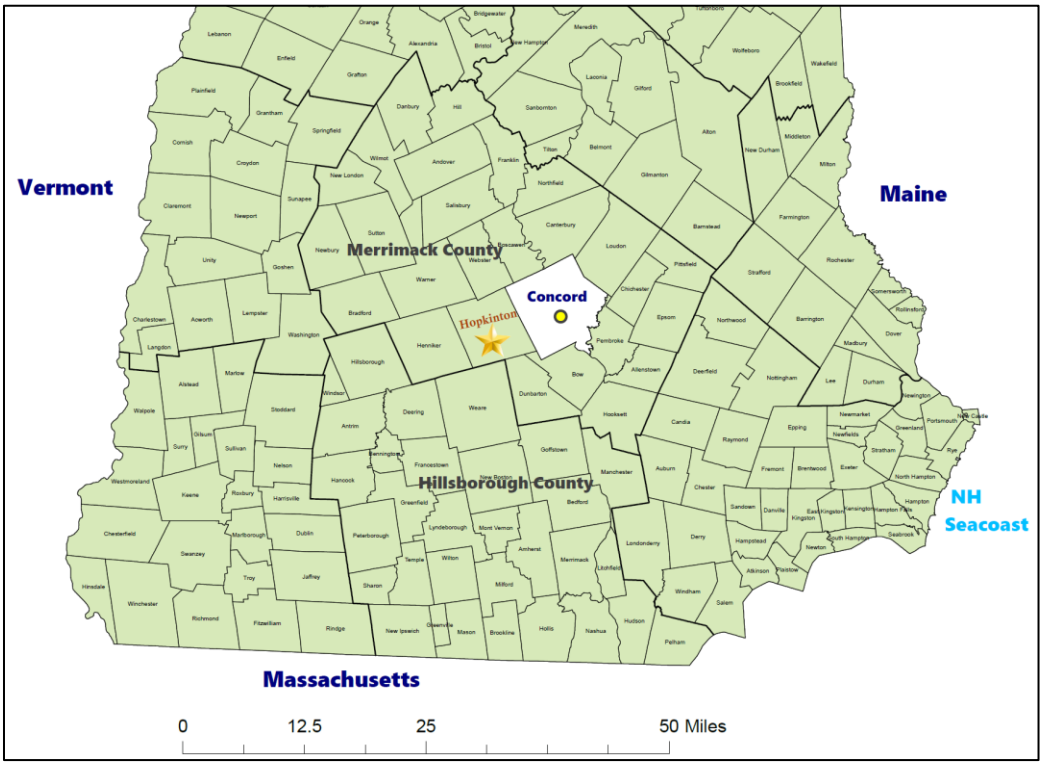
Geographic Context

The Town of Hopkinton is situated in Central New Hampshire within Merrimack County. It is bordered by the communities of Warner and Webster to the north, Bow, Dunbarton and Weare to the south and Henniker to the west. The State's capital City of Concord borders the Town along Hopkinton's eastern boundary. US Routes 9/202 and NH Route 103 and NH Route 127 are essential travel corridors for commuters, often used by those desiring to bypass Interstate 89. The north-south traveling Interstate 89 bisects Hopkinton, traveling from Concord to Warner. The US Route 9/202 bisects the lower third of the community in an east-west direction traveling from Concord to Henniker.

Merrimack County in which Hopkinton resides is often referred to as a valley as its borders are higher in elevation than its middle communities. Concord is the only City in the County. Merrimack County is surrounded by Hillsborough, Sullivan, Belknap, Rockingham, Strafford, and Grafton Counties. Most, but not all, communities in Merrimack County comprise most the Central NH Planning Region joined by two communities from Hillsborough County. Hillsborough County borders Massachusetts and includes the cities of Manchester and Nashua.

Concord and Hopkinton are about 50 miles from the Massachusetts state border, the Vermont state border, the Maine state border, and the seacoast traveling along New Hampshire's Interstates, US Routes, NH Routes, and local roadways. Hopkinton's context within Merrimack County and the State of New Hampshire are shown in **Figure 1**.

Figure 1
Hopkinton in the State



Source: Central NH Regional Planning Commission

Hopkinton is closely associated with the Central NH Region, one of nine planning regions in the State. The Town is a voluntary member of the Central New Hampshire Regional Planning Commission. The **19** Towns and **1** City comprising the Central NH Region contain several rivers and important highways. The Blackwater River and Warner River flow into the Contoocook River which then converges with the Merrimack River in Boscawen and Penacook. The Contoocook and the Merrimack Rivers effectively bisect the region into three sections. The Soucook River and Suncook River also converge into the Merrimack. The Contoocook River runs through the top third of Hopkinton traveling in a northerly direction until its confluence with the Merrimack River. The Warner and Blackwater Rivers flow south into Hopkinton where they join the Contoocook.

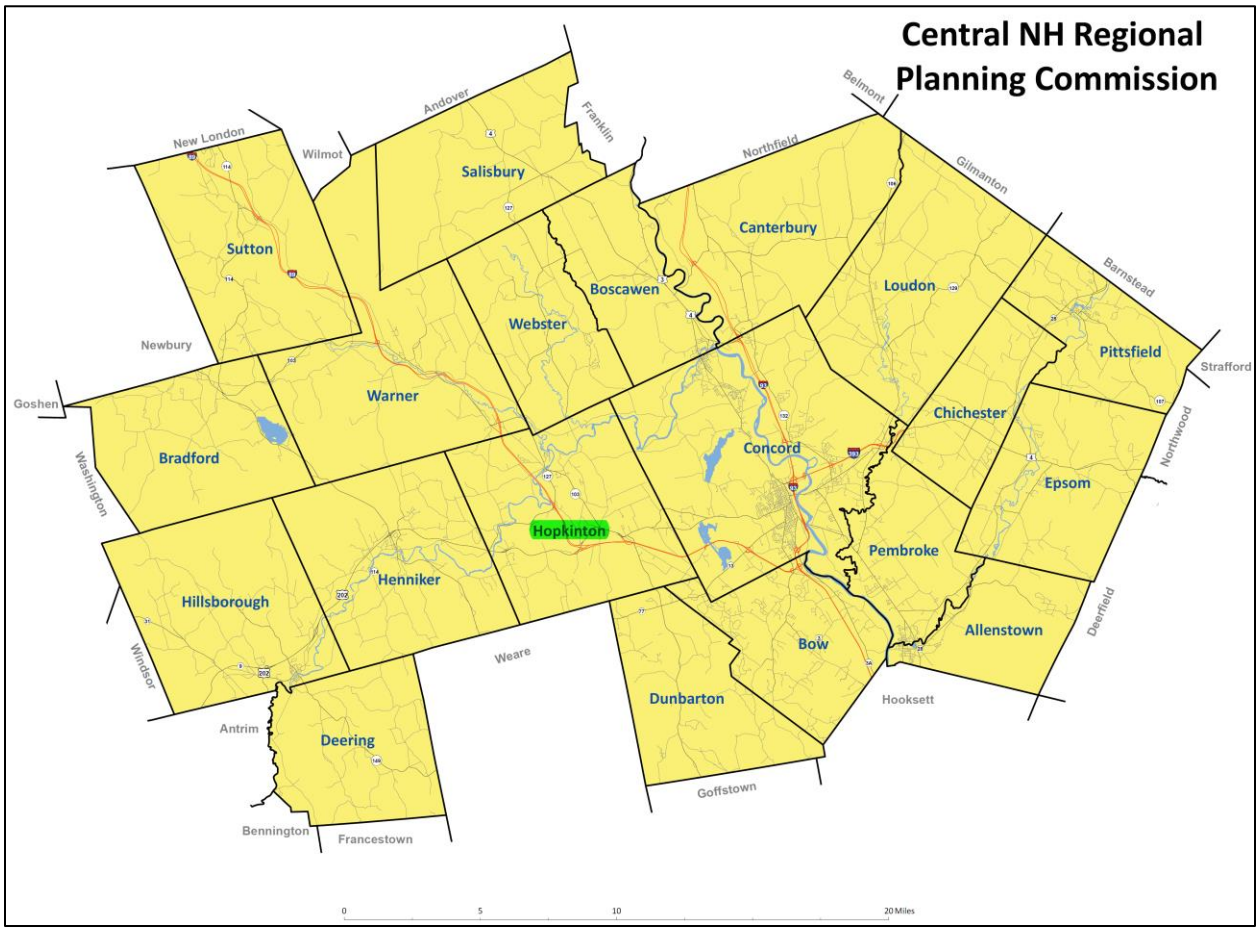
In the Central NH Region, Interstates 89, 93 and 393 stretch in north, northwest, east, and south directions, meeting in Concord and Bow. Major traffic routes of US Route 3 travels north-south and US Routes 9/202 traverses in an east-west direction. Hopkinton is located on US Routes 9/202 and hosts Interstate 89 Exits 4 (one direction only), 6 and 7. Dozens of state highways crisscross the region. As mentioned previously, in Hopkinton, NH Route 103 and Route 127 travel through Hopkinton. A map of the Central NH Region is displayed in **Figure 2**.

Interstates 89, 93 and 393 stretch in north, northwest, east, and south directions, meeting in Concord and Bow. Major traffic routes of US Route 3 travels north-south and US Routes 4/202 traverse in an

east-west direction. Hopkinton is located on US Route 3. Dozens of state highways crisscross the region. In Hopkinton, NH Route 106 and NH Route 28 travel through Town. A map of the Central NH Region is displayed in **Figure 2**.

Figure 2

Hopkinton in the Central NH Region



Source: Central NH Regional Planning Commission

Population and Housing Growth

Hopkinton completed a new Master Plan in **November 2010**. Chapters include detailed information on Community Profile, Land Use, Natural and Scenic Resources and Open Spaces, Transportation, Town Services and Facilities, Housing, Education, Economic Development and Regional Planning. The following data was taken from the most recent sources available during Hazard Mitigation Plan development to portray accurate demographic data of the community. The Planning Board is currently working on Chapter updates.

The following tables in contain the newest available data on housing and population growth which depict development trends over time. Hopkinton's population and housing increases have remained constant since the **1980-1990** growth pattern was established. The **2010** Census counted **5,589** people and **2,381** housing units in Hopkinton.

Table 3

Overall Population and Housing Growth Trends in Hopkinton, 1970-2014

Growth	Population	Net Change #	Net Change %	Housing Units	Net Change #	Net Change %
1970 Census	3,007	N/A	0	1,022	N/A	0
1980 Census	3,861	854	28.4%	1,395	373	36.5%
1990 Census	4,806	945	24.5%	1,924	529	37.9%
2000 Census	5,399	593	12.3%	2,210	286	14.9%
2010 Census	5,589	190	3.5%	2,381	171	7.7%
2014 Population & Housing Estimates*	5,602	13	0.2%	2,410	29	1.2%
Total Change from 1970 – 2010 Census	---	**2,582**	**85.9%**	---	**1,359**	**133.0%**

Sources: 1970-1990 US Census CPH-2-31 Table 9 Population and Housing Unit Counts;
*US Census 2000 & 2010 Data *includes all housing units, including vacant and seasonal*
NH Office of Energy and Planning Population Estimates 2014, 08-15 and NHOEP Housing Estimates 2010-2014

In **Table 3**, Hopkinton's **2010** Census population of **5,589** shows an overall increase of about **86%** in population over the previous four decades, up from **2,582** people in **1970**. Between **2000-2010**, the Town's population increased by about **3.5%** (**190** people) and housing by **7.7%** (**171** units). These numbers trend with the small growth of the Central NH region over the **2000-2010** period. The overall **86%** population growth rate (percentage) from **1970-2010** is comparable to other medium-sized communities in the Central NH region.

The number of housing units in Hopkinton increased by a higher rate since **1970**, growing from **1,022** units in **1970** to over double that number to total **2,410** in **2010**, an overall growth rate of **133%.** This housing rate (percentage) is higher than many medium-sized communities in the Central NH region.

The population and housing growth percentages did not grow equally; the housing growth (**133%**) is about **1.75** times the percentage of population growth (**86%**). The number of people per housing unit has continued to decline from its high of **2.9** people in 1970 to its low of **2.3** people per housing unit in **2010**. Hopkinton's overall population growth since 1970 has increased by **2,582** people and **1,359** homes by **2010**.

Table 4

Population Density in Hopkinton, 1970-2014

Municipality Size		Persons per Square Mile					
Land Acreage	Land Area in Square Miles	1970	1980	1990	2000	2010	2014
28,232	**43.3**	69	89	111	125	129	129

Sources: Table 3, Office of Energy and Planning's GIS acreage calculations, 2014

A good measurement of community population and housing change is population density, or how many people live in a square mile of land area. As displayed in Table 4, the overall population density has increased about **86%** from **69** people per square mile in **1970** to **111** people in **1990** and to **129** people in **2010**. Between the **2000-2010** Census, the increase of **4** people per square mile indicates a significate slow-down from previous decades. Hopkinton is a relatively large community in land area at **43.3** square miles in size and development opportunities are still available.

Table 5

New Construction Permits Issued by Building Type, 2010 – 2015

Building Type	2010	2011	2012	2013	2014	2015	6-Year Totals
Single Family Homes	5	4	3	12	8	7	**39**
Multi-family Homes	0	0	0	0	0	0	**0**
Manufactured Homes	0	0	0	0	0	1	**1**
Non-Residential Buildings	0	0	0	0	1	0	**1**
Totals	**5**	**4**	**3**	**12**	**9**	**8**	**41**

Source: Town of Hopkinton building permits files, 2010-2015

In Table 5, Hopkinton's new construction permits over the last six years are low but consistent. Between **2010-2015**, a total of **39** single family homes have received new construction permits. One (**1**) multi-family home and **1** non-residential building received permits also, showing little economic growth. Within the 2010-2015 timespan, the number of permits for homes have ranged between a low of **3** in 2012 and a high of **12** in **2013**.

New construction permits are not the only measure of a community's growth or decline. Table 6 below displays the school children in the Hopkinton School District between school year **2009/2010** and **2015/16**.

Table 6

Hopkinton School District Enrollment, 2009/2010 – 2015/2016

School		2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	6-Year Totals
Harold Martin	Grades P-3	289	299	285	262	249	243	**1,627**
Maple Street	Grades 4-6	202	188	201	219	277	226	**1,313**
High School	Grades 7-12	484	470	454	430	401	418	**2,657**
Totals		**975**	**957**	**940**	**911**	**877**	**887**	**5,547**

Source: Town of Hopkinton Annual Report, 2015

Land Use and Zoning

According to NH Office of Energy and Planning'2 2013 geographic information system (GIS) calculations, Hopkinton has a total land area of **28,232** acres, or **43.3** square land miles. An additional **1,153** acres (**1.8** square miles) is water. The acreage figure is moderately comparable to the Town's February 2015 Avitar assessing database records of **28,961** acres for the Town. This difference between the actual taxable land calculations from the assessing records and the acreage from the basic GIS calculations is not unusual.

For New Hampshire and specifically the Central NH Region, Hopkinton is considered a small-sized community in terms of population but is a medium-sized community in terms of land area. However, the proportion of residential to forested to commercial land remains about the same as any town in the region, but with a heavier emphasis on the forested land.

From **Table 7**, residential land is the predominant land use type, comprising **43%** of the Town's land area. Municipal, state, and federal land (**27%**) follows as the next highest acreage of land use, followed by forested (includes current use or conservation land) at **20%**. Farmland use is at **6%** followed by commercial/ industrial land use at **3%**. The remaining land uses of institutional (**1%**), communications and utilities (**<1%**), and wetlands (**<1%**) round out the categories of assessed land in Town.

Table 7

Land Use

Land Use Category	Acres	% of Town
Residential	**12,448**	**43.0%**
Commercial and Industrial	837	2.9%
Communications and Utilities	102	0.4%
Institutional	254	0.9%
Municipal, State and Federal	**7,811**	**27.0%**
Forested (includes Current Use or Conservation)	**5,728**	**19.8%**
Farmland	1,763	6.1%
Wetland	18	0.1%
Total	**28,961**	**100.0%**

Source: Town of Hopkinton Assessing Database 02-18-15

The perspective of the Town's Zoning Districts offers another way to view how the land is utilized within Hopkinton in Table 8. A full table of uses is located in the Zoning Ordinance that states which property uses are allowed within each district. Tables of dimensional and density requirements pertaining to lot frontages and lot sizes, contiguous frontage, maximum structure height, maximum building coverage, and minimum open space per lot complement the table of uses.

Table 8

Zoning Districts, 2015

Zoning District	Abbreviation
Residential/Agricultural	R-4
Low Density Residential	R-3
Medium Density Residential (R-2)	R-2
High Density Residential (R-1)	R-1
Commercial (B-1)	B-1
Industrial (M-1)	M-1
Village High Density Residential (VR-1)	VR-1
Village Commercial (VB-1)	VB-1
Village Industrial (VM-1)	VM-1
Overlay District	Abbreviation
Wetlands Conservation Overlay	W-1

Source: Town of Hopkinton Zoning Ordinance 2015

Overlay districts are superimposed upon the underlying zoning districts so additional regulations shall apply. For any conflicting regulation, the more restrictive shall apply. Although the Town has a compliant Floodplain Development Ordinance, it does not serve as a specific overlay district. The Zoning Ordinance has sections amended every year at the annual March Town Meeting and is vigorously used and applied by the Land Use Department.

The community's **Built Environment Changes** describe how and where the community has grown, to which hazards vulnerable areas are susceptible, and states the overall change in hazard vulnerability in **4 HAZARD RISK ASSESSMENT**.

3 GOALS AND OBJECTIVES

The overall purpose of this Plan is to reduce future life and property losses caused by hazard events before they occur by the identification of appropriate **Actions** that are implemented during the five-year duration of this Plan.

Inspired by the *State of New Hampshire Hazard Mitigation Plan*, the following **Goals** were initially developed in a previous Plan version and thus were reviewed and updated as applicable by the Hazard Mitigation Committee during a public meeting. While the hazard incidents have remained essentially the same as from the **2011 Plan** with a few disaster additions over the course of the last five years, it was important to reassess the continued relevancy of **Goals** and **Objectives** to influence the development of the best and most relevant hazard mitigation Actions.

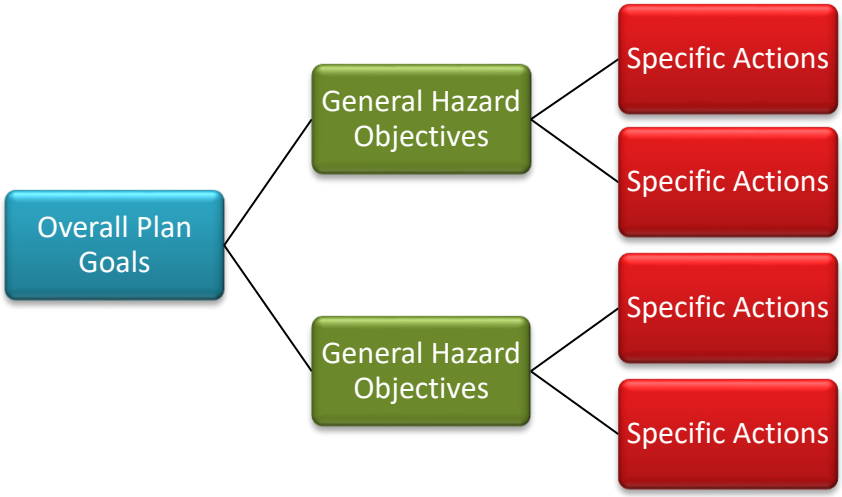
What Are Goals, Objectives and Actions

Goals, Objectives and Actions are used in the Hazard Mitigation Plan to define different levels of meaning. Their relationship is displayed in **Figure 3**.

The overall **Goals** of this Hazard Mitigation Plan provide a macro-level view of what emergency managers want to accomplish to keep the Town's life, property and infrastructure safer from natural disasters. Statements of overall **Goals**, beginning with "To", describe the desired vision of mitigation and safety for the community. **Goals** enable the development of thoughtful hazard **Objectives** designed to generally fulfill those **Goals**.

Figure 3

Relationship of Goals, Objectives and Actions



Objectives begin to narrow down the focus of the overall **Goals** into hazard minimization statements. Main hazard categories of **Flood**, **Fire**, **Severe Wind**, **Extreme Temperature (Cold-Hot)**, **Human**, and **Technological** guide the direction of mitigation efforts. These hazard **Objective** statements, beginning with "Minimize", state Town's desired outcome for each hazard category. The **Objectives** support the overall **Goals** by placing a focus on hazard mitigation or minimization.

Finally, **Actions** are the specific activities or projects which can be undertaken to accomplish an **Objective**. **Actions** begin with a verb to portray a direction for accomplishment. The **Action** is the target to reach to help mitigate hazards in the community. The completed **Action** fulfills the associated **Objectives**. The Actions will be listed and reviewed later in the **Potential Action Evaluation** and **Mitigation Action Plan** tables.

Overall Hazard Mitigation Plan Goals

The following **2** Goals for the **Hazard Mitigation Plan 2017** were developed by the Hazard Mitigation Committee as the vision for the community with respect to the declared disaster declarations, general hazard events, seasonal weather events and changing climate patterns resulting in unexpected events. Collectively, the **Goals** guided the formulation of **Objectives** for each of the main hazard categories. These **Goals** were revised from the **2011 Plan** to emphasize hazard mitigation instead of preparedness, response and recovery which are covered in the ***Emergency Operations Plan***.

Overall Hazard Mitigation Plan Goals

1. **To increase the protection of people in the Town from all natural hazards and disasters and from the impacts of secondary hazards.**
2. **To reduce the potential damages in Town to public and private property, infrastructure, historic resources and the natural environment by natural hazards and disasters and to reduce he impacts of secondary hazards.**

General Hazard Mitigation Objectives

Main hazard event categories, such as Flooding, are intended to encompass the full sub-hazards range described in this Plan. The general Objectives are developed by addressing the primary hazard events that could impact Hopkinton. They focus on minimizing or mitigating the hazard events to support the overall Goals while driving the direction of Action development later in the Plan.

Although human and technological hazards are not natural disasters, many technological hazards in particular are secondary to (caused by) natural hazards such as **Thunderstorms, Flooding** or **Severe Winter Weather** causing **Power Failure** or **Debris Impacted Infrastructure**.

General Hazard Mitigation Objectives

FLOOD HAZARDS

1. **Minimize the damages from floodwaters from the Contoocook River, Blackwater River, Whittier Pond, Boutwell Brook, Kimball Pond, and other water bodies, to life, property and infrastructure.**

2. **Minimize the damages caused by flooded roads, culvert washouts, dam failures, or debris impacted infrastructure.**

FIRE HAZARDS

3. **Minimize the damages from fire, lightning, and wildfire to life, property, and infrastructure.**

SEVERE WIND HAZARDS

4. **Minimize the damages from severe wind events, including thunderstorms, downbursts, hurricanes and tropical storms, and tornadoes to life, property, and infrastructure.**

EXTREME TEMPERATURE (COLD-HOT) HAZARDS

5. **Minimize the damages from both severe winter weather, including storms, snow, ice, and wind chill events and from excessive heat events, to life, property and infrastructure.**

6. **Minimize the threat of public health events from the cold and warm weather seasons (communicable illnesses, Lyme disease, hypothermia, heat exhaustion, asthma, etc) to the public, especially those in close quarters.**

HUMAN HAZARDS

7. **Minimize the damages from human threats such as sabotage/vandalism, terrorism, hostage situations, arson and civil disturbance to life, property and infrastructure.**

TECHNOLOGICAL HAZARDS (Infrastructure and Secondary)

8. **Minimize the damages from multiple hazards to the operational efficiency of all communications systems, underground water utilities, dams, bridges, and transportation roadways**

9. **Minimize the damages from electrical power failure to life, property and infrastructure, in both rural and urban environments.**

10. **Minimize the damages from chemical and hazardous materials exposure to life, property and infrastructure.**

4 HAZARD RISK ASSESSMENT

Natural disasters and technological, and human hazards that have occurred in Hopkinton or have the potential to occur in the Town were assessed in a **Hazard Risk Assessment** to determine their **Overall Risk** to the community. The major disasters declarations covering the Central NH Region (Merrimack County and Hillsborough County) have been inventoried and additional hazard events occurring in Hopkinton and the area have been described. FEMA Public Assistance funding to the Town is detailed for each disaster declaration. A review of climate changes is provided for region to provide perspective on how the weather may change over time.

The *State of New Hampshire Hazard Mitigation Plan, 2013* recommends that municipalities examine multiple natural hazards. Two hazards, coastal flooding and snow avalanche, are not discussed in Hopkinton's Plan because they have no relevance. Within the **Hazard Mitigation Plan 2017**, natural hazards under these basic categories have been incorporated:

- **Flooding Hazards**
- **Wind Hazards**
- **Fire Hazards**
- **Extreme Temperature (Cold-Hot) Hazards**
- **Earth Hazards**
- **Technological (Secondary) Hazards**
- **Human Hazards**

Within these basic hazard categories are numerous related subcategories, all of which are detailed in a **Hazard Risk Assessment.** This Assessment provides a measure of **Frequency**, **Location Area**, **Impact to the Town**, **Hazard Magnitude**, and **Overall Risk** for each hazard in a numerical format as determined by the Hazard Mitigation Committee. Scale definitions and the process to define hazards are discussed.

Many of these examined hazards discussed may pose little threat to the Town. The Hazard Mitigation Committee wanted to acknowledge their possibility as opposed to simply focusing on a handful of top hazards which will certainly occur in the community. Using this broad vision allows Hopkinton to contemplate the impact of a variety of hazards and to develop mitigation actions and design emergency planning programs as appropriate. Only the most predominant hazards, or even multiple hazards, will have mitigation actions developed to try to reduce the hazards' impact. These are later discussed in **Potential Mitigation Actions** and prioritized in the **Mitigation Action Plan**.

Hazard Risk Assessment Rankings

Twenty-seven (**27**) natural, technological, and human hazards are evaluated within this Plan. The **16** natural hazards (including the technological hazard **Dam Failure** because of its close association with flooding) are ranked within in a **Hazard Risk Assessment**. Some hazards may be more likely to occur in the community than others based on past events and current conditions, and some hazards may have a greater impact than other hazards. How vulnerable Hopkinton could be to natural hazards can be measured in terms of **Overall Risk**.

The location of where each hazard has occurred either in the past or may be prone to future hazard occurrences is noted in the **Hazard Locations in Town** column.

Knowing where events may be likely to occur, the 2017 Hazard Mitigation Committee examined each potential hazard for its **Probability of Occurrence** and its potential **Impact to the Town** affecting people, services/infrastructure and property based on past personal recollections and community hazard trends to determine the **Overall Risk** to the community.

The Committee identified each hazard's **Probability of Occurrence** score on a **1-2-3-4** scale from **Unlikely/1** (0-25% chance of occurring in 10 years, which is **2** Hazard Mitigation Plan cycles) to **Highly Likely/4** (76-100% chance in 10 years) as shown below.

Probability of Occurrence

1	**Unlikely=**	**0 - 25% chance**	**in 10 years**
2	**Possible=**	**25 - 50% chance**	**in 10 years**
3	**Likely=**	**51 - 75% chance**	**in 10 years**
4	**Highly Likely=**	**76 - 100% chance**	**in 10 years**

The Committee determined the likely **Impact to the Town** of an event based on a **1-2-3-4** scale for **3 Impact** characteristics – Human injuries, the length of time Critical Services/Infrastructure are shut down, and Property damage. Not all of these characteristics have to be expected because each hazard differs. The scale runs from **Limited/1** to **Catastrophic/4** and the more specific definitions are described below.

The **Probability of Occurrence** score was multiplied by the average of each **Impact to the Town** (Human, Critical Services/Infrastructure and Property) score to obtain the **Overall Risk** score.

The technological and human hazards were not scored to ensure the natural hazards retained the focus of the **Hazard Mitigation Plan Update 2017.** However, **Dam Failure** was rated because of its close correlation to **Flooding**.

Impact to the Town: Human, Critical Facilities/Infrastructure/Services, Property

1	Limited=	**Human:** Injuries treatable with first aid. **Critical Facilities/Infrastructure/Services:** Minor inconvenience; Shutdown for 3 days or less. **Property:** Damaged less than 10%.
2	Significant=	**Human:** Significant injuries or illnesses result in no permanent disability. **Critical Facilities/Infrastructure/Services:** Shutdown for up to 2 weeks. **Property:** Damaged 10% to 25%.
3	Critical=	**Human:** Significant injuries or illnesses result in permanent disability. **Critical Facilities/Infrastructure/Services:** Complete shutdown for at least 2 weeks. **Property:** Damaged 25% to 50%.
4	Catastrophic=	**Human:** At least 1 to multiple deaths. **Critical Facilities/Infrastructure/Services:** Complete shutdown for 30 days or more. **Property:** Damaged greater than 50%.

OVERALL RISK ASSESSMENT SCORES

The highest possible **Overall Risk** score a natural hazard could be ranked using this **Hazard Risk Assessment** system is **16** while the lowest score a hazard could be ranked is **1**. The **Overall Risk** numeric score is one which can help the community weigh the hazards against one another to determine which hazards are most detrimental to the community and which hazards should have the most Actions developed to try to mitigate those hazards. The **Overall Risk** is calculated simply by adding the two scores of **Probability of Occurrence** and **Impact to the Town**. **The full results of the Hazard Risk Assessment are displayed in Table 9**.

Out of the **16** ranked natural hazards, Hopkinton's highest ranking hazards scored an ***Overall Risk*** between **5** - **9** (out of a possible score of **16**), rounded to whole numbers:

Highest Overall Risk Hazards Scored 5-9:

- **Severe Winds, Rainstorms and Thunder Storms 9**
- **Severe Winter Weather and Ice Storms 8**
- **Floods and Flash Floods 6**
- **Dam Failure 6**
- **Lightning 5**
- **Riverine (Merrimack, Contoocook, Blackwater) Scouring, Erosion, Channel Movement 5**
- **Downbursts 5**
- **Drought 5**

Table 9

Hazard Risk Assessment

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Flooding	**Floods and Flash Floods**	**Floodplains, roadways of Town.** Areas prone to flooding in the Town include: Floodplains of Warner / Blackwater / Contoocook Rivers, Hardy Spring Brook, Browns Brook, Dolf Brook, Boutwell Mill Brook, Meadow Brook, Kimball Pond, Flood Control Reservoir, Clement Pond. Meadows of Hopkinton manufactured housing, Little Tooky Road residences, Contoocook Village Downtown. Runoff from roadways or heavy rain can cause floods over the Entire Town.	**3**	1	3	2	**2.00**	**6.00**
Flooding	**Rapid Snow Pack Melt**	**Entire Town.** Melt runoff from impervious surfaces and roadways or from tree cover and fields can cause floods over the Entire Town. Susceptible areas include: Warner River & Blackwater River, Contoocook River. Area above Hopkinton-Everett Reservoir.	**2**	1	2	1	**1.33**	**2.67**
Flooding	**River Ice Jams**	**Warner / Blackwater / Contoocook Rivers and crossing infrastructure.** Hopkinton-Everett Flood Control Dam ice jams could endanger the bridges or dams. Sites susceptible to debris impacted infrastructure (bridges and dams) include those downstream of the Flood Control Dam.	**2**	1	2	1	**1.33**	**2.67**
Flooding	**Riverine (Merrimack, Contoocook, Blackwater) Scouring, Erosion, Channel Movement**	**Warner and Contoocook Rivers, Blackwater River** erosion embankments near Penacook Road bridge abutments. Floodplains of the rivers and brooks. These are the largest watercourses in the Town and run through or Route 103 and US Route 202/9.	**3**	1	3	1	**1.67**	**5.00**
Wind	**Tornadoes**	**Entire Town.** Contoocook Village and other populated areas. Vulnerable populations, Schools, populated. Wooded and forested sections of Town would be difficult to access with trees and power lines down on these significant commuter routes or residential roads, Route 103, US Routes 202/9, Main Street.	**1**	1	2	2	**1.67**	**1.67**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Wind	**Downbursts**	**Entire Town.** Along College Hill Road, which sustained damage. Contoocook Village and other populated areas. Vulnerable populations, Schools, populated. Wooded and forested sections of Town would be difficult to access with trees and power lines down on these significant commuter routes or residential roads, Route 103, US Routes 202/9, Main Street. Taller buildings, telecommunications towers, aboveground utilities particularly vulnerable.	**3**	1	2	2	**1.67**	**5.00**
Wind	**Hurricanes and Tropical Storms**	**Entire Town**. Areas of particular concern include dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure.	**3**	1	2	1	**1.33**	**4.00**
Wind	**Severe Winds, Rainstorms and Thunder Storms**	**Entire Town.** Areas of particular concern include dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure.	**4**	1	3	3	**2.33**	**9.33**
Fire	**Lightning**	**Entire Town.** Areas most susceptible include forested areas, conservation areas, open recreation fields, locations difficult to access by vehicle, points of higher elevation than surrounding area. Susceptible structures include: generators, aboveground utilities, transformers, telecommunications towers, churches and tall buildings.	**4**	1	2	1	**1.33**	**5.33**
Fire	**Wildfire**	**Entire Town**. Areas most susceptible include residential backyards, Town and State forests, Elm Brook State Park, wooded areas, recreation areas, conservation areas, open recreation fields, locations difficult to access by vehicles. Susceptible structures include: aboveground utilities, transformers, telecommunications towers.	**2**	1	2	1	**1.33**	**2.67**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Extreme Temp	**Severe Winter Weather, Cold and Ice Storms**	**Entire Town.** Areas of particular concern include roof collapse anywhere, dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure. Remote areas in the Town may be more difficult to access and/or without power (including heat) for a longer period of time. Most vulnerable populations may be subject to cold temperature, snow isolation, transportation accidents, power failure and communications failure.	**4**	1	3	2	**2.00**	**8.00**
Extreme Temp	**Drought**	**Entire Town / Region.** Areas susceptible include farms, orchards, tree farms. Also vulnerable are those residences with private dug wells and Town or community (serving over 25 people) water supplies. Drought means increased risk of brush fire with dry vegetation.	**3**	1	2	2	**1.67**	**5.00**
Extreme	**Excessive Heat**	**Entire Town.** Vulnerable populations most susceptible to extreme heat include: all Schools and daycare, those populations in Appendix A. Shelters may need to be opened as cooling centers during extended heat conditions.	**4**	1	1	1	**1.00**	**4.00**
Earth	**Earthquake**	**Entire Town.** The Central NH Region is seismically active and earthquakes are regularly felt from area epicenters. Damage to utility poles and wires, roadways and infrastructure (water and waste water treatment facilities, bridges, dams) can be significant. Areas with underground utilities, community water systems, cisterns, old buildings, Contoocook Village and wooden covered bridges are particularly susceptible.	**3**	1	1	1	**1.00**	**3.00**
Earth	**Landslide**	**Slopes greater than 15%** (few if any locations in Town noted). Roads with steep ditching or embankments are most vulnerable to landslides. River and brook banks can also slide, usually known as erosion: Contoocook River, Blackwater River, Warner River.	**2**	1	1	1	**1.00**	**2.00**

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Technological	**Dam Failure**	**Areas downstream of Dams with a High or Significant hazard classification** that if failed, could present a problem to those downstream or directly nearby. Areas particularly susceptible include: Meadows of Hopkinton manufactured housing, Little Tooky Road residences, Contoocook Village Downtown. Damage from Hopkinton Flood Control Dam, Flood Control Spillway (Hopkinton-Everett Reservoir), Elm Brook Dam, Hoague Sprague Dam, Contoocook Village Dam, Kimball Lake Dam.	**2**	1	4	4	**3.00**	**6.00**
Technological	**Power/ Utility Failure**	**Entire Town.** Sites and areas most susceptible include: vulnerable populations (Appendix A). Wooded, forested and more remote sections of Town would be difficult to access. Trees and/or power lines down on these routes or residential roads would be problematic and include: Route 103, US Routes 202/9, Interstate 89.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Technological	**Communi-cations Systems Failure**	**Entire Town.** Sites and areas most susceptible include: Appendix A facilities, telecommunications tower. Telephone and cable lines often go down with power. Communications failure would be worse if it occurred at the Fire and Police Depts, Public Works Department or Town Hall, especially during a holiday, or if power failure inhibited emergency dispatch and EOC operations.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Technological	**Debris Impacted Infrastructure**	**Dams, bridges, culverts, roadways.** Most prominent dams and bridges that could experience debris impacted infrastructure included in Appendix A. Culverts that regularly washout (including those in need of upgrade) include: Dolph Brook and the culvert replacement Table in the Plan. Prominent roadways - routes I-89, Route 103, Routes 202/9, commuter roadways or residential roads that are commonly blocked or that would impact the greatest number of people if blocked by downed trees or power/utility lines.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Technological	**Transportation Accidents**	**Roadways.** Interstate 89 and exit ramps, Route 9/202, NH Route 127, local Class V roads. See Map 4 for regular accident locations - at certain intersections, curves, straightaways, hills.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Technological	**Fire (Vehicle, Structure, Arson)**	**Entire Town.** Areas most susceptible include: Contoocook Village, Main Street area and other populated areas. Vacant foreclosure homes or seasonal buildings in the Town and buildings in densely populated areas or residential manufactured home communities. Vehicle fires could occur anywhere, parking lots, driveways, roadways.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Technological	**Hazardous Materials Spills**	Most significant routes where vehicular traffic transports hazardous waste include: Vehicular traffic Interstate 89 and exit ramps and interchange, Route 9/202, NH Route 127. Homes, businesses, vulnerable populations along the transportation routes could be vulnerable. Largest or most dangerous stationary sites that store and/or handle haz mat on site include those in Appendix A. Also sites those that store fertilizer, pesticides, fuel, etc. Occupational haz mat sites where spills could occur include: medical facilities, Schools, manufacturing, etc.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Human	**Public Health Epidemics**	**Most susceptible transfer sites:** Schools/daycares, health clinics, eating establishments, populated areas, large employers, senior apartments, stores and public assembly venues (see Appendix A). Also, programs with public outreach such as: Meals-on-Wheels, VNA, senior and recreational programs, etc.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Human	**Terrorism**	**None anticipated.** Most susceptible sites could include: Town Hall, Hopkinton Schools, Post Office, Flood Control Reservoir. Also communication towers, major employers (especially those with large quantities of haz materials), health clinics, grocery or convenience stores, restaurants, high volume roadways, water supply infrastructure or dams, Post Office, all governmental facilities, state facilities, political offices or rallies, churches, etc.)	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Human	**Sabotage/ Vandalism**	**Town systems or facilities.** Sabotage would be most likely to occur Town computer systems & website, Town buildings, utilities, dams, water supplies, water and waste water treatment facilities, cemeteries, vacant buildings, under bridges.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated

Natural, Technological, Human Hazard Events		Susceptible (Existing) Hazard Locations in the Town	Probability of Occurrence	Human Injury Impact	Critical Services and Infrastructure Impact	Property Damage Impact	Severity of Impact	OVERALL RISK
Human	**Hostage Situation**	**Entire Town, but isolated incident.** Hostage situations are isolated events. Locations where hostages could be taken include: Town Hall and other public buildings, Schools, banks, Post Office, workplaces, grocery and convenience stores, restaurants, high density population areas (Contoocook Village, manufactured housing communities, apartment buildings), domestic home situations.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated
Human	**Civil Disturbance/ Public Unrest**	**None** as locations where civil disturbance could occur should be limited. Occasions include: Town Meetings, voting day, during visits from political candidates, sporting events, large events such as Old Home Day or veteran's parades, school graduation. Locations include Schools, recreational fields, Town Hall, stores, restaurants, establishments serving alcohol, high density population areas (Contoocook Village, manufactured housing parks, neighborhoods), Police and Fire stations.	Not rated	Not rated	Not rated	Not rated	Not rated	Not rated

Source: Hopkinton Hazard Mitigation Committee 2017

Central NH Region Major Disaster Declarations, 1973-2016

The Central NH region, which encompasses parts of Merrimack County (**18** communities) and Hillsborough County (**2** communities), has been damaged by **21** multiple presidentially-declared major disasters in the last **43** years, between **1973-2016**.

While a natural disaster typically befalls multiple counties in New Hampshire, only those damaging either Merrimack County or Hillsborough County were identified in this section. Over the last **11** years (**2005-2016**), the number of presidentially-declared natural major disasters have increased significantly compared to the first severe storm and floods of **1973** to the **1998** ice storm (**25** years).

Between **2005-2016**, the most recent round of major disasters afflicting the Central NH Region, **12** natural disasters within **11** years were declared for Merrimack and/or Hillsborough Counties, **5** of which were floods, **5** snow/ice storms, and **2** rain/wind storms. No other major disasters were declared between **1998-2005** in the Central NH Region, bringing the total number of disaster declarations to **12** disasters within **18** years (**1998-2016**).

Emergency declarations are often proclaimed for counties in New Hampshire to help communities receive funding for less serious hazard events that may have caused more damage in nearby declared declaration counties or states. Emergency declarations that occurred between **2005-2016** are not counted within the **12** declared disasters, such as Hurricane Sandy in 2012, although the Town received financial assistance for the **5** emergency declarations since 2001.

However, the last declared disaster in Merrimack County, in which Hopkinton is located, was in **February 2013**; as of **June 2016**, no new major disasters have been declared here. These details are displayed in **Table 10**. Most of these disasters will be described within the following **Recent Disaster Events Summary** section.

Table 10

Central NH Region Major Disaster Declarations, 1973 to 2016

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County*	
				Merr	Hill
4209	**2015** January Blizzard	Jan 26-28, **2015**	Severe Winter Storm and Snowstorm	---	H
4105	**2013** Snowstorm NEMO	Feb 8-10, **2013**	Severe Winter Storm and Snowstorm	M	H
4095 EM-3360	**2012** Hurricane Sandy	Oct 26-Nov 8, **2012**	Hurricane Sandy *emergency declaration only for Merr and Hill Cty*	M	H
4049	**2011** Halloween Snow Storm	Oct 29-30, **2011**	Severe Storm and Snowstorm	---	H
4026	**2011** Tropical Storm Irene	Aug 26-Sep 6, **2011**	Tropical Storm Irene	M	---
1913	**2010** March Flooding & Winds	Mar 14-31, **2010**	Severe Storms and Flooding	M	H
1892	**2010** Winter Storm	Feb 23-Mar 3, **2010**	High Winds, Rain, Snow	M	H
1812	**2008** December Ice Storm	Dec 11-23, **2008**	Severe Winter Storm	M	H
1799	**2008** Patriot's Day Flood	Sep 6-7, **2008**	Heavy Rains and Floods	M	H
1782	**2008** July Tornado	Jul 24, **2008**	Tornado, Severe Winds, Heavy Rains	M	---
1695	**2007** April Spring Flood	Apr 15-23, **2007**	Severe Storms and Flooding	M	H
1643	**2006** Mother's Day Flood	May 12-23, **2006**	Severe Storms and Flooding	M	H
1610	**2005** Columbus Day Flood	Oct 7-18, **2005**	Severe Storms and Flooding	M	H
EM-3207	**2005** Snow Emergency	Jan 22-23, **2005**	Snowstorm	M	H
EM-3193	**2003** Snow Emergency	Dec 6-7, **2003**	Snowstorm	M	H
EM-3177	**2003** Snow Emergency	Feb 17-18, **2003**	Snowstorm	M	H
EM-3166	**2001** Snow Emergency	Mar 5-7, **2001**	Snowstorm	M	H
1231	**1998** Flooding	Jun 12-Jul 2, **1998**	Severe Storms and Flooding	M	H
1199	**1998** December Ice Storm	Jan 7-25, **1998**	Ice Storms	M	H
1144	**1996** Severe Storms and Flooding	Oct 20-23, **1996**	Severe Storms and Flooding	M	H

FEMA DR-	Local Disaster Name	Incident Period	FEMA Disaster Name	Includes County*	
				Merr	Hill
1077	**1995** Flood	Oct 20-Nov 15, **1995**	Storms and Floods	M	---
917	**1991** Hurricane Bob	Aug 18-20, **1991**	Severe Storm	---	H
876	**1990** Flooding and Severe Storm	Aug 7-11, **1990**	Flooding and Severe Storm	M	H
789	**1987** Severe Storms and Flooding	Mar 30-Apr 11, **1987**	Severe Storms and Flooding	M	H
771	**1986** Severe Storms and Flooding	Jul 29-Aug 10, **1986**	Severe Storms and Flooding	---	H
399	**1973** Severe Storms and Flooding	Jul 11, **1973**	Severe Storms and Flooding	M	H

Source: http://www.fema.gov/disasters/grid/state/33?field_disaster_type_term_tid_1=All

*M = Merrimack County (18 towns in CNH region) H = Hillsborough County (2 towns in CNH region)

Recent Disaster Events Summary

The Town of Hopkinton has been affected by several significant natural disasters within the last decade and applied for and received Public Assistance (PA) funding for many of these events. Severe natural hazard events have been occurring more frequently in Merrimack County than in the past. While these events on occasion disrupted the flow of the community and isolated residents for days, the disaster impacts were relatively mild as few injuries were reported. FEMA provided Public Assistance funding to the Town for tasks such as cleanup, road repairs, tree and brush cutting, and culvert replacement.

The Hazard Mitigation Committee helped provide anecdotal descriptions of how the recently declared natural disasters or emergency declarations for the Central NH Region affected Hopkinton and its residents. Public Assistance disaster funding opportunities open to communities when a disaster is declared within a county. The Town of Hopkinton applied for and received this funding for several recently declared disasters, and the amount for each disaster is recorded along with a description of the event in **Table 11**. Also identified were numerous hazard events that occurred locally in the community and within the area. The disaster event listing dates from the 1936 floods to present day.

PUBLIC ASSISTANCE GRANT FUNDING

To help reclaim some of the costs these disasters wrought on town property and infrastructure, Hopkinton applied for and received FEMA Public Assistance (PA) funds, Categories A-G, a 75% grant and 25% match program for several declared Merrimack County disasters. These PA funds have been used for overtime wages for Town employees, equipment rentals, snow removal, washout repair, road reconstruction, bridge repair, debris removal, and more.

The database where the Public Assistance funding information resides is available from **1993** to present (**2016**). The funding was sought for and received by Hopkinton for **5** of the **15** declared disasters (including Hurricane Sandy, which was an emergency declaration) in Merrimack County during this timeframe. In addition, Emergency Declarations provided funding to Hopkinton for **4** snowstorms between **2001-2005**. This data is available through FEMA at https://www.fema.gov/openfema-dataset-public-assistance-funded-projects-details-v1.

The most expensive disaster for Hopkinton in terms of FEMA Public Assistance funds received for recovery was the **December 2008 Ice Storm**, after which Hopkinton received over **$50,000** for **2** projects to help repair the roads, bridges, and culverts. The last time the Town was awarded funding was for **$33,000** for protective measures and snow removal for the **February 2013 Severe Winter Storm**. This was the last major disaster declaration for Merrimack County to date. All funding to date, from **1993** to **June 2016** totals the **$235,000**. This detail is displayed in **Table 11**.

COLOR KEY for Table 11:

Declared Disasters in Merrimack County or Hillsborough County (Central NH Region)	PA Funding $ Received by Hopkinton	Other Hopkinton Local Hazard Event

Table 11

Local and Area Hazard Event and Disaster History

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Hopkinton Drought Emergency 2016	No	2016	15-Sep	N/A	Extreme Drought (D3) intensities are found in northern Hillsborough and southern Merrimack Counties. Some of the communities in the Central NH Region are experiencing Severe Drought (D2) or Moderate Drought (D1) conditions. The NH DES has issued a series of statements and tips for homeowner water conservation. As of September 2016, residents and municipalities are requested to voluntarily conserve water. Some communities or water precincts have enacted water restrictions or bans for certain water usage. More restrictions may be enacted or may eventually required by the State if conditions remain the same or worsen.	The Extreme Drought (D3) conditions as of 09/15/16 cover the entire community.	Earth, Drought	US Drought Monitor NH, NH DES
Earthquake 2.9M 2016 Warner Epicenter	No	2016	21-Mar	N/A	Epicenter in Warner/Hopkinton area, 2.8 magnitude. Felt in the Central NH Region/most of Merrimack County, light in Hillsborough County. Felt most strongly in Hopkinton, Henniker, Warner, Webster, Salisbury, Franklin, Canterbury, Concord, and Hillsborough	Reports were made to the USGS from Hopkinton residents feeling the earthquake as a rumble or loud noise.	Earth, Earthquake	Hopkinton Hazard Mitigation Committee, USGS

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Earthquake 2.2M 2015 Epsom Epicenter	No	2015	2-Aug	N/A	Epicenter around Epsom in the Central NH Region in Merrimack County, felt in nearby locations including Concord, Hopkinton, Allenstown, Loudon Chichester and Pittsfield	Reports were also likely made to the USGS from Hopkinton residents feeling the earthquake.	Earth, Earthquake	Earthquaketrack.com
Tornado, Severe Thunderstorms	No	2015	31-Jul	N/A	In Warner, NWS confirmed an EF-0 tornado touched down in the evening. It had a maximum wind speed of 75 mph and was 100 yards wide. Town officials said the tornado ripped the roof off a barn, but there were no injuries reported.	N/A, although Warner abuts Hopkinton to the north	Wind, Tornado	WMUR
Severe Winter Storm and Snowstorm - January Blizzard 2015	**4209**	**2015**	**Jan 26-28**	**No**	The closest reporting weather station, Concord Airport (CON), had accumulated 29" of heavy snow, 50 mph whiteout wind conditions in the region. Not declared in Merrimack County.	No funding applied for/ received (Hillsborough County disaster). Hopkinton experienced heavy snow on their school bus routes. Lots of wind and snow ensured some power failures and tree debris, but the Town did not have an emergency with this storm.	Extreme Temp, Snow, Wind	Hopkinton Hazard Mitigation Committee, fema.gov, Boston Globe
Thanksgiving Day Snowstorm	No	2014	27-Nov	N/A	Large amount of snowfall fell in a very short period of time ahead of typical seasonal expectations. Power outages were prolific, with a peak of About 200,000 power outages in NH, the 4th largest blackout in history. large amount of snowfall in very short time period. Merrimack County has about 6-12" of snow, far less than other counties. Extreme wind gusts reached 110 mph in Concord.	Not a declared disaster. Hopkinton did not experience severe problems.	Extreme Temp, Snow	Concord Monitor, Hopkinton Hazard Mitigation Committee
Hopkinton Public Health Human EEE Virus	No	2014	Fall	N/A	The New Hampshire Department of Health and Human Services (DHHS) is announcing the second human case of Eastern Equine Encephalitis (EEE) this season in New Hampshire, in an adult from Hopkinton. The first human case of EEE in New Hampshire this season was confirmed on August 22nd in Conway, NH. Other EEE positive tests this year include 6 mosquito batches and a mule; there have been no positive test results so far for West Nile Virus (WNV).	The second human case of Eastern Equine Encephalitis (EEE) this season in New Hampshire, in an adult from Hopkinton. The disease has also appeared in a horse. Due to this human case, the risk level for human illness in Hopkinton will be raised to high, and the surrounding towns to moderate risk.	Extreme Temp, Public Health, Epidemic	Hopkinton Town website, Hopkinton Hazard Mitigation Committee
Hopkinton McLane Diesel Truck Rollover	No	2014	Feb	N/A	N/A	The McLane Fuel distribution center had a diesel truck rollover on Route 127/Maple Street.	Transportation Accident, Technological	Hopkinton Hazard Mitigation Committee
Hopkinton Fires in 2013	No	2013	Jan-Dec	N/A	Wildfires can cross community borders although none were thought to have done so from Hopkinton.	12 structure fires, 0 vehicle fires, 7 wildfires, 1 outside rubbish fire, and 1 other fire were reported in Hopkinton in 2013 (21 total)	Fire, Wildfire, Explosion, Vehicle and Structure Fire, Hazardous Materials	National Reporting System, NH Department of Safety, Hopkinton Fire Department

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Earthquake 2.6M 2013 Warner Epicenter	No	2013	11-Oct	N/A	Epicenter in Warner, 2.6 magnitude. Felt in the Central NH Region/northern Merrimack County, most strongly in Hopkinton, Henniker, Warner, Webster, Concord, Salisbury, Franklin	Reports were made to the USGS from Hopkinton residents	Earthquake	USGS
Hopkinton Public Health Hepatitis Virus	No	2013	Jul 20-Aug 3	N/A	According to CBS News Boston, Up to 600- 1,000 people who ate or drank at an American Legion Hall or the Covered Bridge Restaurant in Hopkinton, N.H., are being asked to get vaccinated after a bartender was diagnosed with hepatitis A.	After the disclosure, the Hopkinton Point of Distribution (POD) center at the Hopkinton High School opened to provide vaccinations to those exposed to the disease.	Public Health, Epidemic	CBS Boston News, Medscape.com, Hopkinton Hazard Mitigation Committee
Severe Winter Storm and Snowstorm - Winter Storm NEMO 2013	**4105**	**2013**	**Feb 8-10**	**$32,900**	Winter Storm "Nemo". FEMA-3360-DR. Blizzard conditions with winds gust of 50-60 MPH and over 20 inches snow hit New Hampshire and the New England area. Disaster declaration received for emergency protective measures in eight counties of the State.	**Hopkinton received $32,900 in FEMA Public Assistance funding** for protective measures (snow removal). The Town opened the Slusser Senior Center as a shelter for people.	Severe Winter Weather, Extreme Temp, Snow, Ice, Wind	FEMA, Hopkinton Hazard Mitigation Committee
Hurricane - Hurricane Sandy 2012	**4095 EM-3360**	**2012**	**Oct 26- Nov 8**	**No**	Merrimack County and Hillsborough County received a disaster declaration for Emergency Protective Measures. Five counties experienced severe damage from heavy winds and moderate flooding, 218,000 customers without power. Fallen trees and debris closed roads, building and vehicle damage.	No funding applied for/received. Hopkinton likely experienced severe winds, power failures, and tree debris.	Wind, Flood, Severe Storm, Hurricane	Hopkinton Hazard Mitigation Committee, FEMA, Nashua Telegraph
Hopkinton Fires in 2012	No	2012	Jan-Dec	N/A	Wildfires can cross community borders although none were thought to have done so from Hopkinton.	8 structure fires, 3 vehicle fires, 8 wildfires, 1 outside rubbish fire, 1 special outside fire, and 1 other fire were reported in Hopkinton in 2012 (22 total)	Fire, Wildfire, Explosion, Vehicle and Structure Fire, Hazardous Materials	National Reporting System, NH Department of Safety, Hopkinton Fire Department
Allenstown Chemical Bombs	No	2012	Feb	N/A	Six chemical bombs (made with common household chemicals) were found at a NH DOT shed, and others at houses. No damage of consequence occurred.	N/A, although Allenstown is 3 communities to the east of Hopkinton in the Central NH Region	Human	Allenstown Hazard Mitigation Committee 2013
Earthquake 4.0M 2012 Hollis ME Epicenter	No	2012	16-Oct	N/A	With the epicenter near Hollis Center, Maine, a 4.0 earthquake was measured and felt not only in Central NH, but throughout New England. Reportedly sounding like a jumbo jet and lasting for 10 seconds, calls came in to local Fire Departments inquiring about the event. By two hours later, no calls reporting damages or injuries had been received.	Reports may have been made to the USGS from Hopkinton with an earthquake of this magnitude as it was felt around the Central NH Region.	Earthquake	Concord Monitor, Earthquaketrack.com

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Hopkinton Microburst 2012	No	2012	Jul 17	N/A	About 20,000 electric customers lost power during this summer wind and rain storm. Power lines down & failure for several days. Trees and debris along roadways required clean up.	During the event, the Fire and Police services were tied up. Four main roads were blocked for 2-3 days, including South Road, College Hill Road, Hatfield Road, and Thain Road. The 60-80 mph microburst traveled in a north-south direction crossing Route 127 and US Route 4/202. On College Hill Road, a vehicle was crushed and a home was damaged by falling trees but there no injuries. Took the Public Works Dept 1 month to clean up all the debris.	Wind, Downburst, Thunderstorm	Hopkinton Hazard Mitigation Committee, WMUR
Hopkinton PWD Garage Fire 2012	No	2012	Jun 27	N/A	N/A	A three-alarm fire that destroyed the Hopkinton Public Works garage appears to have started in a dump truck. The truck caught fire for a unknown reason and exploded, which lit the rest of the truck and the PWD building on fire. PWD crew removed several vehicles from the garage. The new metal roof caved in on the grader, the most expensive piece of equipment. The building was a total loss.	Fire, Explosion, Human	Hopkinton Hazard Mitigation Committee, Union Leader
Hopkinton 2011 Fires	No	2012	---	N/A	Wildfires can cross community borders although none were thought to have done so from Hopkinton.	1 structure fire and 1 outside fire were reported in Hopkinton in 2011 (2 total)	Fire	National Reporting System, NH Department of Safety, Hopkinton Fire Department
Snowstorm- Halloween Snow Storm 2011	**4049**	**2011**	**Oct 29-30**	**N/A**	FEMA-4049-DR. Towns in Central NH were impacted by this shocking, early severe snowstorm, although a major disaster declaration was not declared in Merrimack County. Halloween festivities were cancelled in most communities, to the heartbreak of young children. In Hillsborough County, damages were at the equivalent of $5.11 per capita (400,721 people in 2010). The storm was also declared in Rockingham County.	Hopkinton experienced heavy snow which broke the Town's new snow blower.	Extreme Temp, Snow	FEMA, Hopkinton Hazard Mitigation Committee
Tropical Storm- Tropical Storm Irene 2011	**4026**	**2011**	**Aug 26-Sep 6**	**No**	Carroll, Coos, Grafton, and Merrimack Counties suffered severe impacts to roads and bridges as a result of flooding from Tropical Storm Irene, which also caused power outages. Merrimack County reimbursement to towns was $4.29 per capita (146,455 people in 2010), a total of $11m was allocated. Disaster was not declared for Hillsborough County.	No funding applied for/received. There were powerlines down in Hopkinton, downed trees, but not considered an emergency.	Wind, Flood, Severe Storm, Rainstorm, Tropical Storm	FEMA, Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Bow Route 3A Downburst	**4026**	2011	Sep 5	N/A	In nearby Bow, a 60mph microburst damaged or destroyed a dozen campers in the area of Route 3A between Grandview and Down Road. No injuries were reported. Telephone service at the Town's Police dispatch center was also disrupted.	N/A, although Bow abuts Hopkinton on the south	Wind, Downburst, Debris Impacted Infrastructure	Union Leader
Hopkinton Boat Fire on Lake Josylvia (Clement Pond)	No	2011	---	N/A	N/A	A boat exploded on Clement Pond for unknown reasons. The NH DES was call in for spill containment.	Fire, Explosion	Hopkinton Hazard Mitigation Committee
April Fool's Snowstorm	No	2011	1-Apr	N/A	A Nor'easter snowstorm impacted the State, causing over 30,000 power outages, most by PSNH. Snow fell in depths of up to 8", but stopped by noon. Although dozens of accidents were reported, no serious injuries were reported.	N/A, but Hopkinton likely experienced some snow and inconvenience	Extreme Temp, Snow	wmur.com
Hopkinton 2010 Fires	No	2012	---	N/A	Wildfires can cross community borders although none were thought to have done so from Hopkinton.	13 structure fires, 1 vehicle fires, 6 wildfires, 3 outside rubbish fires, 4 special outside fires, and 1 other fire were reported in Hopkinton in 2010 (28 total)	Fire, Wildfire, Explosion, Vehicle and Structure Fire, Hazardous Materials	National Reporting System, NH Department of Safety, Hopkinton Fire Department
Concord Hospital Bomb Threats	No	2010	1-Oct	N/A	A bomb threat was called in to Concord Hospital as a result of a child custody issue and the group known as the "Oathkeepers." The FBI was contacted, but nothing was found in the Hospital during a bomb sweep. Phone lines were flooded with calls by the Oathkeepers to inhibit using the landlines. The incident was determined to be harassment instead of an actual event.	N/A, although Concord abuts Hopkinton to the east	Human, Terrorism	Concord Hazard Mitigation Task Force 2011
Earthquake 3.4M 2010 Boscawen Epicenter	No	2010	26-Sep	N/A	"A magnitude 3.4 earthquake rattled buildings and nerves across much of New Hampshire Saturday night. The quake occurred at 11:28 p.m. and was centered about 10 miles north of Concord, according to the U.S. Geological Survey. State police said they received reports from residents across the state who reported what they thought was an explosion. The quake was felt in places like Fremont, Derry, Durham, Henniker, Penacook and Raymond. There were no reports of damage." The quake was felt all over the state, Southern Maine and Massachusetts, but most reports were received from the Central NH region.	Reports may have been made to the USGS from Hopkinton with the epicenter less than 5 miles to the northeast in Boscawen.	Earth, Earthquake	Union Leader, USGS

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Loudon Pleasant View Greenhouse Fire	No	2010	21-Jan	N/A	Pleasant View Gardens suffered a fire which destroyed about 30,000 square feet of greenhouses, plus a building. The cause is undetermined. This was a significant commercial fire.	N/A, although Loudon is 2 communities to the east of Hopkinton and is also in the Central NH Region	Fire	Loudon Hazard Mitigation Committee, Hopkinton Hazard Mitigation Committee
Severe Storms and Flooding March Strom & Flood 2010	**1913**	**2010**	**Mar 14-31**	**No**	Severe storms and flooding occurred over two weeks and damaged roads and bridges. Merrimack County reimbursement to towns for repair was $0.28 per capita (146,455 people in 2010), and in Hillsborough County reimbursements were $1.80 per capita (400,721 people in 2010)	No funding applied for/received	Flood, Wind	FEMA, Hopkinton Hazard Mitigation Committee
Severe Winter Storm Feb-Mar Storm 2010	**1892**	**2010**	**Feb 23-Mar 3**	**No**	High winds, rain, and snow over a week-long period. Primary impact was debris removal and repair reimbursement for fallen trees and powerlines. In the Concord area, 21,000 Unitil customers were out of power.	No funding applied for/received	Extreme Temp, Wind, Flood	fema.gov, Unitil Energy Systems, Hopkinton Hazard Mitigation Committee
Hopkinton Blackwater River Erosion at East Penacook Road	No	2009	---	N/A	N/A, although the Contoocook spans multiple communities in the Central NH Region and Southwest Region	Due to the rising and dropping of the elevation of the Blackwater River erosion has occurred just north of the bridge off East Penacook Road. Erosion along the Blackwater River embankments causes debris to be caught along the East Penacook Road bridge abutments which can be dangers to those workers that must remove the debris. A member of the Public Works Department was in need of emergency medical services as he had suffered an injury during the removal process	Earth, Erosion	Hopkinton Hazard Mitigation Committee
Severe Winter Storm - December 2008 Ice Storm	**1812**	**2008**	**Dec 11-23**	**$50,100**	Accumulating ice, snow, rain, and strong winds caused downed trees and power lines, with power outages and traffic accidents resulting. In Merrimack County, debris removal and repair cost reimbursement FEMA the equivalent of $10.07 per capita (146,455 people in 2010). In Hillsborough County, debris removal costs were $6.35 per capita (400,721 people in 2010). The major disaster was declared in all 10 counties. New England was blanketed with ice and snow during the winter storm. The weight of the ice caused branches to snap, and trees to either snap or uproot, and brought down power lines and poles across the region. About	**Hopkinton received $50,100 in FEMA Public Assistance funding** for protective measures for this severe ice storm. Snows and ice resulted in down power lines, trees and the closure of ten roads in Hopkinton. It was estimated that Hopkinton home and business owners lost power from three to nine days depending upon their location. No injuries or property loss were reported. The estimated cost to the Town from the storm is estimated at $77,000. This does not include money that residents had to pay for clean-up and housing.	Extreme Temp, Ice, Wind, Technological, Power Failure, Debris Impacted Infrastructure]	FEMA, Concord Monitor, Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
					400 thousand utility customers lost power during the event, with some customers without power for two weeks. Property damage across northern, central and southeastern New Hampshire was estimated at over $5 million. Event was the largest power outage in New Hampshire's history.			
Severe Storms and Flooding - Patriot's Day Flood	**1799**	**2008**	**Sep 6-7**	**No**	Heavy rain from the remnants of tropical storm Hanna resulted in flooding on small rivers and streams in the Central NH area. The remains of tropical storm Hanna moved through eastern New England dumping 3 to 6 inches of rain in New Hampshire in about 8 hours causing rapid rises on area streams. In Merrimack County, damage to road systems totaled the equivalent of $1.48 per capita (146,455 people in 2010) for town reimbursement. Hillsborough County's damage was much higher at $6.90 per capita (400,721 people in 2010)	No funding applied for/received.	Flood, Debris Impacted Infrastructure	FEMA, Hopkinton Hazard Mitigation Committee
Hopkinton Multiple Bird EEE 2008	No	2008	Jul	N/A	N/A	Dead birds were reported in various places throughout the town. The birds were tested by the State lab and determined to be infected with EEE. There were no human cases reported.	Biological, Public Health	Hopkinton Hazard Mitigation Committee
Tornado, Severe Winds, Heavy Rains	**1782**	**2008**	**Jul 24**	**No**	An F2-F1 tornado touched down in Rockingham County then proceeded into another county. Then in Merrimack County, the tornado was rated up to an F-3 and killed a woman in Deerfield trapped in a collapsed house. In the county, there was substantial damage totaled the equivalent of $1.12 per capita (146,455 people in 2010) for the towns' debris removal reimbursement costs. A total of 123 residences statewide were affected, with 17 destroyed and another 37 suffering major damage. Damage was estimated to exceed $10 million. Hillsborough County	N/A, the path did not travel through Hopkinton but occurred 3 communities to the east in the Central NH Region. In Epsom, 84,000 acres were destroyed and there was significant damage to personal property, destroying or damaging 9 homes.	Wind, Tornado, Downburst, Severe Storm	FEMA, Epsom Hazard Mitigation Committee
Hopkinton 3 Building Collapses 2008	No	2008	Feb	N/A	N/A	Feb 2008 - As a result of heavy snow build-up there were two residences in which roof trusses had broken and ceilings had cracked. In each case occupants were required to leave their residence. Mar 2008- A landscaping business' roof had collapsed	Snow, Wind, Technological	Hopkinton Hazard Mitigation Committee, Concord Monitor

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
						with the building being declared a total loss. There were no injuries as a result of the incident. Oct 2008 - The Select Board closed Columbia Hall as a result of structural reports received indicating that condition of the scissor trusses and the potential for failure at any time causing a domino effect and an implosion of the roof.		
Hopkinton Severe Snow Storm 2007	No	2007	===	N/A	N/A	With the Public Works Department having difficulty in keeping up with the storm and the amount of snow fall schools were closed and some were without power.	Extreme Temperatures, Snow	Hopkinton Hazard Mitigation Committee
Hopkinton Kimball Pond Dam Breach 2007	No	2007	===	N/A	N/A	The dam at Kimball Pond swimming area had breached in 2007 due to heavy rain. The dam caused minor washout and erosion downstream with no injuries or property damage reported. The new dam was rebuilt in 2007 at a cost of approximately $260,000.	Dam Failure, Flood	Hopkinton Hazard Mitigation Committee
Hopkinton Blue/Green Algae at Elm Brook 2007	No	2007	August	N/A	N/A	Blue/Green Algae found at the swimming area at Elm Brook. The swimming area was closed to for approximately four weeks	Biological, Public Health, Water Quality	Hopkinton Hazard Mitigation Committee
Concord Hazardous Materials Flooded 2007	No	2007	27-May	N/A	Fifty-three businesses were forced to close at the Concord Center on Ferry Street in Concord when state officials discovered more than 70 buckets of formaldehyde, motor oil, roofing tar and cleaning solvents in the flooded basement. There were no reported injuries but some workers complained of headaches and dizziness.	N/A, although Concord abuts Hopkinton to the west	Flooding, Technological, Hazardous Materials	Concord Monitor
Severe Storms and Flooding - April Spring Floods	**1695**	**2007**	**Apr 15-23**	**$40,200**	Extensive flooding caused by severe storms impacted seven counties, including Merrimack and Hillsborough. Across the region, indirect peak discharge measurements on stream gages on the Suncook River at Short Falls Road in Epsom were 14,100 ft3, which was determined to be greater than 100-year flood discharge levels. Over land, the strong winds downed numerous trees. The downed trees caused widespread power outages, especially near the coast, and numerous road closures. The storm also brought heavy rain to the region which, when combined with snow melt, produced widespread flooding across	**Hopkinton received $40,200 in FEMA Public Assistance funding** for roads and bridges work, including Irish Hill, Clemet Hill, Pleasant Lake Road, Line Hill Road, Kast Hill Road. During this time, Hopkinton emergency services were in close contact with the Army Corps of Engineers at the Hopkinton Dam. Residents in the Meadows Mobile Home Park were warned of the potential of flooding and asked to voluntarily leave their homes. While most residents in the potential flood hazard area of the mobile home park had left their homes one	Flood, Wind, Debris Impacted Infrastructure, Rapid Snow Pack Melt	FEMA, USGS Flood of 2007, Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
					much of the region. Power outages persisted, and stream and river flooding continued across the region.	resident remained which later resulted in the Hopkinton Fire Department having to use their forestry vehicle to rescue the resident. Peak discharge measurements on stream gages on the Contoocook River at below the Hopkinton Dam were 5,370 ft3/second, which was determined to be at 2-5 year flood discharge levels.		
Hopkinton Slusser Senior Center Arson 2007	No	2007	Jan 15	N/A	N/A	According to investigators, a fire that destroyed a senior center under construction appeared to be caused by arson. The two-story building was being framed and was set to open in the spring	Fire, Arson, Human	Hopkinton Hazard Mitigation Committee, Concord Monitor
Webster Pillsbury Lake Dam Breach	**1643**	2006	May 15	N/A	The Pillsbury Lake Dam in Webster, holding back an artificial lake of about 70 acres, was breached by flooding due to heavy rains. Floodwaters punched out a 20-foot breach in the dam. The dam created the Pillsbury Lake District with about 180 households. The Lake's level fell from 15 feet at its deepest point to about 2 feet at that same point following the event.	N/A, although Webster abuts Hopkinton to the north	Flood	Concord Monitor
Bow Landslide During Mother's Day Floods	**1643**	2006	May 14-17	N/A	Backyard material slid toward a Bow home on Mother's Day catching a family, with one young child and expecting another, by surprise. No one was injured by the mudslide but thousands of dollars of property damage were caused. The debris and mud that slid and caused the damage came from land that didn't belong to the family. They had to move out for 10 days until a contractor deemed the property safe.	N/A, although Bow abuts Hopkinton to the east	Earth, Landslide, Erosion	WMUR News
Suncook River Avulsion in Epsom	**1643**	2006	May 14-17	N/A	The Suncook River through Epsom changed its course during this recent heavy rain event and its resultant flooding. The River shifted hundreds of meters, flowing around two dams, creating about a mile of new river through a sand pit a half mile from its original course, and leaving a similar length of dry riverbed. The water carved through peat bogs and tore away a corner of a sand excavation pit. Local communities of Epsom, Allenstown, and Hillsborough later dealt with siltation and	N/A but Hopkinton is within the Central NH Region, 3 towns away from the Suncook River. See storm effects on Hopkinton below	Flood, Earth, Landslide, Erosion, Debris Impacted Infrastructure	Concord Monitor

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
					erosion issues from the new river course			
Severe Storms and Flooding - Mothers Day Flood	**1643**	**2006**	**May 12-23**	**$35,400**	Extensive flooding caused by severe storms impacted seven counties including Merrimack and Hillsborough. The USGS recorded the highest flows on record for several rivers including the Contoocook River in Davisville village, Soucook in Concord, and Piscataquog in Goffstown.	**Hopkinton received $35,400 in FEMA Public Assistance funding** for extreme flooding and washout damage to roads, culverts, bridges, water control facilities, and for debris removal	Flood, Wind, Debris Impacted Infrastructure, Erosion	FEMA, Hopkinton Hazard Mitigation Committee
Webster Wildfire	No	2006	Apr	N/A	A wildfire in Webster burned over fire acres throughout the night. Fire crews had to dig embers out of the soil that were 4 to 5 inches deep. The Forest Ranger commented that embers embedded that deep in the soil at that time of year was very unusual.	N/A, although Webster abuts Hopkinton to the north	Fire	WMUR 4/20/2006
Regional Train Wildfire	No	2006	29-Apr	N/A	A freight train sparked brush fires along tracks in Bow, Hooksett and Manchester. In Bow, a 50' by 350' fire was spreading toward the woods when officials arrived on the scene. Concord Fire Chief said that fires sparked by trains are not unusual and they are typically caused by exhaust coming out of the stack.	N/A although Bow abuts Hopkinton to the southeast.	Fire, Technological	WMUR News
Concord Statehouse Iraq Public Unrest	No	2006	18-Mar	N/A	A reported 400 citizens marched in Concord to recognize the 3 year anniversary of the beginning of the war in Iraq. The protestors marched around downtown Concord and finished in front of the statehouse.	N/A although Concord abuts Hopkinton to the east.	Human, Public Unrest, Civil Disturbance	NH Independent Media Center
Severe Storms and Flooding - Columbus Day Flood	**1610**	**2005**	**Oct 7-18**	**$20,500**	Extensive flooding caused by severe storms impacted five counties. Alstead had several fatalities as the result of dam failure.	**Hopkinton received $20,500 in FEMA Public Assistance funding** for the Columbus Day Flood. Roads and culverts were damaged by flooding and washouts, debris clogged culverts, roads were washed out and slopes were eroded.	Flood, Wind, Debris Impacted Infrastructure, Erosion	FEMA, Hopkinton Hazard Mitigation Committee
Regional Thunderstorms and Lightning 2005	No	2005	12-Jun	N/A	During a thunderstorm, lightning struck and severely damaged the historic Loudon Town Hall on Clough Hill Road. Winds from a severe thunderstorm knocked down trees and power lines down in the towns of Warner, Hopkinton, Concord, Bow, Loudon, and Hopkinton in Merrimack County.	Hopkinton is one of those communities that experienced the thunderstorm and lightning event	Thunderstorm, Lightning, Severe Winds	CNHRPC, Hopkinton Hazard Mitigation Committee, Area Hazard Mitigation Committees

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Canterbury Explosion at Gold Star Sod Farm	No	2005	23-Jan	N/A	A near-fatal explosion occurred at the Gold Star sod farm in Canterbury. Gasoline fumes ignited a propane heater, triggering a fiery explosion and fire that consumed a large workshop and part of the main storage building. Fire crews from several departments battled the fire and laid sand down as a buffer between a nearby river in order to prevent contamination as pesticides and other chemicals burned.	N/A, although Canterbury is 2 communities to the northeast from Hopkinton in the Central NH Region	Fire, Explosion, Technological, Hazardous Materials	Concord Monitor
Snow Emergency	**EM-3207**	**2005**	**Jan 22-23**	**$13,100**	Record and near record snowstorm for 8 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	**Hopkinton received $13,100 in FEMA Public Assistance funding** for snow removal (protective measures).	Severe Winter Weather, Snow	FEMA, Hopkinton Hazard Mitigation Committee
Earthquake 2.2M 2004 Henniker-Hopkinton Epicenter	No	2004	20-Jan	N/A	An earthquake measuring 2.2 on the Richter Scale was centered in the Henniker-Hopkinton area. Shaking and noise were reported, but no damage occurred.	An earthquake measuring 2.2 on the Richter Scale was centered in the Hillsborough- Hopkinton area. Shaking and noise were reported, but no damage occurred.	Earth, Earthquake	Hopkinton Hazard Mitigation Committee, Concord Monitor, January 2004, USGS
Snow Emergency	**EM-3193**	**2003**	**Dec 6-7**	**$16,100**	Record snow fall event impacting much of New England. In NH, 8 counties received emergency protective measures, including Merrimack and Hillsborough.	**Hopkinton received $16,000 in FEMA Public Assistance funding** for snow removal (protective measures).	Extreme Temp, Snow	FEMA
Hopkinton Dry Kiln Fire 2003	No	2003	---	N/A	N/A	A dry kiln at Herrick Millworks was total destroyed as a result of fire. Cause of fire is unknown.	Fire, Arson, Human, Technological, Hazardous Materials	Hopkinton Hazard Mitigation Committee
Snow Emergency	**EM-3177**	**2003**	**Feb 17-18**	**$13,000**	Record and near record snowstorm for 5 NH counties including Merrimack and Hillsborough. Emergency protective measures declared for reimbursement.	**Hopkinton received $13,000 in FEMA Public Assistance funding** for snow removal (protective measures).	Extreme Temp	FEMA
NH Drought Emergency 2002	No	2002	Aug	N/A	All counties in the State of NH except Coos County. One of the hottest Augusts on record in Concord along with drought conditions since March made for a high fire danger in New Hampshire. Numerous forest fires were reported, including a 30-acre blaze in New Durham.	N/A, although Hopkinton was likely affected too	Drought, Extreme Temperatures, Earth, Fire	Concord Monitor 8/20/02
Hopkinton Suspicious Powder Mailings 2002	No	2002	---	N/A	N/A	There were several reports of a powder substance being mailed to prominent State and/or Federal officials living in Hopkinton. Due to the heightened level of security for the US, the substances were tested for biological or chemical substances and the results were negative.	Sabotage, Terrorism	Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Snow Emergency	**EM-3166**	**2001**	**Mar 5-7**	**$13,400**	Record and near-record snowfall from late winter storm, emergency declaration was issued for protective measures. Merrimack, Hillsborough and 5 other counties were declared eligible.	**Hopkinton received $13,400 in FEMA Public Assistance funding** for snow removal (protective measures).	Extreme Temp, Snow	FEMA
Hopkinton Blackwater River Bridge Erosion and Scouring 2000c	No	2000	Early -mid 2000s	N/A	N/A, although the Blackwater River flows through Salisbury and Webster in the Central NH Region before reaching Hopkinton	Erosion along the Blackwater River embankments causes debris to be caught along the East Penacook Road bridge abutments which can be dangers to those workers that must remove the debris. A member of the Public Works Department was in need of emergency medical services as he had suffered an injury during the removal process.	Erosion and Scouring, Flooding, Technological Hazard	Hopkinton Hazard Mitigation Committee
Hopkinton Wildfire 1999	No	1999	May	N/A	N/A	A wildfire in the area of Ridge Lane and Clement Hill Road had burned approximately twenty acres. Due to limited access, helicopters were used in containing the fire. It was noted that the ability of the helicopter to gain water from Clement Pond helped reduce any potential impact on residences in the area.	Wildfire	Hopkinton Hazard Mitigation Committee
Hopkinton Microburst 1999	No	1999	July	N/A	Several downbursts impacted three counties in New Hampshire, including Hillsborough County. It resulted in 2 deaths. Also, two roofs were blown off and widespread power outages occurred. The downburst was designated a macroburst (at least 2.5 miles in diameter).	Areas off Camp Merrimac Road, Broadcove Road, and Penacook Road were impacted by a microburst. Large trees were destroyed and roads were closed. There were no reported injuries.	Wind, Microburst	Hopkinton Hazard Mitigation Committee
Hopkinton Wildfire 1998c	No	1998	---	N/A	N/A	A wildfire between Brockway Road and the high tension lines was a significant threat to homes in the vicinity. It was estimated that approximately seven acres was impacted	Fire, Wildfire	Hopkinton Hazard Mitigation Committee
Concord Library and NHTI Bombs	No	1998	Oct	N/A	The lit fuse of a bomb left in the Concord Library stacks set off smoke alarms that may have saved the lives of many people. The individual allegedly responsible for the bomb scare left notes complaining about state government. About a dozen buildings were evacuated after the New Hampshire Technical Institute in Concord received an anonymous call warning that three bombs had been placed on campus. This	N/A, although Concord abuts Hopkinton to the east	Human, Terrorism	AP Online 11/01/98, NH Homeland Security and Emergency Management

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
					event followed the bomb scares at the Concord Library.			
Hopkinton Gould Hill & Putney Hill Tornado	No	1998	July	N/A	N/A	A tornado touched down in the Gould Hill and Putney Hill areas impacting approximately five acres causing trees to be downed and roads to be closed. No injuries were reported.	Wind, Tornado	Hopkinton Hazard Mitigation Committee
Severe Storms and Flooding	**1231**	**1998**	**Jun 12-Jul 2**	**No**	Heavy flooding in six counties, including Merrimack and Hillsborough Counties. Damages of $3.4m for all counties.	As Hopkinton is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA
Ice Storm of 1998	**1199**	**1998**	**Jan 7-25**	**No**	This ice storm was the first to test our statewide and local emergency management systems and utility providers. Tree and infrastructure damage was extensive and power failures lasted up to two weeks in some parts of the state. In the Central NH Region, many lost power for over a week. This ice storm had severe impacts throughout most of the State, with 52 communities impacted. FEMA Disaster Declaration #1199, Six injuries and one death resulted. Damage totaled $12,446,202. In addition, there were 20 major road closures, 67,586 people left without electricity, and 2,310 people without phone service.	The Town didn't apply for/receive funding. As the entire state and Central NH region experienced the ice storm, it is very likely Hopkinton did as well.	Extreme Temp, Ice Storm, Power Failure	FEMA, US Army Corps of Engineers NH Storms database, Hopkinton Hazard Mitigation Committee
Bradford Milfoil Lake Massasecum	No	1996	---	N/A	Milfoil was discovered on the north end of Lake Massasecum in Bradford. A 10 to 11 acre portion of the lake was closed. Several chemical treatments were tried but failed to eradicate the milfoil. Eventually, the weed was harvested.	N/A, although Bradford abuts Hopkinton to the north	Biological, Public Health, Water Quality	Blaisdell Lake Property Owners Association, Inc. August 3, 2002
Severe Storms and Flooding	**1144**	**1996**	**Oct 20-23**	**No**	Heavy rains caused flooding in six counties, including Merrimack and Hillsborough Counties. Damage totaled $2.3m for all counties.	The Town didn't apply for/receive funding. As Hopkinton is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood	FEMA, NH HSEM
Storms and Floods	**1077**	**1995**	**Oct 20-Nov 15**	**No**	Four NH counties were damaged by excessive rain, high winds and flooding, including Merrimack (not Hillsborough).	The Town didn't apply for/receive funding.	Flood	FEMA, Federal Register
Hopkinton Chemical Fire 1994	No	1994	---	N/A	N/A	The New Hampshire Hazmat Team was called to assist in an unknown chemical fire in a trailer at the Hopkinton Solid Waste Facility. It was determined that the fire was a result of a mixer of various household cleaners. There	Technological, Hazardous Materials	Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
						were no human injuries reported.		
Severe Storm-Hurricane Bob	**917**	**1991**	**Aug 18-20**	**No data available**	Public assistance was available for Hillsborough County and 2 other counties (not Merrimack) for damages caused by Hurricane Bob. The 2 seacoast counties fared the worst.	As the Town is within Merrimack County, it is likely experienced heavy rains, tree debris, power outages and possibly some flooding.	Wind, Hurricane	FEMA
Flooding and Severe Storm	**876**	**1990**	**Aug 7-11**	**No data available**	Moderate to heavy rains caused flooding in eight counties, including Merrimack and Hillsborough Counties. Damage totaled $2.3m for all counties	As Hopkinton is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA, NH HSEM
Severe Storms and Flooding	**789**	**1987**	**Mar 30-Apr 11**	**No data available**	Flooding caused by snowmelt and intense rain was felt in seven counties, including Merrimack and Hillsborough Counties. Nearly $5m in damages.	As Hopkinton is within Merrimack County, it is likely experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA, Hopkinton Hazard Mitigation Committee
Severe Storms and Flooding	**771**	**1986**	**Jul 29-Aug 10**	**No data available**	Severe summer storms with heavy rains, tornadoes, flash floods, and severe winds, damaged the road network statewide. Disaster declared in Cheshire, Sullivan and Hillsborough Counties (not Merrimack).	It is likely Hopkinton experienced heavy rains and possibly some flooding.	Flood, Wind	FEMA, NH HSEM
Dunbarton Radon Testing	No	1986	-1987	N/A	In Dunbarton, a citizen initiative of well water testing, primarily around the Town Center, found that the radon levels in the community exceeded all levels in the country. The Elementary School well tested fine, but the church had a very high concentration, as well as the rest of the area at the top of the hill around the Town Offices. Residents and Town officials placed filtration systems in their homes and public buildings. The information garnered interviews with WMUR Channel 9 and a series of public meetings to raise the awareness of Town residents. Although there is no specific Town program in place, residents can test their wells using kits available at the NH Department of Environmental Services.	N/A, although Dunbarton abuts Hopkinton to the south	Earth	Dunbarton Hazard Mitigation Committee, 2005
2 Hopkinton Plane Crashes	No	1984	-1994	N/A	N/A	1984- A twin engine plane crashed on Beech Hill. It was reported that the incident had occurred due a problem with fuel. There were no injuries because of the plane crash. 1994- An ultra-light place crashed in the Jewett Road area of Town. The reason for the crash is unknown; however,	Technological, Transportation Accidents, Airplane Crashes	Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
						the pilot was able to walk away from the accident.		
Earthquake 4.5M Sanbornton	No	1982	18-Jan-82	N/A	An earthquake originating near in Sanborton in Belknap County measured 4.5M and was felt in various locations throughout the State. The area it was felt includes all of northern Merrimack County including the Concord area communities in Central NH.	With a quake of this size, it is highly likely Hopkinton experienced some strong shaking and noise	Earthquake	Earthquaketrack.com
Concord Beaver Meadow Tornado	No	1979	Jul 27	N/A	In Concord, a small twister was sighted at Beaver Meadow, where 13 trees were toppled, including a 100-foot tall pine. The duration was about 15-20 seconds.	N/A, although Concord abuts Hopkinton to the east	Wind, Tornado	Concord Monitor
Blizzard of 1978	No	1978	Feb 5-7	N/A	RSI Index of Category 5 (Extreme). This snowstorm is described as "a natural disaster of major proportions" and stunned all of New England. The storm was caused by an intense coastal Nor'easter that produced winds in excess of hurricane force and very high snow totals. Most of southern New England received more than three feet of snow, 25-33" in NH and higher throughout New England. Abandoned cars along roadways immobilized infrastructure and blocked major interstates. For over a week, New England remained paralyzed by the storm. All of New Hampshire was impacted. Governor Meldrim Thomson Jr. declared a state of emergency.	Although it is unknown what Hopkinton experienced, it is likely many of the same depths and effects occurred across the Town.	Extreme Temperatures, Severe Snow Storms, Windchill, Power Failure	American Meteorological Society, Northeast States Emergency Consortium
Quebec Earthquake	No	1973	15-Jun	N/A	An earthquake originating near the Quebec border at a scale of 4.8 was felt in various locations throughout the State.	N/A, although some Hopkinton residents may have felt the effects	Earthquake	Northeast States Emergency Consortium
Severe Storms and Flooding	**399**	**1973**	**Jul 11**	**No data available**	All counties in the State of NH experienced storm damage and were declared disaster areas, including Merrimack and Hillsborough Counties.	No information available	Flood, Wind	FEMA
Hopkinton Heavy Snow	No	1969	---	N/A	N/A	Snow was so heavy that one town resident reported having to have oil delivered gallon by gallon on foot because the truck couldn't make it up through the snow.	Extreme Temp, Snow	Interview with Mildred Raymond, author of the bicentennial edition of the Hopkinton History, found in the Antiquarian Society files

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
Hopkinton Three River Ice Jams	No	1968	to 1979	N/A	N/A, although the Contoocook River flows through several Central NH communities.	The Cold Regions Research and Engineering Laboratory (CRREL) lists three ice jams that have occurred in Hopkinton, but provides no detail on impacts of these jams. The jams occurred in March of 1968, February 1970, and March 1979. The construction of the Hopkinton-Everett Dam mitigated some of the flooding caused by ice jams.	River Ice Jams, Severe Winter Weather	Cold Regions Research and Engineering Laboratory
Older Hurricanes	No	1954	to 1991	N/A	Many older hurricanes have impacted New Hampshire including the 1954 – 1991 Hurricanes: Carol on August 31, 1954 (tree and crop damage), Edna on September 11, 1954, Donna on April 12, 1960 (heavy flooding), Doria on August 28, 1971, Bell on August 10, 1976, Gloria on September 27, 1985, and Bob in 1991.	Downed trees, wind damage, and flooding was likely experienced in Hopkinton during many of these hurricanes.	Wind, Flood, Hurricane, Tropical Storm, Debris Impacted Infrastructure	NH Homeland Security and Emergency Management, Hopkinton Hazard Mitigation Committee
10 Severe Snowstorms, mid 1900s	No	1940	to 1978	N/A	Ten severe snowstorms are documented in south-central New Hampshire during this time span, February 14-15, 1940 (depths over 30" and high winds), February 14-17, 1958 (20-33"), March 18-21, 1958 (22-24"), March 2-5, 1960 (up to 25"), January 18-20, 1961 (up to 25", blizzard conditions), January 11-14, 1964 (up to 12"), January 29-31, 1966 (up to 10"), February 22-28, 1969 (24-98", slow-moving storm), December 25-28, 1969 (12-18"), January 19-21, 1978 (up to 16").	Although it is unknown what Hopkinton experienced, it is likely many of the same depths occurred.	Extreme Temperatures, Severe Snow Storms, Ice, Windchill, Power Failure	American Meteorological Society
Hopkinton Hurricane of 1938	No	1938	Sep 21	N/A	Hurricane made landfall as a 3 on the Saffir-Simpson Scale, killed about 682 people and damaged or destroyed over 57,000 homes. Most deadly New England hurricane. Central New Hampshire was inundated with water. Downed trees caused extensive damage to homes, businesses and community infrastructure. President Roosevelt ordered emergency aid be sent to NH, including Merrimack County	This hurricane caused damage with both flooding and wind. In Hopkinton the flooding was worse than it had been in 1936 when the Contoocook River flooded the village. There was massive tree damage and the roofs of several buildings at the Hopkinton Fairgrounds were torn off .	Wind, Flood	Wikipedia, Concord Monitor, Freak Winds of New Hampshire
Hopkinton Flood of 1936	No	1936	Mar 11-21	N/A	Simultaneous high snowfall totals, heavy rains, and warm weather combined to hit all of New England. Floods killed 24 people, caused $133,000,000 in damage, and made 77,000 people homeless in New England. The great flooding of 1936 resulted from heavy rains and rapid snow pack melt. Snow north of Concord contributed to the higher	Warm weather and heavy rains caused flooding throughout the state. The 1936 flood resulted in residents of Hopkinton suffering severe losses. Everything from the Boston & Maine Railroad Station to the Gristmill was shut-down as a result of flooding. In fact, the foundation of the Gristmill had ultimately	Flood, Ice Jams, Rapid Snow Pack Melt	Concord Monitor, Union Leader, Flood Waters, New Hampshire 1936 and Hopkinton Antiquarian Society files, Army Corps of Engineers Ice Jam Database, Hopkinton Hazard Mitigation Committee

Event	Declared Disaster DR-	Year	Date	FEMA Public Assistance	Area Effects Surrounding Hopkinton	Local Effects Occurring in Hopkinton	Hazard Category	Source
					waters in the Winnipesaukee, Contoocook and Pemigewassett rivers that were largely responsible for the destruction in Concord and the surrounding area. NH issued boil water warnings to everyone.	washed away. Much of Contoocook Village, the town center of Hopkinton, was flooded with water several feet deep. Heavy currents in the floodwaters brought ice and lumber rushing into the village square. The current capsized several rescue boats. It was after this flood that discussions that ultimately led to the construction of the Hopkinton-Everett Dam began		
Hopkinton Snow Drifts of 1887	No	1887	March	N/A	N/A	Drifting snow made roads impassible and blocked train service. It took two selectmen going to Town Hall over two and a half hours to travel three miles. Some drifts were over ten feet deep.	Extreme Temperatures, Snow	Letter in the Hopkinton Antiquarian Society files
Hopkinton Bridge Washout 1852	No	1852	Spring	N/A	N/A, although the Contoocook River flows through several Central NH communities.	Floods washed away a stone bridge across the Contoocook River.	Flood, Rapid Snow Pack Melt, Debris Impacted Infrastructure, Bridge Washout	Life and Times in Hopkinton, NH
Hopkinton Droughts (2) 1775-1840	No	1775	to 1840	N/A	N/A although droughts affect regional areas	in 1775, Conditions were so dry that all of the cattle in town were brought to the Contoocook River where they stayed until the drought ended. In 1840, Trees had to be cut down to use the leaves for livestock feed.	Extreme Temperatures, Drought	Life and Times in Hopkinton, NH

Source: Compilation of Events by Hopkinton Hazard Mitigation Committee; CNHRPC

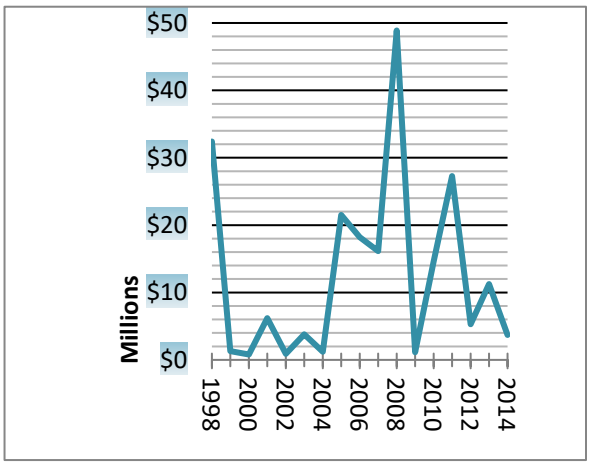
Local Climate Changes and Extreme Weather

In the State and the Central NH Region, like any other areas, exist our own "micro-climate" areas that can be analyzed for future susceptibility to disasters and hazard events. New Hampshire has obtained high costs of damage over time due to hazardous weather and declared disasters. A review of the state and area history can provide a perspective on what Hopkinton can expect to see in terms of extreme weather in the future.

Table 12

Summary of Hazardous Weather Fatalities, Injuries, and Damage Costs in NH, 1998-2014

Year	Fatalities	Injuries	Total Damages $
2014	0	2	**$3,700,000**
2013	0	30	**$11,250,000**
2012	1	4	**$5,280,000**
2011	1	2	**$27,280,000**
2010	1	6	**$14,630,000**
2009	1	0	**$1,130,000**
2008	2	5	**$48,890,000**
2007	0	3	**$16,150,000**
2006	1	9	**$18,200,000**
2005	4	9	**$21,500,000**
2004	0	11	**$1,200,000**
2003	2	29	**$3,800,000**
2002	0	7	**$900,000**
2001	0	2	**$6,200,000**
2000	2	6	**$800,000**
1999	3	17	**$1,300,000**
1998	1	23	**$32,400,000**



Annual Hazardous Weather $ Damages in NH

Source: National Oceanic and Atmospheric Administration, last accessed 2/10/16
http://www.nws.noaa.gov/om/hazstats.shtml

Injuries to people and the costs of damages in New Hampshire have increased as a result of hazardous weather. These increases of injuries and damages can be generally applied to the major disasters declared in the State. As displayed in **Table 12**, the highest numbers of damage costs correlate to the 1998 (**$32m**) and 2008 (**$49m**) ice storms between 1998 and 2014.

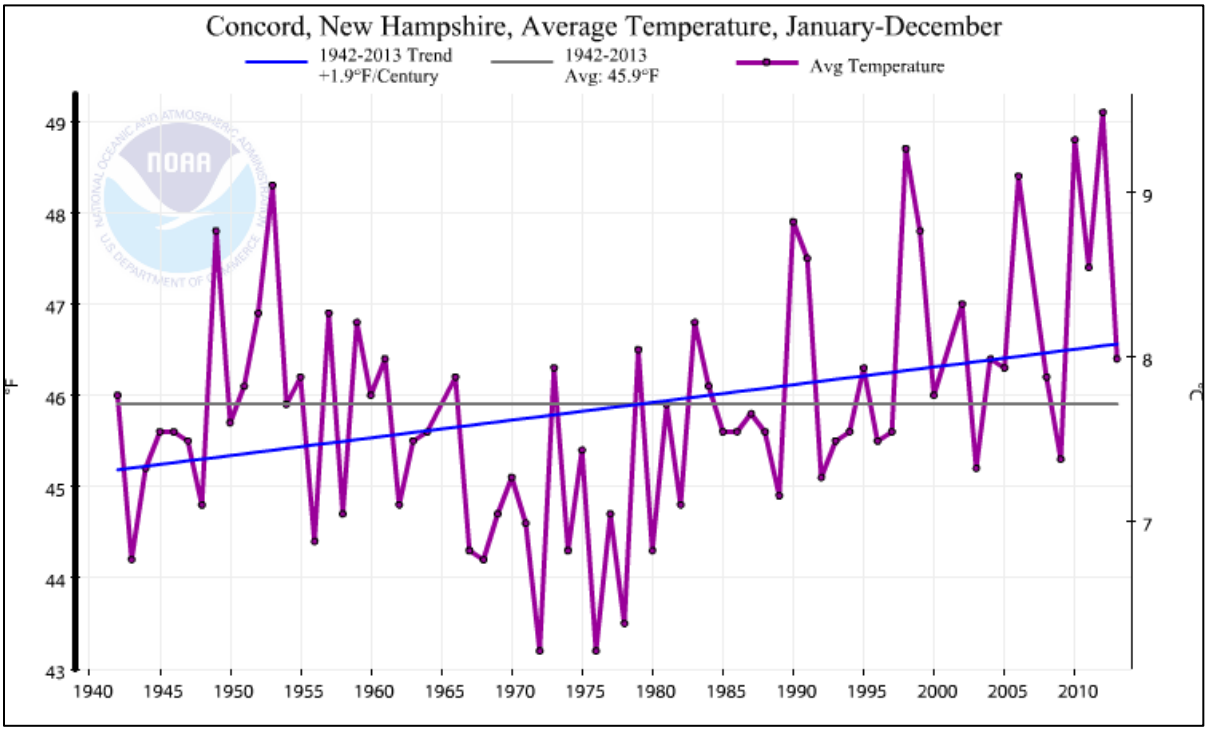
The number of injuries and fatalities have a less distinct association, with the highest numbers shown in 2013 (**30**) and 2003 (**31**). However, the greatest number of fatalities during this time period occurred in 2005 (**4**), likely during the time of the Columbus Day floods that hit the southwestern section of the State very hard.

Much of the rest of the discussion in this section has been directly excerpted or paraphrased from the ***Central NH Regional Plan 2015***. The Central NH Region's weather history is summarized to provide a view of the trends around the Concord area where the weather measurements have taken since 1939 at the Concord Airport. Hopkinton abuts the City of Concord, so these measurements should have some reasonable basis in Hopkinton.

Figure 4 displays Concord's average annual temperature between 1942 (**46.0°F**) and 2013 (**46.4°F**). Earlier data was not available. As with typical New Hampshire weather, the seasonal temperatures can vary year after year and without obtaining an average, changes are difficult to see. The displayed trend line allows a definitive way of averaging all of the temperatures and illustrates a **+2.8°F** increase in average annual temperature during this 70-year time period.

Figure 4

Average Annual Temperature for Concord, 1942-2013

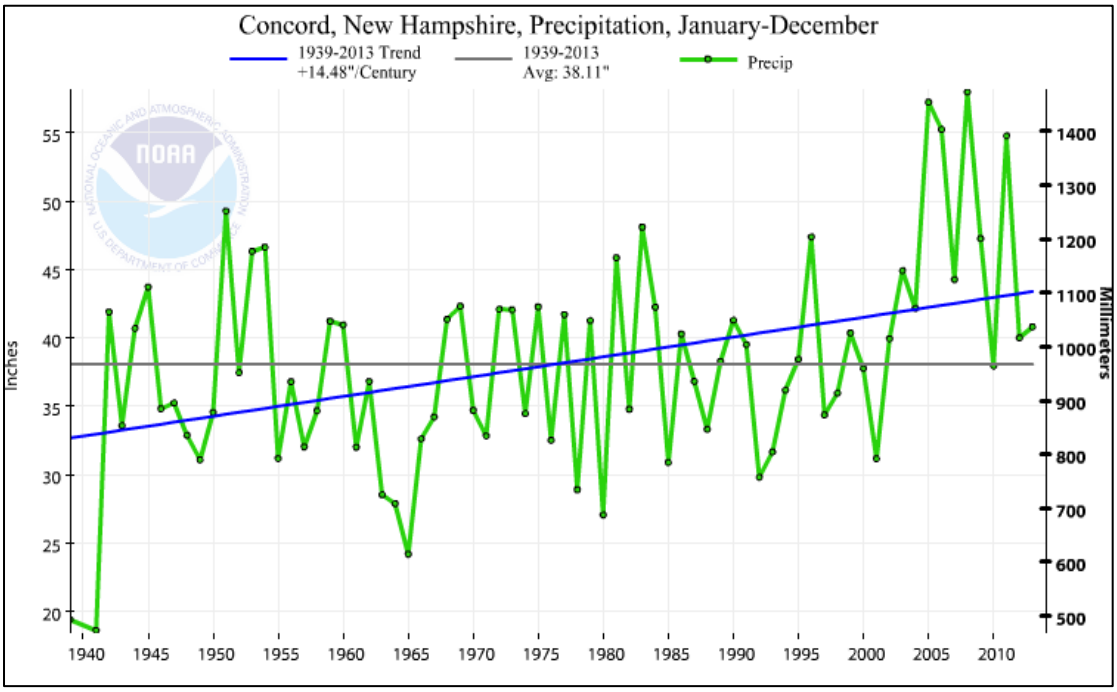


Source: National Oceanic and Atmospheric Administration

For precipitation changes, **Figure 5** displays Concord's average annual precipitation rates between 1939 and 2013. Varying seasonal rainfall amounts continue over the decades. The trend line serves the same purpose to illustrate an overall increase of **+14.48"** in precipitation over the 74-year time period from 1939 to 2013.

Figure 5

Average Annual Precipitation for Concord, 1939-2013

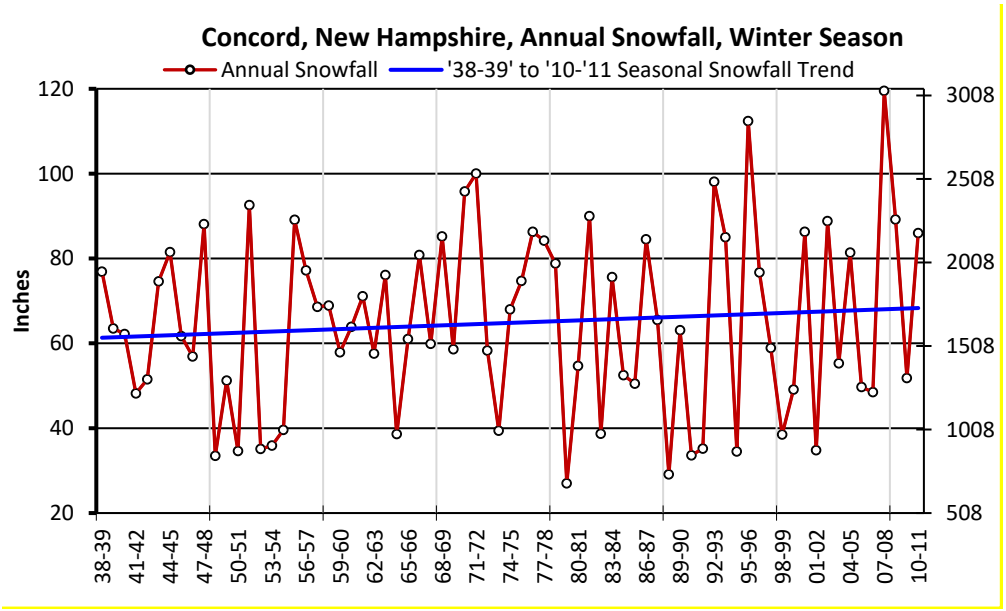


Source: National Oceanic and Atmospheric Administration

Similar to temperature and precipitation, annual snowfall amounts as reported by NOAA were observed for Concord starting in the **1938-1939** winter season through the **2010-2011** winter season. Snowfall data from **2011-2013** was not available. As displayed in **Figure 6**, the amount annual of snowfall has varied greatly over the past century. Overall, the trend line indicates a slight increase in annual snowfall inches, from about **60"** in the **1938/39** season to about **68"** in **2010/11**, totaling an increase of **+8"** of snowfall over the 72-year time span.

Figure 6

Average Annual Snowfall for Concord, Winter Seasons 1938/39 - 2010/11



Source: NOAA Compiled by: CNHRPC

Hopkinton abuts Concord to the southeast, sharing the Soucook River as a border. This climate data may certainly be relevant to the entire Central NH Region which includes the Town. The Central NH region climate summation is that the temperature is getting warmer, the precipitation is increasing, and the snowfall is slightly increasing according to the National Oceanic and Atmospheric Administration's data collection at the Concord airport. There are no indications to see these trend lines reverse although the snowfall varies greatly from one season to the next, almost in an alternating pattern.

The Southern NH Climate Change Assessment, formally entitled ***Climate Change in Southern New Hampshire: Past, Present, and Future, 2014*** by the University of New Hampshire, reviewed current climate conditions and projected future conditions of Southern New Hampshire under potential low and high emission scenarios. Their past and future climate overview is illustrated in **Figure 7**.

Figure 7

Southern NH Climate Assessment Projections

Past Data and Future Climate Overview

SOUTHERN NH CLIMATE ASSESSMENT Projections

TEMPERATURE

What have we seen since 1970?

- → Average maximum temperatures have warmed by 2.0°F (annual) and 2.9°F (winter)
- → Average minimum temperatures have warmed by 3.2°F (annual) and 6.1°F (winter)

What can we expect?

- → Summers will be hotter: 16-47 days above 90°F
- → Winters will be warmer: 20-45 fewer days below 32°F

RAINFALL

What have we seen since 1970?

- → Annual precipitation has increased by 8-22%
- → Frequency and magnitude of extreme events

What can we expect?

- → Precipitation annual average will increase: 15-20%
- → More frequent and severe flooding

SNOW

What have we seen since 1970?

- → Fewer days with snow cover
- → Lake ice-out dates occurring earlier

What can we expect?

- → Significant decrease of 20-50% in number of snow covered days

As a result of anticipated extreme weather continuing and climate changes in Central NH and Hopkinton, consideration should be given for potential impacts to the community. A few new issues are considered, although the list is not detailed. For more information on these topics, refer to the **Central NH Regional Plan 2015**.

More Human Health Emergency Events

- ☞ Illnesses such as heatstroke, fainting, and heat exhaustion.
- ☞ Excess heat especially dangerous for the aging population and residents without air conditioning.
- ☞ Increase in greenhouse gas emission, energy demand, and air conditioning use and cost.
- ☞ More favorable conditions for insects carrying viruses and diseases, such as West Nile Virus.
- ☞ Increases risk of waterborne illnesses caused by pollutants entering the town's water supply, commonly through stormwater runoff and sewage overflow.
- ☞ Infrastructure failure by adding additional stress, leading to potential injury or loss of life.
- ☞ More air pollution, leading to asthma and breathing disorders.

Natural Environment Disruption

- ☞ Too much water and/or lack of water can disrupt trees and plants natural growing cycle, potential leading the tree, plant, and surrounding area to die.
- ☞ Additional water and drought conditions affect wetland discharge, stream flow, and water quality, affecting the habitat's quality of life and species' health within the area .
- ☞ Debris will be a result of harsh flooding, including trash and downed trees, polluting waters, harming habitats, and damaging property and infrastructure.

Declining Forest Health

- ☞ Large weather events such as heat stress, drought, and periods of winter thaw followed by intense cold can lead to loss of trees.
- ☞ Become susceptible to invasive species and diseases, such as the Hemlock Wooly Adelgid.
- ☞ Loss of trees can have a direct impact on portions of the region's economic components, including declining tourism.

Fewer Recreation Opportunities

- ☞ Weather Impacts on Recreational Trails such as debris, flooding and erosion.
- ☞ Snowmobiling, ice fishing, snow shoeing, skiing and snowboarding provide numerous sources of winter recreation and winter tourism, enhancing the quality of life and economy, will be affected with shorter seasons.

Risks to the Built Environment

- ☞ Critical infrastructure such as roads, bridges, culverts, stormwater drainage systems, water and wastewater treatment facilities, natural gas lines, electric lines and poles might be at risk of severe damage or failure if the anticipated extreme weather events occur.
- ☞ Damaged infrastructure cannot provide services to homes and businesses, disrupting the economy and may endanger public health.
- ☞ Culverts are at risk to extreme precipitation events, including rain, snow, and ice.
- ☞ Residents who experience damage with flooding to their homes and personal belonging may lack proper flooding insurance, placing the resident in financial hardship.
- ☞ Dams with High Hazard and Significant Hazard classifications are the most likely to cause the largest amount of damage or loss of life.

Increasing Municipal Transportation Systems Maintenance Needs

- ☞ Volume of flooding is expected to increase, potentially closing roads and increasing the travel time for drivers and increasing the cost and energy use.
- ☞ Flooding can also cause damage to pavement and embankments, increasing maintenance, repair, and replacement costs to municipalities.
- ☞ Extreme precipitation will also increase erosion, decreasing certain infrastructure components design life span.

Aging and Inadequate Stormwater Infrastructure

- ☞ Stormwater infrastructure such as catch basins, pipes, discharge points, and culverts that redirect stormwater runoff can impacted by flooding and cannot perform their function.
- ☞ Blocking of water can lead to flooding of the area and roadways, potential leading to the closure of nearby roads.
- ☞ Components of stormwater infrastructure are outdated, and increased flows are added stress to the system, more money to maintain and higher replacement costs.

☞ Increased development with increased amounts of impervious surface adds the volume of stormwater runoff within more urban area.

Decreasing Water Resources

☞ Water quality and quantity are both threatened by projected changing weather events, with threats of flooding, drought, erosion and stormwater runoff.
☞ By preventing groundwater from replenishing, additional runoff and sediments can lead to intensify flows in rivers and streams with higher contamination levels of unwanted nutrients and pathogens.
☞ Additional water treatment may be necessary, potentially overloading treatment systems.
☞ Contamination can pollute sewage, threatening the performance of wastewater treatment facilities.
☞ Increased occurrences in flooding can also intensify flows, causing overloading of treatment system.
☞ When the ground is frozen, rapid snow melt from warm days or intense rain is not able to infiltrate the ground, leading to drought conditions.

Changing Food and Agriculture Production

☞ Merrimack County is the top county in the State for agriculture sales of higher temperatures will promote a longer growing season for most crops, benefiting a larger number of local crops.
☞ Negative impacts can potentially alter the region to a climate not suitable for growing valuable local crops such as apples and blueberries.
☞ Temperature are expected to slow weight gain and lower the volume of milk produced by dairy cows.
☞ Higher overnight temperatures are anticipated to prevent the dairy cows and cattle from recovering from heat stress.
☞ Warmer temperatures and increase in carbon dioxide in the air creates a more ideal environment for pests and weeds, potentially increasing the use of herbicides and pesticides on crop.

This is a sampling of how changing climate and severe weather impacts can affect communities in New Hampshire, in the Central NH Region and in Hopkinton. Consideration should be given to applicable items during the development and update of the **Hazard Mitigation Plan**.

Detailed Hazard Events in Hopkinton

A compilation of hazards that have occurred in Hopkinton and the Central NH Region area is provided in the prior Table of **Local and Area Hazard Events. Hazard Locations in Town** are areas to watch, areas of particular susceptibility and may be vulnerable to future events. **Potential Future Hazards** are determined based on the past hazard events, possibilities, and existing issues in Town to provide focus to future potential problem areas and to help with mitigation action development.

Each hazard is generally described and then is noted how and where it could occur in Hopkinton. For all hazards examined in this Plan, a table of the **Hazard Locations in Town** and the **Potential Future Hazards** is provided at the end of this Plan Chapter.

Hazard events were researched using a wide variety of sources for the **original Hopkinton Hazard Mitigation Plan 2004** which were the basis for many of the past disaster events and updated to the present. The **Hazard Mitigation Plan Update 2011** provided recent information on many of the extreme disasters experienced between 2005-2008. Sources and techniques included interviewing local townspeople, researching Town Histories and related documents, and collecting information from governmental or non-profit websites. Presidentially declared disasters or other significant hazard events are described for the surrounding area or Merrimack County for the **Hazard Mitigation Plan Update 2017** and some of them may have affected the community. These disasters were also considered by the Committee when determining the risk evaluation.

Committee member experiences, knowledge, and recollections generally comprise the **Local and Area Hazard Events** and **Hazard Locations in Town.** While additional hazards might have occurred in Town, those events in the Plan are what the Committee chose to list, or were familiar with to list, to comprise the hazard events within the in Tables. The same is true for the **Potential Future Hazards** section.

FLOODING

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges. However, floods can be beneficial to the low lying agricultural areas which are used for active farm lands by enriching the soil.

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term *100-year flood* does not mean that a flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase *1% annual chance flood*. This phrase means that there is a 1% chance of a flood of that size happening in any year.

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of year. A sudden thaw during the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to drain. Flooding is the most common natural disaster to affect New Hampshire, a common and costly hazard.

There are several types of **Flooding** hazards examined in the **Hazard Risk Assessment**:

- **Floods and Flash Floods**
- **Rapid Snow Pack Melt**
- **Ice Jams**
- **Riverine Fluvial Hazard Flooding, Erosion, Channel Movement**

Magnitude of Flooding

Flooding magnitude, or how bad flooding could get in Hopkinton, can be measured by the following SFHA Flood Zone scale in **Table 13**. "Flooding" encompasses all types of flooding including **Floods and Flash Floods**, **Rapid Snow Pack Melt**, **River Ice Jams** and **Fluvial Hazard Erosion and Channel Movement**.

Table 13

Special Flood Hazard Area (SFHA) Zones on 2010 DFIRMS

Special Flood Hazard Areas on Hopkinton DFIRMs	
Zone A	**1% annual chance of flooding** • **100-year** floodplains *without* Base Flood Elevations (BFE)
Zone AE *(with or without floodways)*	**1% annual chance of flooding** • **100-year** floodplains *with* Base Flood Elevations (BFE) • some identified as **floodways** with stream channel and/or adjacent floodplain areas • areas must be kept free of encroachment so 1% annual chance of flood will not substantially increase flood height
Zone X	**0.2% annual chance of flooding** • **500-year** floodplain *without* Base Flood Elevations (BFE) • sheet flow flooding less than 1-foot deep • stream flooding where the contributing drainage area is less than 1 square mile • areas protected from 100-year floodplains by levees • OR areas determined to be outside the 0.2% annual chance of flood (see DFIRMs)

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

Hopkinton DFIRMs can be viewed online at and downloaded from the NH Geographically Referenced Analysis and Transfer System (NH GRANIT) website. Alternatively, the DFIRMs' respective paper FEMA April 19, 2010 Floodplain Maps in the Town Office could be consulted. Should the **Zone A** or **Zone X** or **Zone AE** flood to either the 100-year or 500-year level, the DFIRM areas will help **measure the location of the floodplain and potential magnitude of the flood.**

Flooding in Hopkinton

Hopkinton has several areas particularly susceptible to flooding and contains the US Army Corps Hopkinton-Everett Flood Control. The Contoocook River bisects the Town in a west-east pattern western and many brooks abound.

The Blackwater River and the Warner River both converge into the Contoocook River within a mile of each other. A few large brooks in Town flow year-round including Dolf Brook, Hardy Spring Brook, and Boutwell Mill Brook. The area above the Hopkinton-Everett Reservoir is hydrologically active and different types of hazard events could introduce more water into the fluvial system and cause overflow.

These large watercourses and numerous individual brooks and ponds in Hopkinton contribute to flooding these and other areas in Town:

- **Watercourses:** Contoocook River, Warner River, Blackwater River, Hardy Spring Brook, Dolf Brook, Browns Brook, Meadow Brook, One Stack Brook, Boutwell Mill Brook and several unnamed Brooks.
- **Waterbodies:** Flood Control Reservoir, Carr Pond, Clement Pond, Grassy Pond, Rolf Pond, Dolf Brook, Kimball Pond, Whittier Pond, Drew Lake.

Roads in Hopkinton are occasionally vulnerable to washouts and floods but do not consistently washout during flash flooding and heavy rain events. A listing of past and future potential road washouts is shown on ***Map 1 Potential Hazards*** and ***Map 2 Past Hazards***. A **Table** of undersized Town-owned culverts to be upgraded to ensure their carrying capacity can be found in **5 COMMUNITY VULNERABILITY ASSESSMENT**. The most common, sometimes regular **road washouts** are:

- Sugar Hill and Thain Roads closed, 100-year floods – Hopkinton-Everett Dam (April 2010)
- Thain Road closed, 100-year floods – Hopkinton-Everett Dam (March 2011)
- Mostly gravel roads washout and erodes the ditchline
- Beaver impacting streams and water bodies that flow into culverts
- Roads don't consistently washout, just the significant flooding events
- Brockway, Branch Londonderry Turnpike, Old Putney, Old Stage Coach, Thain, Patch, Clement Hill, Bound Tree, Crowell, Hatfield, Moran, Pat Rowe, and Old Homes Roads experience minor washouts. Some of these roads the Army Corps of Engineers will flood annually.

However, the proximity to the Contoocook River and the presence of several lakes and ponds makes the Town particularly susceptible to flooding. The following areas have been identified by the Hazard Mitigation Committee as being immediately susceptible to the impacts to **flooding**:

- Little Tooky Road Residential Homes
- The Meadows of Hopkinton Manufactured Housing
- Contoocook Village Downtown

Special Flood Hazard Areas (SFHAs)

Base Flood Elevations (BFEs) are abundant along the Contoocook River on the Digital Flood Insurance Rate Maps (DFIRMs) of 2010. The primary DFIRMs identifying floodplains in Hopkinton (**330116**) which are along the Contoocook River are NH (**D33013C**) **#0503**, **#0504**, **#0501**, **#0502**, **#0506**, and **#0318.** Also included is **#0314** which follows a section of the Blackwater River only. Some of the Contoocook River panels are shared with the Warner River and Blackwater River. These (**6**) DFIRMs include regular BFEs along their span through Town and have SFHA **Zone AE** (1% annual risk of flooding) with floodways.

These DFIRMs also display the SFHA **Zone AE** (1% annual risk of flooding) without floodways, SFHA **Zone A** (1% annual risk of flooding) except for **#0314** in Hopkinton, and **Zone X** (0.2% annual risk of flooding) locations. These are highlighted gray in **Table 14**.

Eight (**8**) of the remaining **9** other DFIRMs covering the community, **#0507**, **#0485**, **#0510**, **#0492**, **#0511**, **#0515**, **#0520**, **#0530**, and **#0540**, display SFHA **Zone A** (1% annual risk of flooding) and/or **Zone X** (0.2% annual risk of flooding) locations. These are typically found along the other brooks or major brooks in Town. The last panel **#0530** contains a section of Hopkinton but does not have any SFHAs. **Table 14** also provides this information.

Table 14

Locations of Hopkinton Special Flood Hazard Areas (SFHA) on 2010 DFIRMS

Panel NH (D33013C)	Flood Zones in Hopkinton	Base Flood Elevations (BFEs)	Water Body Areas	Community Location
#0503	AE with floodway, AE, A, X	383, 370, 367, 366, 366, 365, 365, 364	Contoocook River, Hardy Spring Brook, Flood Control Reservoir	Western-central section containing Route 127 and Hopkinton Dike/Elm Brook Dam
#0504	AE with floodway, AE, A, X	365, 365, 364	Contoocook River, Unnamed Brook, Flood Control Reservoir	Geographic center of the community. Contains I-89 junction with Route 127
#0501	AE with floodway, AE, A, X	364-Contoocook (362, 362-Warner R)	Warner River, Contoocook River, Hardy Spring Brook, Flood Control Reservoir	Northern-central border with Warner. Contains Interstate I-89 and Route 127.
#0502	AE with floodway, AE, A, X	362, 361, 361, 361, 360-Contoocook (362, 362-Warner) (360, 360, 360-Blackwater)	Contoocook River, Warner River, Blackwater River, Browns Brook	Northern-central border with Webster. Contains Route 127.
#0506	AE with floodway, AE, A, X	360, 360, 359, (360-Blackwater)	Contoocook River, Blackwater River, Dolf Brook	Northeastern section of Town, shares short western border with Concord.
#0318	AE with floodway, AE, A, X	359, 359 (360-Meadow Brook)	Contoocook River, Meadow Brook	Northeastern corner bordering Webster and Concord.

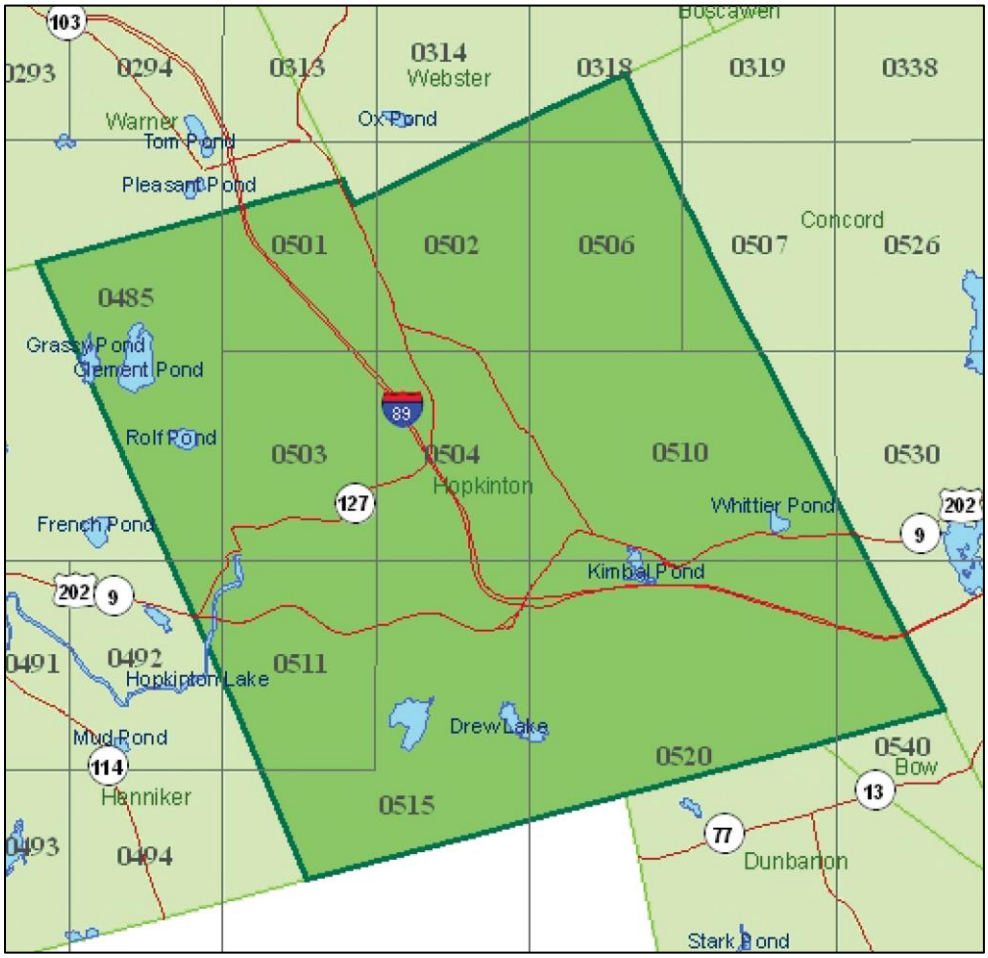
Panel NH (D33013C)	Flood Zones in Hopkinton	Base Flood Elevations (BFEs)	Water Body Areas	Community Location
#0314	AE with floodway, AE, X	360	Blackwater River	Small northeastern section of Town, shares short northern border with Webster.
#0507	A	N/A	Unnamed Brook	Eastern border of Town, shares western border with Concord.
#0485	A	N/A	Hardy Spring Brook, Carr Pond, Clement Pond, Grassy Pond, Rolf Pond	Northwestern corner, borders Henniker.
#0510	A	N/A	Dolf Brook, Kimball Pond, Whittier Pond	Central and eastern-central sections of Town. Eastern border shared with Concord. Contains Whittier Pond, Routes 9/202 and Route 127.
#0492	A	N/A	Contoocook River	Short western-central border shared with Henniker. Contains Routes 9/202.
#0511	A	N/A	Contoocook River, Flood Control Reservoir	Western section of Town containing Routes 9/202.
#0515	A	N/A	Flood Control Reservoir, Drew Lake	Southwestern corner of Town and the south-central section. Shares southwest border with Henniker.
#0520	A	N/A	Flood Control Reservoir, Drew Lake, Canal #2, One Stack Brook, Kimball Pond, Boutwell Mill Brook	Southeastern-central section. Shares southern border with Dunbarton. Contains Interstate 89 and Routes 9/202.
#0540	A	N/A	Boutwell Mill Brook	Southeastern corner of Town, shares southern border with Bow and eastern border with Concord. Contains Interstate 89 and Routes 9/202.

Sources: FEMA and NH Geographically Referenced Analysis and Transfer System (NH GRANIT) websites

Figure 8 displays the relative location of each of the DFIRM panels in the community used in **Table 14**. This set of DFIRMs is excerpted from the ***Merrimack County Flood Insurance Study (FIS) of 2010***.

Figure 8

DFIRM Panel Location, 2010

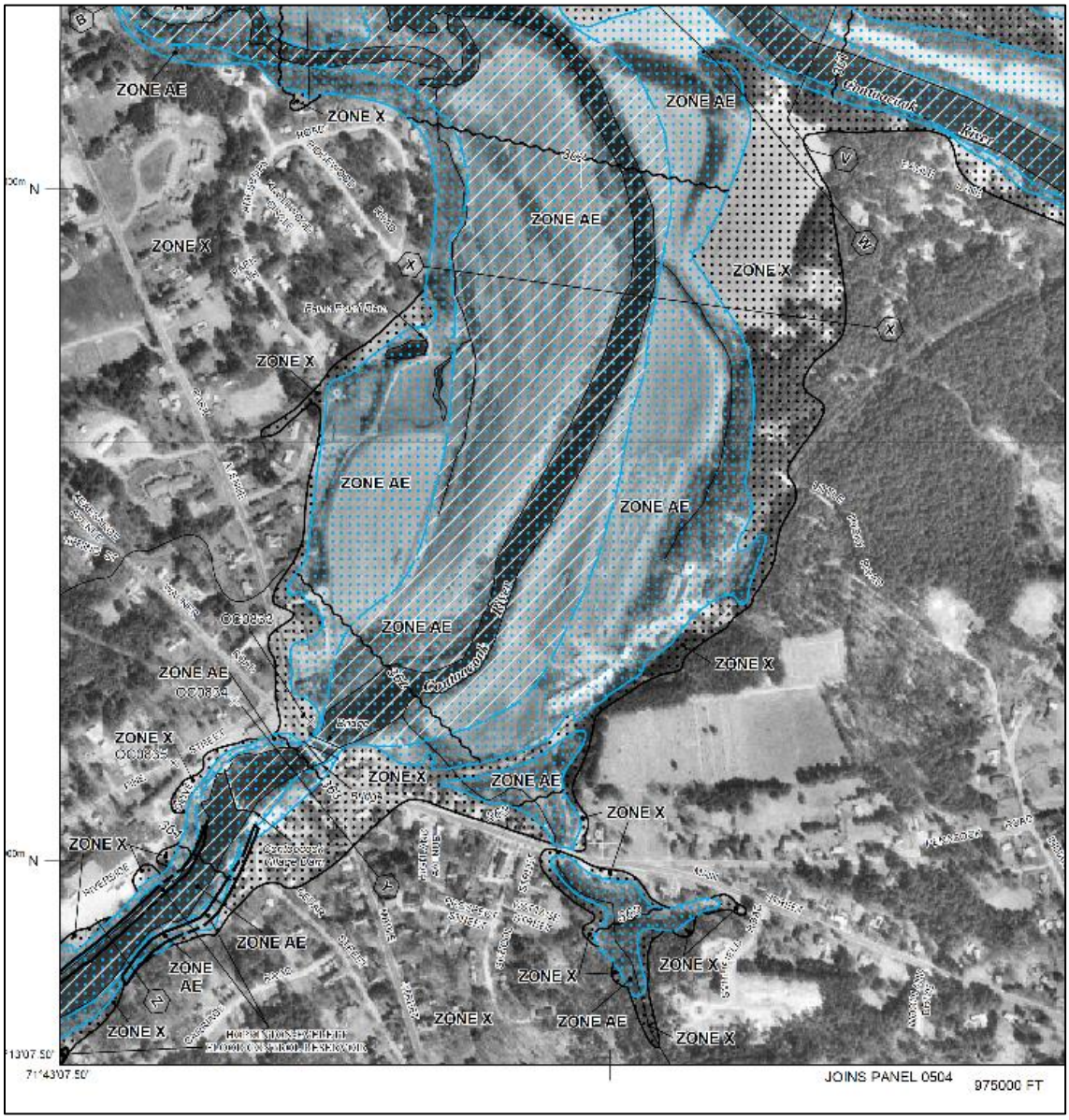


Source: Hopkinton DFIRMS can be downloaded at http://www.granit.nh.edu/dfirms/, last accessed 03-18-16

Figure 9 displays an example of a zoomed-in view of the Contoocook Village DFIRM to illustrate their appearance, a significant upgrade from the previous series of paper maps. The maps are now set on an aerial photography background that displays roads, buildings and forested areas.

Figure 9

Zoom View of Hopkinton DFIRM Panel Location #0502



Source: FEMA DFIRMS 2010 for Hopkinton NH, Panel #0502

Rapid Snow Pack Melt

Warm temperatures and heavy rains cause rapid snowmelt. The water cannot seep into the frozen ground in early spring and so it runs off into streets and waterways. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

There is the possibility of damages from the rapid snow pack melt because of the flooding from the Suncook River and the various streams along the roads, and from the culverts of the various brooks. Locations in Hopkinton that may be vulnerable to rapid snow pack melt include undersized or unmaintained culverts, roads, driveways, slopes, yards or fields, or swollen brooks, or any of the Town's fast moving brooks or ditches. Damage to roads is expected.

Magnitude of Rapid Snow Pack Melt

Rapid snow pack melt is a type of flooding. On its own, it has no known magnitude measurement. However, the hazard can share **Flooding's** Special Flood Hazard Areas (SFHAs) table.

Rapid Snow Pack Melt in Hopkinton

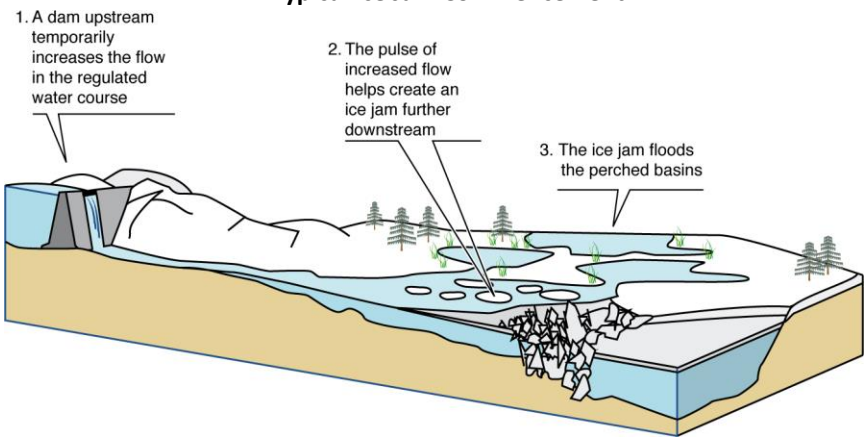
Melt runoff from impervious surfaces and roadways or from tree cover and fields can cause floods over the Entire Town. Road washouts and/or culvert failure locations or other areas flooded include: Brockway, Branch Londonderry Turnpike, Old Putney, Old Stage Coach, Thain, Patch, Clement Hill, Bound Tree, Crowell, Hatfield, Moran, Pat Rowe, and Old Homes Roads experience minor washouts. Some of these roads the Army Corps of Engineers will flood annually. Sugar Hill and Thain Roads were closed during 100-year floods at the Hopkinton-Everett Dam (April 2010); Thain Road was closed during 100-year floods at the Hopkinton-Everett Dam (March 2011).

In these vulnerable areas, the roads may be washed away, preventing traffic from passing. All areas of town could be susceptible to rapid snow pack melt. Based on past flooding events, flooding damage could also occur where the Blackwater River and the Warner River both converge into the Contoocook River within a mile of each other. The area above the Hopkinton-Everett Reservoir is hydrologically active and melting snow might occasionally cause overflow. Floodplains could become inundated and evacuations might be necessary.

River Ice Jams

Rising waters in early spring often break ice into chunks, which float downstream, pile up and cause flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents significant flooding threats to bridges, roads, and the surrounding lands. A visual of how ice jams often form is displayed in **Figure 10**.

Figure 10
Typical Ice Jam Commencement



Source: USGS, Internet Accessed May 2014

Magnitude of River Ice Jams

There is no known widely-used magnitude scale for **river ice jams**. River ice jams can cause debris impacted infrastructure when they apply pressure to bridges and dams.

River Ice Jams in Hopkinton

Ice jams have been known to have occurred in the past in sections along the Contoocook River but not in Hopkinton, although the potential exists. The Contoocook, Warner and Blackwater Rivers have flow volumes which could have potential ice formation and movement during high water levels in spring and during severe rain fall events after a deep winter freeze. **River ice jams** may have future potential to occur on the Suncook River at Upper Turnpike Street at the double-decker bridge, which is an area of concern. Other bridges and dams as identified in **APPENDIX A Critical and Community Facility Vulnerability Assessment** have the potential for river ice jam damage.

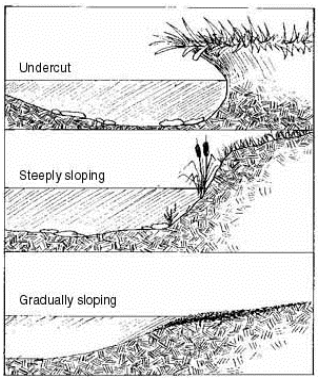
Riverine Fluvial Erosion, Bed Scouring and Channel Movement

Fluvial erosion is the wearing away of the river/stream bank and floodway. Bed scouring is the wearing away of the bed of the river or stream, typically shown as a pool type formation at downstream culvert outflows. Watercourses with high elevation change (stream gradient) are particularly prone to flash-flooding conditions and most vulnerable to erosion and scouring. During flooding or even high flow events, rivers can erode their banks and migrate into their floodplains. A migrating river, when channel movement is occurring, has the potential to impact nearby structures (berms, dams, buildings, etc.) or infrastructure such as river or stream crossings (culverts and bridges) or transportation features (roads, drainage structures, rail, etc.) in its migration path.

Fluvial geomorphology is the study of how processes of flowing water in rivers work to shape river channels and the land around them. Fluvial assessments are a collection of field data undertaken within

designated river reaches. A **river reach** is a length of stream that has characteristics similar enough that condition data collected within that length is representative of the entire reach. Figure 11 displays visual bank erosion characteristics.

Figure 11
Bank Erosion Characteristics

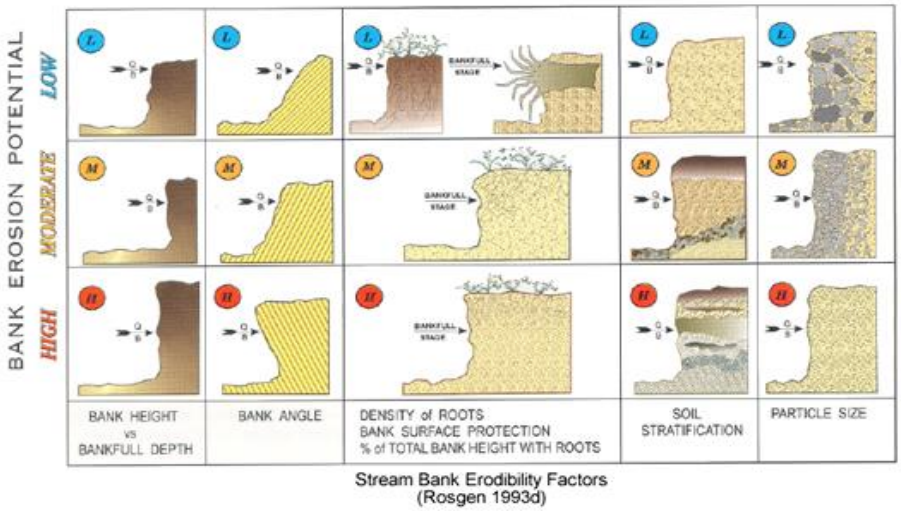


Source: US Geological Survey (USGS)

Magnitude of (Fluvial) River Bank Erosion

River and streambank erosion magnitude can be measured by the US EPA Bank Erosion Prediction Index (BEHI), which is used with the Near Bank Stress (NBS) quantification. Taken into consideration for the BEHI are the bank height versus bankfull depth, bank angle, density of roots, soil stratification, and particle size at a river reach. Figure 12 displays the visual version of the index.

Figure 12
Bank Erosion Prediction Index (BEHI)



Source: US Environmental Protection Agency (US EPA)

Riverine Fluvial Erosion, Bed Scouring and Channel Movement in Hopkinton

Erosion along the Contoocook River, Warner River and/or Blackwater River could occur at locations along its banks. Although the Contoocook river is monitored by the US Army Corps of Engineers, the Town should remain alert for potential developing erosion sites. Blackwater River banks have been seen eroding into the water. Brooks in Hopkinton can also be prone to erosion or scouring of the streambed.

The Hazard Mitigation Committee identified the following as potential future hazards in the case of **stream bank erosion and scouring**:

- The Meadows of Hopkinton Manufactured Housing
- Little Tooky Road Residences
- Kimball Pond Swimming Area
- Kimball Lake Recreation Area

WIND HAZARDS

Hurricane season begins on June 1 and continues through the end of November. August and September are the most active hurricane months. It is not uncommon for New England to be impacted by a hurricane more than once in a season. River and flooding due to heavy rains is a risk to Hopkinton during hurricanes. Numerous hurricane events in recent history have occurred in the State, region, and the local area surrounding Hopkinton that may have also had an impact on the Town.

Wind is also found in severe winter snow and ice storms, making this hazard likely to occur during the entire year. Significantly high winds occur especially during hurricanes, tornadoes, winter storms, and thunderstorms any time of the year. Falling objects and downed power lines are dangerous risks associated with high winds. Property damage and downed trees are common during high wind occurrences. All utilities, including power lines, are at risk and their damage or destruction would create a hazard to the Town. A communications interruption or failure resulting from damage to telecommunications towers could affect the capabilities of emergency personnel to respond to the hazard event.

There are several types of **Wind** hazards examined in the **Hazard Risk Assessment**:

- **Tornadoes**
- **Downbursts**
- **Hurricanes and Tropical Storms**
- **Severe Wind, Rain Storms and Thunderstorms**

Tornadoes

Significantly high winds that occur especially during hurricanes, winter storms, and thunderstorms, but can also exist independent of other storms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during high wind occurrences.

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one-mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

Magnitude of Tornadoes

A tornado occurring in Hopkinton would cause considerable damage. Roofs could be torn off frame houses; dams could be damaged; large trees snapped or uprooted; and light object missiles would be generated by an EF-2 Tornado. Tornado magnitude is measured by the Enhanced Fujita (EF) Scale, a 2007 update from the original F-scale (Fujita Scale), which are provided in **Table 15**.

Table 15

Enhanced Fujita (EF) Scale

Enhanced Fujita (EF) Scale 2007 – Present	**Fujita (F) Scale *replaced***
F Number with 3-Second Gust mph	**F Number with 3-Second Gust mph**
EF0 65-85 mph	**F0** 45-78 mph
EF1 86-110 mph	**F1** 79-117 mph
EF2 111-135 mph	**F2** 118-161 mph
EF3 136-165 mph	**F3** 162-209 mph
EF4 166-200 mph	**F4** 210-261 mph
EF5 over 200 mph	**F5** 262-317 mph

Source: National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center

Tornadoes in Hopkinton

A 1998 tornado was reported to have occurred on Gould Hill/Putney Hill. The whole Town could be vulnerable to a **tornado**. Populated areas include the Contoocook Village area, manufactured housing communities or vulnerable populations such as the Hopkinton Schools, the age 55+ and assisted living facilities and more (see **APPENDIX A Critical and Community Facility Vulnerability Assessment** for a list of sites). Wooded sections of Town run a risk of isolation through debris impacted infrastructure (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. A tornado occurring in Hopkinton would cause considerable damage. Roofs could be torn off frame houses; manufactured homes demolished; large trees snapped or uprooted; vehicles crushed by trees; and light object missiles could be generated.

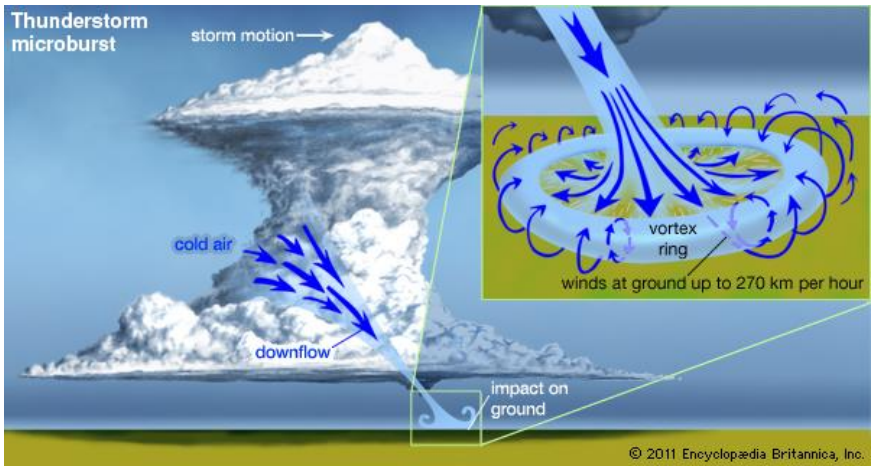
Downbursts

A downburst is a severe localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts are capable of producing winds of up to 175 mph and are life threatening. Downbursts are quite common during Central NH's hot weather months. Microbursts and macrobursts (wet) have been known to occur here in the region.

Downbursts of both sizes can produce strong wind shear - or large changes in wind speed and direction over a short distance. Trees are regularly snapped off in a singular direction by a macroburst or microburst. Downbursts typically originate from thunderstorm clouds, with air moving in a downward motion until it hits the ground level and then spreads outward in all directions. In fact, the wind pattern of a downburst is the opposite of a tornado's wind pattern, shown in **Figure 13**.

Figure 13

Microburst Forming from Thunderstorm Clouds



Source: Internet (Encyclopedia Brittanica)

Magnitude of Downbursts

Downburst magnitude is rated on the same NOAA Enhanced Fujita (EF) scale as tornadoes. In addition, downbursts fall into two categories:

- microburst, which covers an area less than 2.5 miles in diameter and
- macroburst, which covers an area equal to or greater than 2.5 miles in diameter.

Downbursts in Hopkinton

Downbursts are considered a greater threat than tornadoes in Hopkinton. The northern part of Hopkinton has a history of high winds. The likelihood of future wind events in Town seems high. **High winds** are unpredictable, and are often more prevalent at higher elevations. While the center of Hopkinton, Contoocook Village, is in a low area, residents report wind being a problem on the edges of Town at higher elevations. A recent severe **downburst** in 2012 swept through the eastern side of Town along College Hill Road in a north-south pattern.

More populated locations could have the potential for higher injury and property damage from downbursts. Contoocook Village area, manufactured housing communities or vulnerable populations such as the Hopkinton Schools, the age 55+ and assisted living facilities and more. Forested locations run a risk of isolation through debris impacted infrastructure (trees down on roads and powerlines) resulting in power failure with little emergency access until the way is cleared. Their effects can be similar but in a more targeted area. Historic resources and exposed, taller buildings, communications towers, and utilities could also be affected.

Hurricanes and Tropical Storms

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which accompany the storm. The floods and high winds can result in loss of life and property. Hurricanes, high wind and rain events, and thunderstorms can damage Hopkinton just like any other community in Central New Hampshire. Forested lands and trees along the transportation infrastructure can be blown down across roads; the above-ground powerlines along the sides of the road can be snapped either by trees or high winds and fall onto the roads or nearby objects; and runoff flooding and stream/brook and river flooding can occur because of hurricanes and severe storms.

Magnitude of Hurricanes and Tropical Storms

The Saffir-Simpson Hurricane Wind Scale **measures the magnitude of wind event** on a 1 through 5 rating basis. The definitions of Category 1 through 5 sustained wind miles per hour and their respective threats

to people, different types of homes, shopping centers, trees, power lines, water, and more are displayed in Table 16.

Table 16

Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 *major*	111-129 mph	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 *major*	130-156 mph	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 *major*	157 mph or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Oceanic and Atmospheric Administration (NOAA

Hurricanes and Tropical Storms in Hopkinton

Hurricane Sandy, which was not a declared disaster in Hopkinton, caused many roads to temporarily close while the Public Works Department cleared them of debris. Trees and limbs fell onto the roadways and onto powerlines. If vehicles had been traveling on these roads while the hurricane was in progress, they would have been in danger.

When **hurricanes or tropical storms** occur in Hopkinton, the entire Town's electrical utilities of Eversource (formerly Public Service of NH or PSNH), will continue to be prone to power outages. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads. Areas particularly vulnerable to the combination of **flooding**, **wind**, **tree debris** and **power failure** include the heavily forested areas. Radio operability for emergency communications could be adversely affected. Land line utilities are at risk of failure during severe storm weather.

Severe Wind, Rainstorms and Thunder Storms

More commonly experienced are severe wind storms, rainstorms and thunder storms. The severe wind storms occur during all months of the year while the thunder storms tend to erupt during periods of humidity. On occasion, precipitation in the form of rain or hail is experienced during these storms. Rainstorms bring can flooding and high winds. Thunderstorms can also bring lightning hazards in addition to high winds and flooding.

Magnitude of Severe Wind and Thunder Storms

Many of the severe wind storms Hopkinton experiences are not hurricanes but are severe wind storms or thunderstorms. Thunderstorms are common in New Hampshire, particularly during the hot weather months. The Thunderstorm Category Criteria scale in **Table 17** measures the magnitude of thunderstorms with their various weather components, including rain, wind, hail, tornado, and lightning.

Table 17

Thunderstorm Criteria Scale

Thunderstorm Categories	Rainfall Inches per hour	Wind Gust max mph	Hail Size in	Tornado Potential Highest Category	Lightning Frequency per 5 minutes	Darkness Aspect	Overall Thunderstorm Impact
T-1 **Weak Thunderstorms** or **Thundershowers**	0.03" to 0.10"	< 25 mph	None	None	Few strikes during entire storm	**Slightly Dark** Sunlight may be seen after storm	1. No damage. 2. Gusty winds at times.
T-2 **Moderate Thunderstorms**	0.10" to 0.25"	25-40 mph	None	None	Occasional 1 to 10	**Moderately Dark** Heavy downpours might cause the need for car headlights	1. Heavy downpours. 2. Occasional lightning. 3. Gusty winds. 4. Very little damage. 5. Small tree branches might break. 6. Lawn furniture moved around. 7. Power outages are possible.
T-3 **Heavy Thunderstorms** 1. Singular or lines of storms	0.25" to 0.55"	40-57 mph	1/4" to 3/4"	EF0	Occasional to Frequent 10 to 20	**Dark** Car headlights used. Visibility low in heavy rains. Cars might pull off the road.	1. Minor damage. 2. Downpours produce some flooding on streets. 3. Frequent lightning could cause house fires. 4. Hail occurs with the downpours. 5. Small tree branches are broken. 6. Shingles are blown off roofs. 7. Power outages are likely.
T-4 **Intense Thunderstorms** 1.weaker supercells 2. Bow echoes or lines of storms	0.55" to 1.25"	58-70 mph	1" to 1.5"	EF0 to EF2	Frequent 20 to 30	**Very Dark** Car headlights used. Some streetlights come on.	1. Moderate damage. 2. Heavy rains can cause flooding to streams and roadway flooding occurs. 3. Hail can cause dents on cars and cause crop damage. 4. Tornado damage. 5. Power outages will occur.

Thunderstorm Categories	Rainfall Inches per hour	Wind Gust max mph	Hail Size in	Tornado Potential Highest Category	Lightning Frequency per 5 minutes	Darkness Aspect	Overall Thunderstorm Impact
T-5 Extreme Thunderstorms 1. Supercells with family of tornadoes 2. Derecho Windstorms	1.25" to 4"	> 70 mph	1.5" to 4"	EF3 to EF5	Frequent to Continuous > 30	**Pitch Black** Street lights come on. House lights might be used.	1. Severe damage to trees and property. Damage is widespread. 2. Flooding rains. 3. Damaging hail. 4. Damaging wind gusts to trees and buildings. 5. Tornadoes EF3 to EF5 or family of tornadoes can occur. Tornadoes cause total devastation. 6. Widespread power outages.

Source: Adapted from Accuweather.com, Henry Margusity, Senior Meteorologist

Incidentally, hail can accompany thunderstorms, hurricanes, or severe wind events. The Hail Size Description Chart describes the potential size of hail during a hurricane or severe storm event, which could occur anywhere in Hopkinton. The chart is shown below along with a Hail Size Comparison Chart which is a visual representation of some of the relative sizes of hail (note this chart image is not shown to scale). The **Table 18** hail size description and **Figure 14** size comparison scales measure the magnitude of hailstones that could fall on Hopkinton during severe storm events.

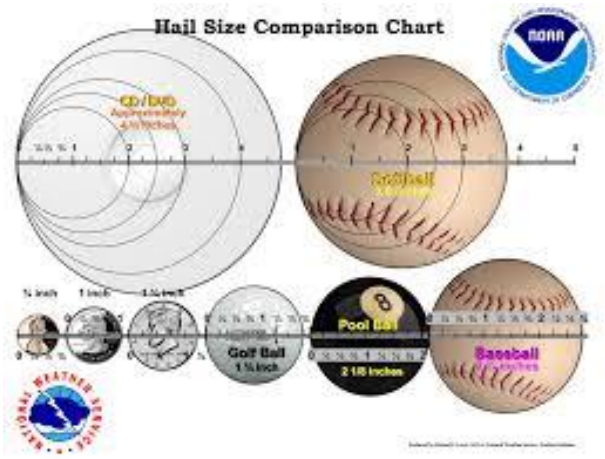
Table 18

Hail Size Description

Hailstone Diameter (inches)	Size Description
< 1/4	bb
1/4	**Pea Size**
1/2	Mothball Size
3/4	Penny Size
7/8	Nickel Size
Severe Criteria 1	**Quarter Size**
1 1/4	Half Dollar Size
1 1/2	Walnut or Ping Pong Ball
1 3/4	Golf Ball Size
2	**Hen Egg Size**
2 1/2	Tennis Ball Size
2 3/4	Baseball Size
3	**Teacup Size**
3 4/5	Softball Size
4	**Grapefruit Size**

Figure 14

Hail Size Comparison



Sources: National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS)

Severe Wind, Rainstorms and Thunder Storms in Hopkinton

All of Hopkinton has experienced **severe wind**, **rainstorms**, and **thunderstorms**. The entire Town's electrical utilities of Eversource (formerly Public Service of NH or PSNH), will continue to be prone to power outages. The response time to these outages could be several days in the more remote or densely populated areas of Town, depending on where debris has fallen onto roads. Areas particularly vulnerable to the combination of **flooding**, **wind**, **tree debris** and **power failure** include the heavily forested areas. Radio operability for emergency communications could be adversely affected. Land line utilities are at risk of failure during severe storm weather.

FIRE HAZARDS

Fire can be caused by several agents and can spread rapidly to consume property and endanger lives. This **2017 Plan** examines **lightning**, and **wildfire** (natural) fire sources and places other **fires (vehicles, structure, arson, explosions**) with **Technological Hazards**.

Wildfire is a significant concern and can quickly get out of control without good infrastructure and procedures. Lightning can cause fire or wildfire. Locations of older narrow graveled roads or densely packed residential areas (Contoocook Village, cul-de-sac neighborhoods) are among the most vulnerable locations for fire and wildfire hazards. Rural, forested areas of the community or recreation and conservation areas are often the most vulnerable to both wildfire and lightning.

There are two types of natural **Fire** hazards examined in the **Hazard Risk Assessment**:

- **Lightning**
- **Wildfire**

Lightning

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, a shock wave that can damage building walls and break glass. Lightning strikes can cause death, injury, and property damage. Lightning is often referred to as the "underrated killer".

Magnitude of Lightning

Lightning can be measured to determine how likely it may be for starting fires. Using a Level system of **1** to **6** corresponding with storm development and the number of lightning strikes, the Lightning Activity Level (LAL) measures the magnitude of lightning strikes as displayed in **Table 19**.

Table 19

Lightning Activity Level (LAL)

Level	LAL Cloud and Storm Development	Cloud to Ground Strikes per 5 Minutes	Cloud to Ground Strikes per 15 Minutes
LAL 1	No thunderstorms	n/a	n/a
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a 5- minute period.	1 to 5	1 to 8
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5-minute period.	6 to 10	9 to 15
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 cloud to ground strikes in a 5-minute period.	11 to 15	16 to 25
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5-minute period.	> 15	> 25
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	6 to 10	9 to 15

Source: National Weather Service

Lightning in Hopkinton

Lightning regularly strikes in Town, including at the Town Hall. Specific sites which would cause the greatest impact if struck by **lightning** include the Town Buildings, electrical utilities, generators, transformers, the Wastewater Treatment Facility and telecommunication towers. The heavily forested areas including Mast Yard State Forest, conservation areas and Town recreation areas are often remote and difficult to access by emergency vehicles as are the older, narrow gravel roads.

Wildfire

Wildfire is defined as any unwanted and unplanned fire burning in forest, shrub or grass. Wildfires are frequently referred to as forest fires, shrub fires or grass fires, depending on their location. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. The threat of wildfires is greatest where vegetation patterns have been altered by past land-use practices, fire suppression and fire exclusion. Because fire is a natural process, fire suppression can lead to more severe wildfires due to vegetation buildup.

Increased severity over recent years has decreased capability to extinguish wildfires. Wildfires are unpredictable and usually destructive, causing both personal property damage and damage to community infrastructure and cultural and economic resources.

Magnitude of Wildfire

The standard of measuring wildfire magnitude is by the National Wildfire Coordinating Group (NWCG)'s wildfire classification scale. Table 20 displays the wildfire classification size per the number of acres burned.

Table 20

National Wildfire Coordinating Group Wildfire Classification Scale

Fire Class	Sizes in Acres
Class A	1/4 acre or less
Class B	> 1/4 acre to < 10 acres
Class C	10 acres to < 100 acres
Class D	100 acres to < 300 acres
Class E	300 acres to < 1,000 acres
Class F	1,000 acres to < 5,000 acres
Class G	5,000 acres or more

Source: National Wildfire Coordinating Group

Wildfire in Hopkinton

Although **wildfire** damage has been kept to a minimum to date, the potential for losing an immense acreage of Hopkinton to this natural hazard is possible, particularly with the severe drought conditions currently occurring in 2016. The heavily forested woodlands of Town and State forests, Elm Brook State Park and conservation areas are often remote locations and difficult to access by emergency vehicles. Densely packed residential neighborhoods and recreational fields abut forested lands. Any **debris** left over from **flooding**, **winter storms**, or **wind events** are a **wildfire hazard**. When **droughts** or drier conditions occur, the dry vegetation becomes a significant hazard to the Town Fire Department.

EXTREME TEMPERATURE (COLD-HOT) HAZARDS

Extreme temperature hazards include diverse hazards such as severe cold and snowstorms, excessive heat, drought, and public health. The snow and ice component often results in communications & power failure for a large segment of the Town. This category is meant to encompass all the hazards which can be influenced by the extreme weather temperatures and climate changes that New England, New Hampshire, the Central NH Region, and Hopkinton are experiencing.

There are several types of **Extreme Temperature** (**cold-hot**) hazards examined in the **Hazard Risk Assessment**:

- **Severe Winter Weather, Cold, and Ice Storms**
- **Drought**
- **Excessive Heat**
- **Public Health (Epidemics)**

The National Weather Service (NWS) in Gray, Maine which covers New Hampshire collects and reports climate data in addition to issuing warning and advisories. Winter 2015-2016 was the warmest and one of the least snowy on record in Concord, their most local reporting station. The average temperature this season since 1868 was **30.9** degrees, topping the previous record of **30.4** degrees in the season of 1879-1880. Precipitation was **2.01** inches above normal this winter, totaling **10.53** inches. Total snowfall was **24.7** inches, **20.2** inches below normal. Warmest temperature records were also set during 2015.

Severe Winter Weather, Cold, and Ice Storms

Ice and snow events typically occur during the winter months and can cause loss of life, property damage, and tree damage. Severe winter storms, including Nor'easters, typically occur during January and February. However, winter storms can occur from late September through late May.

A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding, wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

An ice storm involves rain, which freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects. Ice storms also often produce widespread power outages.

A Nor'easter is a large weather system traveling from South to North, passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. In the winter months, oftentimes blizzard conditions accompany these events. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods.

Extreme cold temperatures are associated with continental Arctic air masses. The actual temperatures reached depend specifically on the nature of the cold air mass and where it originated. In general, those from the Arctic regions are the coldest. Though cold temperatures are dangerous, they become more so in conjunction with strong winds. The combination produces a wind-chill factor – heat loss measured in Watts per meter squared (Wm-2). A wind-chill factor of 1400 Wm-2 is equivalent to a temperature of -40 degrees F. At 2700 Wm-2, exposed flesh freezes within a half-minute.

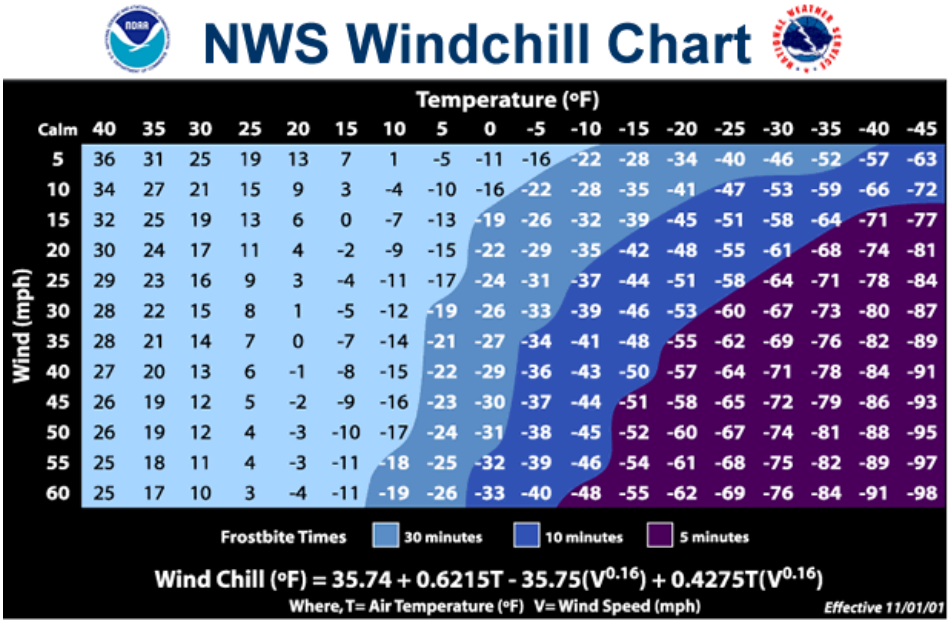
Numerous severe winter events in recent history have occurred in the State, region, and the local area surrounding Hopkinton that may have also had an impact on the Town. Unlike the relatively infrequent hurricane, New Hampshire generally experiences at least one or two Nor'easters each year with varying degrees of severity. These storms have the potential to inflict more damage than many hurricanes because the high storm surge and high winds can last from 12 hours to 3 days, while the duration of hurricanes ranges from 6 to 12 hours.

All winter storms make walking and driving extremely dangerous. The elderly and very young are at high risk during winter storms and may be affected by hypothermia and isolation. During winter storms, there is an increased risk of **fire** because people experience **power failure** and use candles, portable gas stoves, and other flammable sources of heat and light.

Magnitude of Severe Winter Weather

Severe Winter Weather magnitude in can be measured for windchill, ice accumulation and snowfall using several different scales and indices including the NWS Windchill Chart, Sperry-Piltz Ice Accumulation Index (SPIA) and NCDC Regional Snowfall Index (RSI) for the Northeast. **Figure 15** displays the Windchill Temperature Index which measures the wind and temperature leading to how quickly frostbite can occur.

Figure 15
Windchill Temperature Index



Source: National Weather Service

Table 21 displays the Sperry-Piltz Ice Accumulation Index (SPIA) which measure the magnitude of ice damage from severe winter weather. The index is compared to the tornado and hurricane scales note

above. Storm total rainfall converted to ice accumulation, wind, and temperatures during the storm period are used to develop SPIA.

Table 21

Sperry-Piltz Ice Accumulation Index (SPIA)

Ice Damage Index	Average NWS Ice Amount *in Inches*	Wind Speed *mph*	Ice Damage and Impact Descriptions
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems. No alerts or advisories needed for crews, few outages.
1	0.10 to 0.25	15 to 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges might become slick and hazardous.
	0.25 to 0.50	> 15	
2	0.10 to 0.25	25-35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions might be extremely hazardous due to ice accumulation.
	0.25 to 0.50	15-25	
	0.50 to 0.75	< 15	
3	0.10 to 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days. Warming sites needed.
	0.25 to 0.50	25 - 35	
	0.50 to 0.75	15 - 25	
	0.75 to 1.00	< 15	
4	0.25 to 0.50	> = 35	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. Shelters or warming sites needed.
	0.50 to 0.75	25 - 35	
	0.75 to 1.00	15 - 25	
	1.00 to 1.50	< 15	
5	0.50 to 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 to 1.00	> = 25	
	1.00 to 1.50	> = 15	
	> 1.50	Any	

Source: www.spia-index.com (adapted by CNHRPC)

The Regional Snowfall Index (RSI) for the Northeast is used to categorize significant snowstorms. The RSI ranks snowstorm effects on a scale from **1** to **5**, similar to the Enhanced Fujita Scale for tornadoes or the Saffir-Simpson Hurricane Wind Scale for hurricanes. The RSI differs from these other indices because it includes population, a social component. The RSI is based on the spatial extent of the storm, the amount of snowfall, and the juxtaposition of these elements with population. The Regional Snowfall Index (RSI) displayed in **Table 22** is a measurement of the magnitude of a snowstorm in the Northeast, which includes New Hampshire.

Table 22
Regional Snowfall Index (RSI) for the Northeast

Storm Category	RSI Value	Snow Description
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Source: www.ncdc.noaa.gov/snow-and-ice/rsi/ (adapted by CNHRPC)

Severe Winter Weather in Hopkinton

Winter weather events are as common in Hopkinton as they are in the other areas of Central New Hampshire. The most recent worst storm on record was the **December 2008 Ice Storm** with wide-spread power outages that lasting for over a week in the remote, forested areas. Hopkinton's steep slopes and hills and numerous Class VI and gravel roads, along with its unique water features and main state commuter roadways (US Route 9/202, Route 103) suggest a potential for road icing (**transportation accidents**) when ice and storm events hit. **Communications failure**, **power failure**, **extreme cold** and local road impassibility (trees and/or power lines down) occur as well. Areas above 800 feet in elevation are particularly vulnerable to the effects of severe winter weather. Areas of particular concern include dams, bridges, vulnerable populations, Hopkinton Schools, manufactured housing communities, electrical power utilities, communications network, local government operations, and older or historic buildings (roof collapse).

Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of droughts is indicated through measurements of soil moisture, groundwater levels, and streamflow. However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground-water levels or increasing streamflow. Low streamflow also correlates with low ground-water levels and commonly cause diminished water supply because ground water discharge to streams and rivers maintains streamflow during extended dry periods.

In the case of drought, residential (dug wells especially) and the Contoocook Village Water Precinct would be threatened. Most homes in Town rely on well water which is not easily replenished during periods of drought. All farms and orchards in town, including the tree farms, would be negatively affected by drought, which also influences the economic situation of the community. Wildfires would have the potential of being more severe and commonplace during periods of drought.

Magnitude of Drought

Table 23 displays overall drought magnitude, measured by the Palmer Hydrological Drought Index (PHDI) the extent of hydrological drought in the form of long-term, cumulative monthly moisture conditions. The indices are developed by algorithms taking into consideration precipitation, temperature data, and the local Available Water Content (AWC) of the soil.

Table 23

Palmer Drought Conditions

Hydrological Drought Classification	
Extremely Moist	+4 and above
Very Moist	+3 to +3.99
Moderately Moist	+2 to +2.99
Mid-Range	-1.99 to +1.99
Moderate Drought	-2 to -2.99
Severe Drought	-3 to -3.99
Extreme Drought	-4 and below

Source: www.ncdc.noaa.gov/sotc/drought (as compiled by CNHRPC)

Drought in Hopkinton

Periods of **drought** in Hopkinton would occur Town-wide and could cause property damage and economic losses. The lack of water would become a community problem to keep people hydrated and the failure of agricultural crops, products and farm animals can occur. Failure of tree farms to thrive can result in economic losses. Increased likelihood of wide-spread **brush fire** and **wildfire** will occur with drier vegetation. **Lightning** strikes could contribute to wildfire risk during droughts. Dug wells can dry up during droughts and interrupt personal water supplies. Property damage and personal injuries or death could occur from drought-related fires or dry wells. The Village municipal water source, Contoocook Village Water Precinct, could enact water saving measures to assist with keeping the groundwater table higher. Residents should be encouraged to voluntarily undertake water conservation.

Excessive Heat

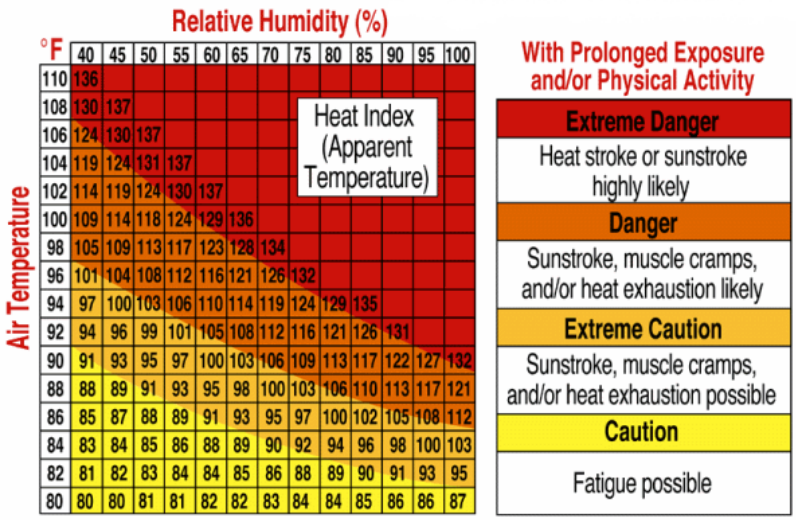
A heat wave is a period of abnormally and uncomfortably hot and unusually humid weather that typically lasts two or more days. The National Weather Services' Heat Index is used to measure humidity against temperature to develop a "real feel" temperature. Heat disorders on the body are quick and can be deadly. These now normal hot temperatures in the summer are commonly known as **excessive heat**.

Magnitude of Excessive Heat

Excessive heat is measured by the NWS Heat Index and the NWS Excessive Heat Warning Classifications. As both the air temperature and the humidity rise, so will the danger level to people. Heat disorders will become more likely with prolonged exposure or strenuous activity as shown in **Figure 16**.

Figure 16

Heat Index (Temperature and Humidity)



Source: weather.gov

Excessive Heat in Hopkinton

Hopkinton has experienced **heat waves** where temperatures exceeded 90 degrees for several days. During these times, many specific population sites in Town particularly susceptible to excessive heat, including the assisted living facilities, the Hopkinton Schools, and the over 55+ housing communities, should have access to either air conditioning or cooling facilities. **Excessive heat** can cause dehydration, heat exhaustion and more serious illnesses. Other vulnerable facilities are indicated in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**.

EARTH HAZARDS

Earth hazards include geologic events such as the small earthquake NH residents experience. The Central NH area is seismically active and small earthquakes (less than 2.5 magnitude on the Richter Scale) occur about 1-2 times per year. Landslides can occur as a result of earthquakes, rain, flooding and result in erosion along roadways and watercourses.

Radon is a naturally occurring radioactive gas with carcinogenic properties. The gas is a common problem in many states, including New Hampshire, seeping into homes from basements. Radon may also enter homes dissolved in drinking water from drilled wells. High levels of radon in water from individual drilled wells is a common occurrence in New Hampshire. Radon is no longer being addressed by the State of New

Hampshire Hazard Mitigation Plan as no new studies have made specific data available. It is generally known that radon exists throughout in the State and in communities, including the Central NH Region. Arsenic is a new concern that often co-occurs with radon. Radon is known to be present throughout New Hampshire and is addressed on an individual basis, no longer addressed in the **Hazard Mitigation Plan** because of the lack of state monitoring and available action.

There are two types of **Earth** hazards examined in the **Hazard Risk Assessment**:

- **Earthquake**
- **Landslide**

Earthquake

An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. **Earthquakes** can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause **landslides**, **flash floods**, **fires**, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale. Geologic events are often associated with California, but New England is considered a moderate risk earthquake zone.

Earthquakes in Hopkinton

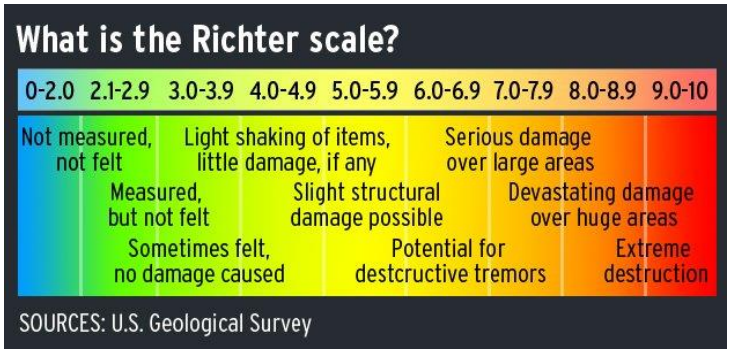
Multiple small scale **earthquakes**, about **1** quake every **1-2** years, have been felt by Hopkinton residents, with their epicenters occurring within the borders of Hopkinton (Contoocook) itself or otherwise within **10** miles since 2002 to present day. The Central NH Region is an active seismic area with mild quakes in bedrock. No damages or injuries have been reported from these events. It is likely Hopkinton residents will continue to feel earthquakes it the future; close earthquakes with a magnitude greater than 2.5 would be concerning to the Town. Older buildings in Contoocook Village or historic buildings along Route 9/202 could be particularly susceptible to earthquake damage. Underground water and/or electric utilities, stone walls, bridges and historic resources could be susceptible.

Magnitude of Earthquake Hazards

Earthquake hazard magnitude can be measured by the Richter Scale as shown in **Figure 17**. To better place the Richter Scale magnitude in perspective, the Mercalli Scale describes the *intensity* felt at different magnitudes in **Figure 18**.

Figure 17

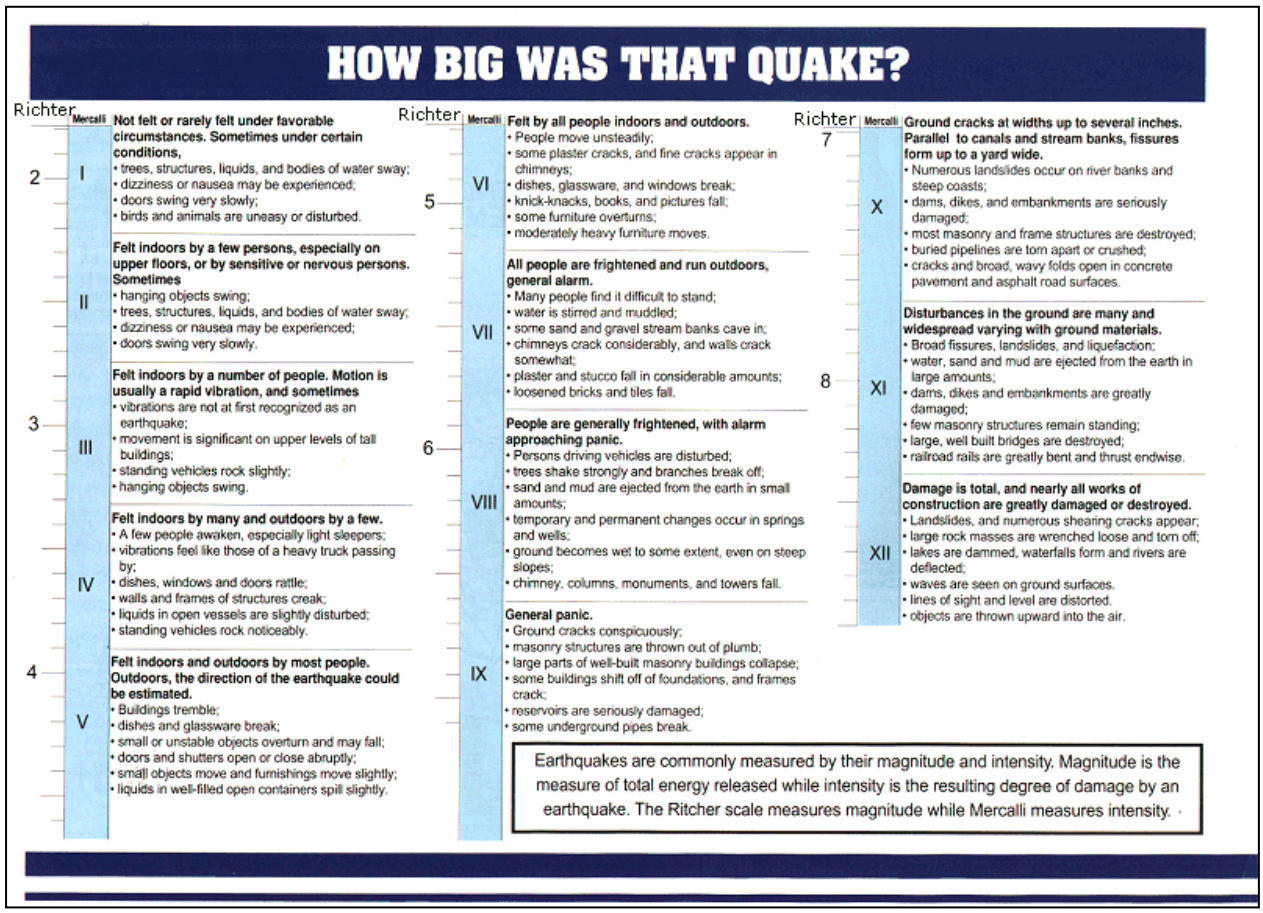
Descriptive Richter Scale



Source: US Geological Survey (USGS)

Figure 18

Earthquake Impacts on the Richter and Modified Mercalli Scales

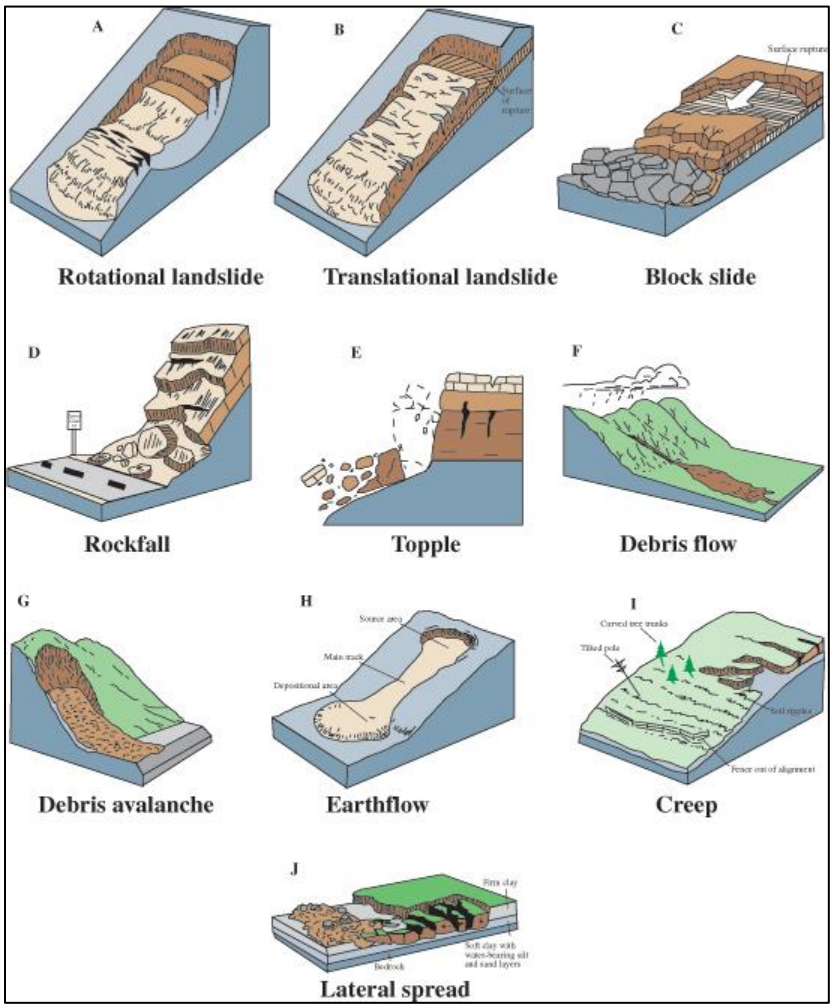


Source: National Oceanic and Atmospheric Administration (NOAA)

Landslide

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity including: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides, and earth flows. Landslides have damaged or destroyed roads, railroads, pipelines, electrical and telephone lines, mines, buildings, canals, sewers, bridges, dams, airports, forests, parks, and farms. A display of different types of landslides is shown in **Figure 19**.

Figure 19
Basic Types of Landslides



Source: US Geological Survey (USGS)

Magnitude of Landslide Hazards

There is no known standardized measurement of landslide magnitude available.

Landslides in Hopkinton

Landslide is a possibility in limited areas of Hopkinton where certain topological conditions are met. Development in proximity to areas of steep slopes (greater than 15% or 25%) could present a risk to residents. Most potential landslides will be in conjunction with another hazard event, such as flooding, a severe rain event, earthquake, or from the construction of buildings or infrastructure in a topologically vulnerable area. Roads could experience landslide erosion during heavy rain events and a large-scale landslide could damage only a limited number of structures, such as during flooding events. Currently, there are areas of the Blackwater River bank eroding into the river; this could also be considered a type of landslide.

TECHNOLOGICAL HAZARD EVENTS

Many technological hazards could be construed as secondary hazards, as they often occur as the result of a primary (natural) hazard. For example, **power failure** or **transportation accidents** (technological) can result from severe winter weather (natural). Scientific measures of magnitude are generally not available for individual technological hazards, but they are provided for **debris impacted infrastructure** and **dam failure** which are closely related to **flooding** and for **hazardous materials spills** and **radiological incident**.

There are several types of **Technological** hazards examined in the **Hazard Risk Assessment**:

- **Dam Failure**
- **Power/Utility Failure**
- **Communications Systems Failure**
- **Debris Impacted Infrastructure**
- **Transportation Accidents**
- **Fire (Vehicle, Structure, Arson)**
- **Hazardous Materials Spills**

Magnitude of Technological Events

Magnitude of most technological hazards are not addressed in this Plan. The only exception is **Dam Failure** because of its close relationship with flooding using the NH DES Dam Hazard Classifications.

Dam Failure

Dam breach and the resulting failure cause rapid loss of water that is normally impounded by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property as they are quick, unexpected, and if they occur during a flooding event, dam failures can overload an already burdened water channel.

Magnitude of Dam Failures

Although dam failure is considered a **Technological Hazard**, it is often a secondary hazard caused by flooding conditions. Classifications of dams and their magnitude of failure can be measured by the NH DES Dam Hazard Classifications shown in **Table 24**.

Table 24

New Hampshire Dam Hazard Classifications

NON-MENACE Structure		Inspection
NM	Means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is: ❍ Less than six feet in height if it has a storage capacity greater than 50 acre-feet; ❍ Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.	Every 6 years if criteria met
LOW Hazard Structure		**Inspection**
LH	Means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following: ❍ No possible loss of life. ❍ Low economic loss to structures or property. ❍ Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services. ❍ The release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course. ❍ Reversible environmental losses to environmentally-sensitive sites.	Every 6 years
SIGNIFICANT Hazard Structure		**Inspection**
SH	Means a dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following: ❍ No probable loss of lives. ❍ Major economic loss to structures or property. ❍ Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services. ❍ Major environmental or public health losses, including one or more of the following: ♦ Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair. ♦ The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more. ♦ Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.	Every 4 years
HIGH Hazard Structure		**Inspection**
HH	Means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of: ❍ Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions. ❍ Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot. ❍ Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services. ❍ The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII. ❍ Any other circumstance that would more likely than not cause one or more deaths.	Every 2 years

Source: NH Department of Environmental Services (NHDES) Dams Bureau, 2012

Dam Failures in Hopkinton

Dam failures, or breaches, are a potential danger to people and property within the dam failure inundation area(s). There are **25** active dams in Hopkinton, all listed in **APPENDIX A**.

Several dams are of a High Hazard dam classification: **Hopkinton Flood Control Dam**, **Hopkinton Dike Elm Brook Dam**, and the **Flood Control Spillway**. Two (**2**) dams, **Hoague Sprague Dam** on the Contoocook River and **Town Sewage Lagoon** are classified as Significant Hazard dams. Four (**4**) dams are classified as Low Hazard dams: **Contoocook Village Dam** on the Contoocook River**, Grassy Pond Dam**, **Kimball Lake Dam**, and **Drew Lake North Outlet** on Elm Brook. The remaining **25** dams are classified as Non-Menace (**NM**) or Exempt dams. The Significant and Low Hazard dams located in Hopkinton could cause property damage or loss of life if dam failure occurs.

Power/Utility Failure

Utilities systems exist everywhere and are subject to damage from construction work, accidents and extreme weather. Many utilities are protected by back-up generators to prevent failure, whatever the cause may be. Nuclear power plants produce roughly 20% of the nation's power, they exist in nearly all states and 3 million Americans live within 10 miles of a nuclear power plant. The greatest risk to life resulting from a nuclear power plant failure is radiation contamination resulting from radiation release into the environment. People in the immediate vicinity are at greatest risk of radiation contamination. Another common source of energy, coal, can be potentially hazardous because coal power plants emit chemicals such as mercury and sulfur dioxide.

New Hampshire contains nuclear, coal and natural gas power plants. There is only one (**1**) coal power plant in New Hampshire, the Eversource Merrimack Station in Bow. The Merrimack Station is the largest coal-fired electrical generating station owned by Eversource (formerly PSNH) and supplies power to 190,000 households.

In the harsh environment that New Hampshire residents are subjected to, power and utility failures on an isolated level are commonplace. During nearly every heavy snow storm, ice storm, or other severe weather event, someone, somewhere, loses power and/or other utilities.

Power Failure in Hopkinton

For most storm events, some residents and businesses have experienced **power failure**. Hopkinton receives electricity from Eversource. Basic critical facilities that serve residents could be damaged by power failure. The official shelter space available to Hopkinton residents is the Hopkinton High School. This shelter also provides accommodation to area residents. Kitchen facilities, power generation, running water, cots, and showers are needed to become a Red Cross-certified shelter, which the High School has been designated. Or, residents should be able to shelter in place, gathering needed supplies and water ahead of time, for up to three days.

Power failure can cause inconvenience, loss of economy, extra Town expenditures, restrict emergency and response because the typical power failure is a secondary hazard caused by a severe wind or severe winter weather event. This problem is applicable to the **Hurricanes and Tropical Storms, Downbursts**, **Tornadoes**, and **Severe Winter Weather, Cold, and Ice Storms** hazard events described earlier as well as **Debris Impacted Infrastructure** and **Transportation Accident** hazard events in the following sections.

Communications Systems Failure

Communications systems, like utilities, are found everywhere and are subject to damage by construction work, severe weather and traffic accidents. Because communications systems depend on electricity, any power outage may cause an interruption in a communications system. In addition, many communications systems have buried cables which are particularly vulnerable to being cut. Communications systems interruptions can negatively impact a region, town, neighborhood or household in the case of a natural disaster, catastrophe or other emergency. Power lines often share cables and poles with communications systems. When power fails, cable, telephone and radio services frequently fail as well.

Communications Systems Failure in Hopkinton

Any **communications failure** can mean lack of emergency services or delayed emergency services. Police/Fire use digital service and are members of the effective Central NH Mutual Aid Compact Dispatch service. However, for residents, services can be disrupted easily. Those at greatest risk are the same as those for **power/utility failure**. There has been a steady migration to cell phone use only with people dropping their landline telephones. A few individuals in Town require oxygen and power failure and the likely accompanying communications systems failure would comprise the most vulnerable populations. The emergency shelter at Hopkinton High School would have to open during lengthy events.

Debris Impacted Infrastructure

Debris impacted infrastructure regularly occurs along the Central NH Region's rivers and streams and also along roadways. Rivers or brooks flowing under bridges or through culverts could get clogged or damaged by woody material or leaves in the watercourse. Culvert maintenance is particularly important before and during heavy rainfall and floods. Tree limbs falling onto power lines and onto roadways, disrupting both electricity and the roadway, occur during wind or winter storms.

Debris Impacted Infrastructure in Hopkinton

Hopkinton's watercourses, including the Contoocook River, Blackwater River, Warner River, brooks, drainage swales, ditches and detention ponds have a tendency to **flood** their banks, **overflow culverts**, or **washout roads** during certain conditions. Trees and limbs falling on roads and power lines cause **power failure** or **road blockage**. Infrastructure in Hopkinton can refer to roadways, powerlines, utility lines, culverts, water towers, bridges or dams. These features inventoried in **APPENDIX A Critical and Community Vulnerability Assessment** are those which should be watched carefully before and after

storms and should be checked and maintained regularly to reduce the risk of significant **debris impacted infrastructure** events**. Erosion** along the Blackwater River embankments causes debris to be caught along the East Penacook Road bridge abutments which can be dangers to those workers that must remove the debris.

Transportation Accidents

Automobile accidents could occur on any roadway in the Central NH region. A major accident would have the greatest impact for travelers on I-89, I-93 and I-393 as these roads experience high traffic volume and vehicles travel at high speeds. In addition, several rail lines create the potential for a transportation accident. Many motor vehicle accidents occur at train crossings. Trains could potentially derail, causing injuries or fatalities and hazardous materials spills. In the Central NH Region, the Concord-Lincoln Line runs 73 miles between Concord and Lincoln. The New Hampshire Maine Line runs between Concord, Nashua and Lowell, MA. Several communities through which these lines travel have expressed the concern about hazardous material spills due to transportation accidents or sabotage.

Transportation Accidents in Hopkinton

Traffic accidents may be the most likely future transportation hazard in Hopkinton on I-89, the exit ramps and on-ramps, Route 9/202 and Route 103 at difficult intersections, hills, curves or straightaways with the potential for deadly accidents. Interstate 89 bisects the community and the interchanges in Hopkinton have frequent accidents. Local police are expected to respond to accidents before the State Police arrive. As vehicular traffic increases or as the weather turns bad, there is the likelihood that **transportation accidents** will occur in these and other areas.

Fire (Arson, Vehicle, Structure)

Fires which are not natural hazards are often associated with vehicles, structures or hazardous materials spills, or sometimes an explosion. These are considered **Technological Hazards**. Arson, the deliberate setting of a fire as an act of sabotage or mischief, is a **Human Hazard** but is described in this section for convenience. No magnitude scales were defined for these types of non-natural fires.

Fire in Hopkinton

The Fire Department annually reports all fires to the NH Fire Marshal's office. Over the four-year period of **2010** to **2013**, a total of **73** fires were reported in Hopkinton. Fires included wildfires, vehicle fires, structure fires, debris fires, and other types. The majority experienced were structure fires. A list of hazardous materials facilities which could cause fire or explosions in Town is available in **APPENDIX A Critical and Community Facility Vulnerability Assessment**. Also available from these **APPENDIX A** tables are a listing of vulnerable populations that are living in close quarters.

Hazardous Materials Spills

Hazardous materials and hazardous wastes contain properties that make them potentially dangerous or harmful to humans. They can be liquids, solids, contained gases or sludge. Hazardous wastes can be the by-product of manufacturing, as well as discarded commercial products. Most households contain cleaning agents that become hazardous waste when disposed of improperly. Chemicals have numerous benefits but can also cause hazards during their production, storage, transportation, use or disposal. Hazardous materials can have adverse health related effects and may even cause death in certain cases. In addition, hazardous materials may damage homes, businesses and other property, as well as natural ecosystems. Chemical accidents in plants or chemical spills during transportation may often release hazardous chemicals.

The risk from hazardous materials spills or releases into groundwater is present if consumers and homeowners make irresponsible decisions regarding the disposal of household chemicals. These household chemicals can contaminate drinking water in wells and cause damage to various ecosystems. Most people contaminate without being aware that they are doing so. Further education may be needed to reduce hazardous waste contamination.

Hazardous Materials Spills in Hopkinton

Transportation of hazardous materials on Interstate 89, through the interchanges in the community, and along Routes 9/202 and Route 103 is likely an everyday occurrence. These trucks could rollover and spill their contents onto these significant roadways. The forthcoming ***Draft New Hampshire Hazardous Material Commodity Flow Study 2015*** and its accompanying maps may provide some enlightening data the Town can use to help protect the community from spills.

There are several health care, school, manufacturing and occupational facilities in Town that handle, store, or use hazardous materials. Any of these facilities could have a spill or an incident at their location. A listing of known facilities which store or could use hazardous materials has been inventoried in **APPENDIX A Critical and Community Vulnerability Assessment**.

HUMAN HAZARD EVENTS

Events of human nature include terrorism (ecological, cyber and chemical), sabotage/vandalism, hostage situations, and civil unrest. These are often “behind the scenes” hazards that local Police Departments handle on a regular basis. These events are all caused by direct human action.

There are several types of **Human** hazards examined in the **Hazard Risk Assessment**:

- **Public Health Epidemics**
- **Terrorism**
- **Sabotage/Vandalism**

- **Hostage Situation**
- **Civil Disturbance/Public Unrest**

Human Hazards are examined by descriptions of the types of human hazards and in the **Potential Future Hazards**. Scientific measures of magnitude are not available for individual human hazards.

Public Health Epidemics

Public health issues can be measured in many ways. Students and the elderly are vulnerable to seasonal health outbreaks as they tend to congregate in large numbers and in shared environments where physical contact is common. Large groups can make bioterrorism more effective.

It is difficult to predict where an epidemic would occur due to human, mosquito and wildlife mobility. Commonly occurring epidemics following extreme heat or cold can include **influenza**, rotovirus, Lyme disease, EEE, West Nile, and any could occur in Hopkinton. The Town has swampy areas around its wetlands and brooks which are prime breeding ground for **mosquitoes**. Large deer herds that can be present do carry **deer ticks** in the Town's heavily forested Northern section and into State Forests. Water quality degradation (failing septic systems, flooding, pipes breaking) could sicken residents using the public water supply, dug wells or bedrock wells or cause aquatic and wildlife deaths.

Public Health Epidemics in Hopkinton

Reported widespread **public health** issues have occurred recently in Hopkinton and were resolved. The highest risk pick-up or transfer facilities in Town are the Hopkinton Schools, daycare facilities, the 55+ living facilities and senior programs, and the many restaurants and gathering places (see **APPENDIX A**). The same populations identified as particularly susceptible to **Excessive Heat** would be most vulnerable to public health issues and epidemics.

To help combat local and area public health issues, Hopkinton is nearby a regional Point of Distribution (POD) site at the Hopkinton High School, a location where vaccines or other medicines are provided to people during an emergency.

Terrorism

The use of force or violence against people to create fear, cause physical harm and/or intimidation or for reasons of ransom. Terrorists often make threats to create fear and change public opinion. Cyber terrorism consists of hackers who threaten the economy by attacking the intricate computer infrastructure, affecting business and communication. Biological and chemical terrorism refers to those infectious microbes or toxins used to produce illness or death in people or animals. Terrorists may contaminate food or water, thus threatening an unprotected civilian population. Eco-terrorism refers to the destruction of property by persons who are generally opposed to the destruction of the environment or to make a visible argument against forms of technology that may be destructive to the environment.

Terrorism in Hopkinton

It is unlikely that the Town would be the target of any act of international **terrorism**. Domestic terrorism has occurred within the last 15 years in Hopkinton and/or regionally. Possible targets could be the Town Hall, the Hopkinton Schools, Post Office, the Flood Control Reservoir, all governmental facilities, State facilities or churches.

Sabotage/Vandalism

Sabotage is a deliberate action aimed at someone or some institution in order to weaken that person's or institution's integrity and reputation through subversion, destruction, obstruction or disruption. Sabotage may occur in war, a workplace, in the natural environment, as a crime, in politics or as a direct attack against an individual.

Sabotage /Vandalism in Hopkinton

Any incident of **sabotage** in Hopkinton could come from within Hopkinton or any nearby Town, or outside of the State or country, but some sabotage efforts would require perpetrators to be on site. Technological systems such as computer systems at the Town Hall, utilities, telecommunications towers or the municipal water and wastewater systems could be vulnerable. Many other significant facilities in Hopkinton could be subject to sabotage. These include the major powerlines, transformers and utility substations.

Vandalism can also be present at cemeteries, vacant buildings, under bridges. While a nuisance, vandalism has a lower potential to harm than sabotage.

Hostage Situation

A hostage situation is an incident where an innocent civilian is held by someone or some group of persons demanding something from another person or group of persons not related to the person or persons being held hostage. The person or persons held are done so pending the fulfillment of certain terms.

Hostage Situations in Hopkinton

Hostage situations can occur anywhere, are isolated events and are nearly impossible to predict; none have been reported for this Plan. The Hopkinton sites where hostages could be taken include the Town Hall and other public buildings, Schools, day care facilities, banks, Post Office, workplaces, grocery and convenience stores, restaurants, high density population areas (Contoocook Village, housing communities) and in particular, domestic home situations.

Civil Disturbance/Public Unrest

This hazard refers to types of disturbances that are caused by a group of people, often in protest against major socio-political problems including sit-ins or protests against wars and any general and public

expression of outrage against a political establishment or policy. Many instances of civil disturbance and public unrest are quelled by a use of force from police. Participants may be victims of personal injury in severe cases.

The most probable locations of larger civil disturbance and/or protest in New Hampshire are at the State House in Concord and at the universities and colleges. They have also occurred at political locations, such as feminist health centers or political party headquarters.

Civil Disturbance/Public Unrest in Hopkinton

None have been reported and large scale incidents of civil disturbance and public unrest are unlikely in Hopkinton. Locally, the highest potential for **public unrest** could take place during Town Meetings and School Meetings, on voting day or during visits from political candidates, or at large events such as Old Home Day, Veteran's Parades or School graduations. Locations where civil unrest could occur include the Schools, at sporting events, Town Hall, restaurants and establishments serving alcohol, high density population areas (Contoocook Village, housing communities, residential neighborhoods), and the Police and Fire Stations.

Existing and Potential Future Hazards

After the inventory of hazards types and past hazards in Town, hazards that currently exist or that need to be monitored in Hopkinton has been completed along with potential future hazards that could occur in other areas. This unique listing of **Existing and Potential Future Hazards** was compiled so the Town can be aware of areas that might need to be watched for recurring hazardous problems or that may experience some of these hazards for the first time. The listing was developed by knowledge of the Hazard Mitigation Committee and past experiences of hazards. Past locations of hazard events, where they exist for each hazard, are listed under the individual hazard narratives in the previous section. The existing and susceptible hazard locations are taken from the **Hazard Risk Assessment**. With this existing and potential future knowledge listed side by side, it becomes easier for a community to plan mitigation measures for the most prominent hazard events in Town.

Included in **Table 25** is the **Overall Risk** score between **1-16** from the **Hazard Risk Assessment** for **16** natural hazards. The name of the magnitude or extent scale of the natural hazard is represented for ease of reference. Technological and human hazards were not rated for their **Overall Risk** to retain the importance of maintaining a natural hazard perspective for the **Hazard Mitigation Plan 2017**. **NR** stands for **Not Rated**.

Table 25

Existing and Potential Future Hazards

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
Flooding	**Floods and Flash Floods**	**6.0**	**Floodplains.** Areas prone to flooding in the Town include: Floodplains of Warner / Blackwater / Contoocook Rivers, Hardy Spring Brook, Browns Brook, Dolf Brook, Boutwell Mill Brook, Meadow Brook, Kimball Pond, Flood Control Reservoir, Clement Pond. Meadows of Hopkinton manufactured housing, Little Tooky Road residences, Contoocook Village Downtown. Runoff from roadways or heavy rain can cause floods over the Entire Town.	Hopkinton has had flash floods and flooding due to torrential rains. During these events, roads such as Sugar Hill and Thain were not passable as the U.S. Army Corps flooded these areas as part of the Hopkinton Lakes Reservoir. While flooding of small streams, streets, and low-lying areas, and storm drains are not generally threatening nor is it significantly damaging to property, Hopkinton has, on occasion, been called to evacuate residents located in the lower portion of the Meadows of Hopkinton manufactured (mobile) home park which can be impacted by the Warner River and the lower portion of the Little Tooky residential neighborhood can be impacted by the Contoocook River. Hopkinton's greatest concern is the continued potential for the need of emergency rescues and the usage of emergency shelters.	Special Flood Hazard Areas (SFHAs) on 2009 Digital Flood Rate Insurance Maps (Zones A, AE, X)
Flooding	**Rapid Snow Pack Melt**	**2.7**	**Entire Town.** Melt runoff from impervious surfaces and roadways or from tree cover and fields can cause floods over the Entire Town. Susceptible areas include: Warner River & Blackwater River, Contoocook River. Area above Hopkinton-Everett Reservoir.	Structures located on, along, or at the base of, steep slopes are most vulnerable to rapid snow pack melt. At this time, Hopkinton has had no reported impacts.	None specific known but can use SFHAs
Flooding	**River Ice Jams**	**2.7**	**Warner / Blackwater / Contoocook Rivers.** Hopkinton-Everett Flood Control Dam ice jams could endanger the bridges or dams. Sites susceptible to debris impacted infrastructure (bridges and dams) include those downstream of the Flood Control Dam.	Bridges and dams are at the highest risk of being impacted by ice jams. Rowell Covered Bridge (Maple Street over Contoocook River), Tyler Bridge (East Penacook Road over Contoocook River), Contoocook River Dam (Pine Street over Contoocook River), Contoocook River Stone Bridge (Main Street over Contoocook River), Contoocook Railroad Bridge (Main Street over Contoocook River), Blackwater Bridge (East Penacook Road over Blackwater River), and Hopkinton Everett Dam (Maple Street part of Hopkinton Lakes) all have a potential for river ice jams. Dam and/or bridge failure could have catastrophic results in Hopkinton, including loss of human life and property.	No known widely-used scale measuring the magnitude of river ice jams
Flooding	**Riverine (Merrimack, Contoocook, Blackwater) Scouring, Erosion, Channel Movement**	**5.0**	**Warner and Contoocook Rivers, Blackwater River** erosion embankments near Penacook Road bridge abutments. Floodplains of the rivers and brooks. These are the largest watercourses in the Town and run through or Route 103 and US Route 202/9.	Much of the damage from these two hazards could be expected to impact not only privately owned properties, but also public property, such as roads and bridges. The Contoocook River, Hopkinton Lakes, Blackwater River, Warner River, Deer Meadow Brook, Boutwell Mill Brook and Dolfe Brook all have a high risk of erosion and channel movement; and give rise to concerns of flooding, damage to properties, and the potential for the loss of life in these areas.	EPA Bank Erosion Risk Index
Wind	**Tornadoes**	**1.7**	**Entire Town.** Contoocook Village and other populated areas. Vulnerable populations, Schools, populated. Wooded and forested sections of Town would be difficult to access with trees and power lines down on these significant commuter routes or residential roads, Route 103, US Routes 202/9, Main Street.	The timing and locations of tornados are unpredictable, as they can happen anytime there is a thunderstorm. Within recent years, Hopkinton has not experienced tornado activity; however, the threat always remains. The greatest concern is the potential impact to life and property.	Enhanced Fujita (EF) Tornado Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
Wind	**Downbursts**	**5.0**	**Entire Town**. Along College Hill Road, which sustained damage. Contoocook Village and other populated areas. Vulnerable populations, Schools, populated. Wooded and forested sections of Town would be difficult to access with trees and power lines down on these significant commuter routes or residential roads, Route 103, US Routes 202/9, Main Street. Taller buildings, telecommunications towers, aboveground utilities particularly vulnerable.	The timing and locations of downbursts are unpredictable, as they can happen anytime there is a thunderstorm. Within the past twenty years, Hopkinton has experienced the impact of downbursts that resulted in the destruction of structures, land and utilities along Penacook, Gould Hill, Briar Hill, Pinewood, Thain, Hatfield and Sugar Hill roads. For the most part, the destruction was a result of uprooted and fallen trees. As always, Hopkinton's greatest concern is the impact that these unpredictable downbursts can have on life and property.	Enhanced Fujita (EF) Tornado Scale
Wind	**Hurricanes and Tropical Storms**	**4.0**	**Entire Town.** Areas of particular concern include dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure.	In the past, Hopkinton has been impacted by torrential rains and winds, as a result of hurricanes and tropical storms traveling throughout the east coast. For example, in 2012, heavy rain and winds from Hurricane Sandy resulted in wide spread power outages with uprooted and fallen trees. The areas impacted were not isolated at anyone location in Town. Hopkinton's greatest concern is the impact that a hurricane or tropical storm can have on life and property, with little or no advance notice to the residents or emergency services.	Saffir-Simpson Hurricane Wind Scale
Wind	**Severe Winds, Rainstorms and Thunder Storms**	**9.3**	**Entire Town.** Areas of particular concern include dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure.	The timing and locations of thunderstorms is unpredictable, as they can happen anytime with little warning. In recent years, the torrential rains caused widespread culvert failures and flooding throughout the Town. In addition, there was also widespread power outage with uprooted and fallen trees. The greatest concern is of the impact that severe winds, torrential rains and hail can have on life and property, with little notice for residents to seek shelter. It is necessary that Hopkinton remains prepared for such events.	Accuweather Thunderstorm Criteria Scale, Hail Size Scale
Fire	**Lightning**	**5.3**	**Entire Town.** Areas most susceptible include forested areas, conservation areas, open recreation fields, locations difficult to access by vehicle, points of higher elevation than surrounding area. Susceptible structures include: generators, aboveground utilities, transformers, telecommunications towers, churches and tall buildings.	All areas of Hopkinton are potentially at risk for property damage and loss of life due to lightning. The timing and locations of lightning strikes is unpredictable as it can happen with little warning. There has been no known damage from lightning in Hopkinton.	Lightning Activity Level (LAL)
Fire	**Wildfire**	**2.7**	**Entire Town.** Areas most susceptible include residential backyards, Town and State forests, Elm Brook State Park, wooded areas, recreation areas, conservation areas, open recreation fields, locations difficult to access by vehicle. Susceptible structures include: aboveground utilities, transformers, telecommunications towers.	Given the heavily forested land in Hopkinton, annually, Hopkinton's fire fighters battle brush fires that are fueled by warm temperatures, dry weather conditions and strong winds. The most recent area was the Mast Yard State Forest. While Hopkinton has been fortunate to not have lost structures as a result of the fires, Hopkinton's greatest concern is the potential for the loss of life and property, as these areas where wildfires typically begin, are remote, requiring equipment to be carried into the sites, and generally not accessible for fire vehicles.	NWCG Wildfire Classification

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
Extreme Temperature	**Severe Winter Weather, Wind Chill and Ice Storms**	**8.0**	**Entire Town.** Areas of particular concern include roof collapse anywhere, dams, bridges, vulnerable populations, Schools, assisted living or over age 55+ communities. Roadways (fallen trees), electrical power utilities, communications network, local government operations are susceptible to damage to debris impacted infrastructure. Remote areas in the Town may be more difficult to access and/or without power (including heat) for a longer period. Most vulnerable populations may be subject to cold temperature, snow isolation, transportation accidents, power failure and communications failure.	Severe winter weather can include snow, blizzards, ice storms and extreme cold. All of these events are a threat to Hopkinton, with subzero temperatures from extreme wind chill and storms causing low visibility for commuters, disruption in power, and community services. As with extreme heat, severe winter weather and ice storms can cause the vulnerable populations, such as the elderly and medically frail, to be affected as they are susceptible to hypothermia. Furthermore, individuals powering their homes with generators are subjected to carbon monoxide poisoning, if proper ventilation procedures are not followed. When necessary, Hopkinton opens emergency shelters.	NWS Windchill Index, Sperry-Piltz Ice Accumulation (SPIA), NCDC Regional Snowfall Index (RSI) for Northeast
Extreme Temp	**Drought**	**5.0**	**Entire Town / Region.** Areas susceptible include farms, orchards, tree farms. Also vulnerable are those residences with private dug wells and Town or community (serving over 25 people) water supplies. Drought means increased risk of brush fire with dry vegetation.	While Hopkinton has two public water systems (Hopkinton Village and Contoocook Village), most of Hopkinton's residents rely on private wells. For those families that are supported by public water systems, water supply and water use data is used to determine whether there is a potential for drought to occur or to continue. This assists in supporting decisions related to use and, if necessary, the allocation of water during periods of drought conditions. In recent years, it has been reported that residents with private wells around Bound Tree and Burnham Intervale roads have had their wells go dry. However, we are unaware of the type or year of construction of these wells, whether drilled or dug. In some cases, residents had new wells installed, connected to the Contoocook Village Precinct water system, or just waited for rain, so that their wells could replenish. Hopkinton's concerns with drought conditions include the impact on farmers' crops and livestock, potential for wildfires, and of course, the impact on residents that rely on drinking water from use of private wells.	Palmer Hydrological Drought Index (PHDI)
Extreme Temp	**Excessive Heat**	**4.0**	**Entire Town.** Vulnerable populations most susceptible to extreme heat include: all Schools and daycare, those populations in Appendix A. Shelters may need to be opened as cooling centers during extended heat conditions.	Extreme heat is an occasional and short-lived event in Hopkinton. While there have been no extended periods of extreme heat in Hopkinton, all areas of Hopkinton would be affected by extreme heat, in its event. Particular areas and populations at a greater risk are the elderly and young children. Additionally, power systems may become overburdened, which would in turn negatively affect communications.	NWS Heat Index
Earth Hazards	**Earthquake**	**3.0**	**Entire Town.** The Central NH Region is seismically active and earthquakes are regularly felt from area epicenters. Damage to utility poles and wires, roadways and infrastructure (water and waste water treatment facilities, bridges, dams) can be significant. Areas with underground utilities, community water systems, cisterns, old buildings, Contoocook Village and	While New Hampshire rarely experience earthquakes, to date, they have not been of a high magnitude to cause significant damage. Should there be such a high magnitude earthquake the concern would be with the aging structures in Town and its impact of destruction it would have on life and property. The new Fire Station & Highway DPW Garage were built to earthquake standards, as was St. Methodios and any building built since 2011.	Richter Magnitude Scale

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
			wooden covered bridges are particularly susceptible.		
Earth	**Landslide**	**2.0**	**Slopes greater than 15%** (few if any locations in Town noted). Roads with steep ditching or embankments are most vulnerable to landslide. River and brook banks can also slide, usually known as erosion: Contoocook River, Blackwater River, Warner River.	Hopkinton has not experienced landslides. Due to its topography, Hopkinton does not appear to be influenced by this condition.	No known widely-used scale measuring the magnitude of landslides
Technological	**Dam Failure**	**6.0**	**Areas downstream of Dams with a High or Significant hazard classification** that if failed, could present a problem to those downstream or directly nearby. Areas particularly susceptible include: Meadows of Hopkinton manufactured housing, Little Tooky Road residences, Contoocook Village Downtown. Damage from Hopkinton Flood Control Dam, Flood Control Spillway (Hopkinton-Everett Reservoir), Elm Brook Dam, Hoague Sprague Dam, Contoocook Village Dam, Kimball Lake Dam.	In recent years, Hopkinton has had one dam failure, due to a blocked overflow pipe located at Dolfe Brook. In this situation, Hopkinton was fortunate that the culvert pipes could handle the excessive water. The greatest concern is the possibility of the Hopkinton Everett Dam failing, which would be catastrophic to the Village of Contoocook as it could result in the loss of life and property.	NHDES Dam Hazard Classification *either/or criteria* **Dam Failure causes flooding and therefore is included as natural in this instance*
Technological	**Power/ Utility Failure**	NR	**Entire Town. S**ites and areas most susceptible include: vulnerable populations (Appendix A). Wooded, forested and more remote sections of Town would be difficult to access. Trees and/or power lines down on these routes or residential roads would be problematic and include: Route 103, US Routes 202/9, Interstate 89.	Many residents and businesses in Hopkinton are unprepared for the disruptions caused by power/utility failure. While the majority of the power/utility failures from Eversource Energy and Unitil last only a few hours, some power outages have lasted many days, due to the magnitude of the wind and ice that have taken power lines down. The most recent memorable storm was Thanksgiving week of 2014. In this case, most residents had no power and therefore, no means to keep warm. For those that were not fortunate to be able to stay with family/friends, Hopkinton opened its emergency shelter located at the Hopkinton Middle/High School.	N/A
Technological	**Communications Systems Failure**	NR	**Entire Town.** Sites and areas most susceptible include: Appendix A facilities, telecommunications tower. Telephone and cable lines often go down with power. Communications failure would be worse if it occurred at the Fire and Police Depts, Public Works Department or Town Hall, especially during a holiday, or if power failure inhibited emergency dispatch and EOC operations.	The result from power failure includes a loss of landline communications capability by residents and first responders, which in turn, negatively impacts public safety. Backup systems such as portable and mobile phones are necessary for Hopkinton's emergency responders to communicate during disasters. This equipment is used daily and allows for the emergency responders to remain in contact with the Capital Area Mutual Aid Fire Dispatch and Merrimack County Dispatch. Furthermore, this equipment allows those emergency responders to communicate, in the event of an emergency, also with Hopkinton's Public Works Department.	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
Technological	**Transportation Accidents**	NR	**Interstate 89 and exit ramps, Route 9/202, NH Route 127, local Class V roads**. See Map 4 for regular accident locations - at certain intersections, curves, straightaways, hills.	Traffic accidents and traffic congestion is most prominent in the Contoocook Village area where banks, restaurants, and shops are located and where Route 127 and Route 103 intersect. Hopkinton residents, however, are accustomed to this type of congestion, and accidents resulting from these traffic events are low impact. Traffic accidents that are life threatening typically occur along Route 202/9 (Hopkinton/Henniker town line) and Interstate 89, where vehicles are traveling at much higher speeds. Traffic associated with commuter hours during the weekdays has the most significant traffic events. Poor winter conditions are another cause for vehicular accidents on any road.	N/A
Technological	**Debris Impacted Infrastructure**	NR	Most **prominent dams and bridges** that could experience debris impacted infrastructure included in Appendix A. Culverts that regularly washout (including those in need of upgrade) include: Dolph Brook and the culvert replacement Table in the Plan. **Prominent roadways - routes I-89, Route 103, Routes 202/9,** commuter roadways or residential roads that are commonly blocked or that would impact the greatest number of people if blocked by downed trees or power/utility lines.	Bridges, culverts and related roadways are most vulnerable for debris impacted infrastructure. If flooding occurs in the Town of Hopkinton, there is the potential for debris impacted infrastructure to cause damage. Vegetative debris, including silt and soil, will most likely be the main source of debris impacted infrastructure.	N/A
Technological	**Hazardous Materials Spills/ Radiological Accidents**	NR	**Entire Town.** Most significant routes where vehicular traffic transports hazardous waste include: Vehicular traffic Interstate 89 and exit ramps and interchange, Route 9/202, NH Route 127. Homes, businesses, vulnerable populations along the transportation routes could be vulnerable. Largest or most dangerous stationary sites that store and/or handle haz mat on site include those in Appendix A. Also, sites those that store fertilizer, pesticides, fuel, etc. Occupational haz mat sites where spills could occur include: medical facilities, Schools, manufacturing, etc.	Within the past five years, Hopkinton has had to respond to a propane leak at the Harold Martin School located off Main Street in Hopkinton Village, vehicle accidents involving fuel, including a fueling truck, off I-89, and the most recent was a boat fire on Lake JoSylvia (Clement Pond). While Hopkinton has the Central NH Hazmat Team readily available for Type A incidents, Hopkinton lacks the necessary equipment and training certifications to adequately address hazardous material spills. Knowing how to react when an incident occurs can minimize the required cleanup efforts and the potential impact to life and property.	N/A
Technological	**Public Health Epidemics**	NR	**Entire Town.** Areas or sites most vulnerable to exposure to and transfer of illness include: Schools, health clinics, eating establishments, populated areas, large employers, senior apartments, stores and public assembly venues (see Appendix A). Also, programs with public outreach such as: Meals-on-Wheels, VNA, senior and recreational programs, etc.	Hopkinton has dealt with a public health epidemic when Hepatitis A was found to have been transmitted to the public at a local restaurant. The Town should remain prepared to for a town wide epidemic as well as a regional epidemic as Hopkinton Middle/High School serves as a Point of Distribution (POD) for Hopkinton and several area towns. Working in cooperation with the Concord Area Public Health Network (CAPH) the town should remain prepared for an epidemic situation should one occur.	
Human	**Fire (Vehicle, Structure, Arson**	NR	**Entire Town.** Areas most susceptible include: Contoocook Village, Main Street area and other populated areas. Vacant foreclosure homes or seasonal buildings in the Town and buildings in densely populated areas	In Hopkinton, most structure fires are occur from chimney fire or electrical fire; however, in 2012, the Hopkinton Public Works Garage was totally destroyed by a fire that had started as a result of a vehicle fire. The most recent residential fire was in 2015, at a residence on Main Street in Contoocook Village which was	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
			or residential manufactured home communities. Vehicle fires could occur anywhere, parking lots, driveways, roadways.	destroyed by an electrical fire. Hopkinton is made up of many large homes that were built in the 1700's - 1900's. The type of construction, such as "balloon construction" along with the dated electrical wiring, increases the risk of a large structure fire, requiring the use of mutual aid towns, to assist in the suppression of these fires. Hopkinton Fire/Rescue has responded to vehicle fires, which mostly occur along I-89 or just off the highway off ramp at Exits 5 and 6. In a few cases, Hopkinton has responded to vehicle fires, due to accidents, that resulted in the loss of life. As always, Hopkinton's greatest concern is with the potential for loss of life, property and injuries to emergency responders.	
Human	**Terrorism**	NR	**None likely.** Most susceptible sites could include: Town Hall, Hopkinton Schools, Post Office, Flood Control Reservoir. Also communication towers, major employers (especially those with large quantities of haz materials), health clinics, grocery or convenience stores, restaurants, high volume roadways, water supply infrastructure or dams, Post Office, all governmental facilities, state facilities, political offices or rallies, churches, etc.)	All communication facilities and government and municipal facilities are vulnerable to terrorism. This is a relatively new threat that must be addressed through training and equipping of local emergency response personnel in cooperation with state and federal agencies. It is essential that staff identify and thoroughly understand specific procedures to follow in the event of an attack.	N/A
Human	**Sabotage/ Vandalism**	NR	**Utilities or Town Property.** Sabotage would be most likely to occur Town computer systems & website, Town buildings, utilities, dams, water supplies, water and waste water treatment facilities, cemeteries, vacant buildings, under bridges.	The most vulnerable assets for tampering or sabotage with the potential for the largest destruction are the water systems in Hopkinton Village and Contoocook Village. These systems provide drinking water to a number of families in both Villages. Any tampering or sabotage of these water systems could produce, in the worst case, significant loss of life and/or public health and safety consequences. While vandalism occurs in Hopkinton, its impact is minimal.	N/A
Human	**Hostage Situation**	NR	**None likely.** Hostage situations are isolated events. Locations where hostages could be taken include: Town Hall and other public buildings, Schools, banks, Post Office, workplaces, grocery and convenience stores, restaurants, high density population areas (Contoocook Village, manufactured housing communities, apartment buildings), domestic home situations.	The Municipal buildings, banks, public and private schools are most susceptible to someone being seized or kidnapped. These types of events, though isolated, may occur at any assembly or domestic situation and are nearly impossible to predict. It is the Town's policy to address hostage situations using all resources necessary to end the crisis peacefully. However, if circumstances warrant, authorized officials shall use whatever force is both reasonable and necessary to protect the community or any citizen from harm.	N/A

Hazard Risk Assessment Hazards		Overall Risk	Hazard Locations in Town – Existing (Susceptible) From Hazard Risk Assessment	Potential Future Hazards	Magnitude/ Extent Measure-ment Scale
Human	**Civil Disturbance/ Public Unrest**	NR	**None likely**. Locations where civil disturbance could occur should be limited. Occasions include: Town Meetings, voting day, during visits from political candidates, sporting events, large events such as Old Home Day or Veteran's parades, school graduation. Locations include Schools, recreational fields, Town Hall, stores, restaurants, establishments serving alcohol, high density population areas (Contoocook Village, manufactured housing communities, apartment buildings), Police and Fire stations, health clinics.	Protests or demonstrations may occur at any of the public facilities. Generally, the events would initiate outside of the community. There is no real threat to the Town for public unrest. The Town's policy regarding the matter is to protect life, property, and the rights of all citizens while preserving order.	N/A

Source: Hopkinton Hazard Mitigation Committee

Although there are many potential hazards in Hopkinton's future, the community is knowledgeable about where some of the worst occurrences might result with this descriptive **Potential Future Hazards** inventory. A comprehensive, specific community facility inventory that indicates each site's ***Primary Hazard Vulnerabilities*** is found next in **5 COMMUNITY VULNERABILITY ASSESSMENT**.

Hopkinton's Built Environment Changes Since the 2011 Plan

The locations of where people and buildings are concentrated now or where new lands may be developed should be compared to the changing locations of potential natural hazards in order to best mitigate potential property damage, personal injury or loss of life. The overall vulnerability of the Town to natural disasters is believed to have increased with the population and development increases.

AREAS OF HIGHEST DENSITIES

The highest density of population in Hopkinton is found in Contoocook Village along Main Street, Maple Street, Park Avenue, Kearsarge Avenue and Pine Street. This area contains a small business center and many homes. Residential land uses are scattered throughout the community, with greater concentrations located in areas east of I-89. Technological hazards like **transportation accidents** or natural hazards like **severe winter weather** may be the greatest threats to the population living along major transportation routes or backwoods Class V and VI roads.

Changes Since the 2011 Plan

The areas of highest density in the community at large have not changed. Contoocook Village, Main Street, and areas near I-89 have remained the same. Although businesses may change, they often reuse the existing buildings and locations which is more common than completely new facilities. New subdivisions with lots for sale have not yet created new neighborhoods that have greatly increased densities of existing areas. The religious camp on Camp Merrimac Road has a capacity for just over 200 overnight guests which could prove difficult to evacuate in case of wildfire or if any Town-wide hazard events (**snowstorm**, **severe winds**, **thunderstorms & rain**, **power failure**) occurred in Hopkinton during one of the camp's events. The large, isolated facility could also be subject to **public health** issues, **lightning, sabotage/vandalism**, **terrorism**, **arson**, or other types of site-specific hazard events.

VULNERABLE POPULATIONS

The Contoocook River runs through Hopkinton in a general west-east pattern. Since much of Hopkinton's overall compact development is located in Contoocook Village, it is vulnerable to the impacts of **flooding** and most of the homes this area are located in the floodplain. Interstate I-89 bisects the Town in a general north-south direction. **Transportation accidents** on I-89 could inhibit the ability of people to travel or could result in secondary impacts to residents and businesses.

People living in higher areas which are not located on main travel routes or susceptible to **flooding** have the potential to be isolated from emergency services due to **traffic blockages, ice**, **heavy snow**, or **fire**. The relatively undeveloped southeastern and northeastern portions of Town may encounter these difficulties in a disaster.

Changes Since the 2011 Plan

St. Methodios Faith and Heritage Center is a religious facility and camp where more than 200 people can be accommodated overnight. Hazard events to which the facility is most vulnerable include **wildfire**, **accidental fire**, **severe winds**, **winter weather**, **public health**, **terrorism**, **sabotage/vandalism**, **lightning**, **power failures**, **arson,** and other **human hazards**. The Town continues to host several manufactured housing parks, The Meadows (75 homes), Deer Meadow (50 homes) and Elm Brook Village (30 homes). Other vulnerability populations are still the Hopkinton Schools, Little Tooky Area camps (25 homes), Sandy Beach Family Campground (100 sites). Two independent schools, Beech Hill School and Contoocook School (NFI North) also contain younger populations of children for large portions of the day. Vulnerable populations are particularly susceptible to **evacuation problems**, **public health** issues, **human** and **technological** hazards, as well as **all of the natural hazards**.

FUTURE DEVELOPMENT IN HOPKINTON

Since 2011, several Planning Board subdivisions have been approved for new lots to build out. Presently, they are all residential developments including Granite Valley at Kearsarge Avenue (3 of 5 lots remain), Wildwood at Kearsarge Avenue (13 of 15 lots remain), West Ridge Circle at Clement Hill Road (1 of 12 lots

remains), White Tail Run at College Hill Road (2 of 7 lots remain), and the new Annie Gunn and Railway Drive development at Clement Hill Road and Pine Street which is undeveloped to date but may consider the option of reverting to a single parcel of land in the future.

Future development in the rural areas may require that roadways be built to specifications that would be less vulnerable to **flooding**. The secondary technological hazards of **power failures** and **communications failures** are often due to **ice**, **snow** and **wind** damage. The primary concern for new development in rural areas is potential **isolation** in emergency situations and the **inability to evacuate**.

Changes Since the 2011 Plan

Although over the last five years the Town's population growth was greater than **4%** and housing growth was about **8%**, land was sold and subdivided in preparation for possible rising markets.

All over the community, small vacant or forested residential lots are for sale for single residential home development. Three lots for sale have development potential; one large lot of over 100 acres on Bound Tree Road, one lot of 35 acres at Tyler Road and East Penacook Road, and a 10-acre lot on Patch Road. The remaining lots for single family homes include Wildwood and White Tail Run lots, lots on Upper Straw Road, and various other under 5-acre lots with no additional development capability. **Wildfire**, **severe wind hazards** and **severe winter weather** (contributing to the **secondary technological hazards**) would be the most common issues.

There are many significant impediments to new development. Most large lots are in conservation easements (in perpetuity), current use (subject to conversion penalties), agricultural use, are owned by the Town of Hopkinton or are owned by the federal government US Army Corps of Engineers. Significant **wetlands subject to mild flooding**, topographic impairments (including potential **landslide**) and flowage rights are barriers to development. **Radon** is an issue in the State of New Hampshire, to which the entire Town may be vulnerable. All may be susceptible to **fire** hazards because the homes, often on cul-de-sacs with one egress, are close to one another in wooded areas. Existing concerns of **limited emergency access** will remain as remaining lots in Town are sold and built.

5 COMMUNITY VULNERABILITY ASSESSMENT AND LOSS ESTIMATION

The Hazard Mitigation Committee developed and/or updated as needed each of the assets tables within this Chapter. Sites were added or removed, and contact information was revised. Modifications were made to the ***Primary Hazard Vulnerability*** column to reflect changes over the last five years. Revisions were made to the future development section, which now includes a clear table. The Plan's maps were also updated from the **Hopkinton Hazard Mitigation Plan 2011**.

The identification of Critical and Community Facilities within Hopkinton is integral to determining what facilities may be at risk from a natural disaster. Every Critical and Community Facility can be damaged by multiple hazards listed in **4 HAZARD RISK ASSESSMENT**. A tabular inventory of facilities in Hopkinton is provided in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**. The ***911 Street Address*** and ***Phone*** number of each facility is supplied, the assessed ***Structure Replacement Value $***, and the ***Primary Hazard Vulnerabilities*** to which the facility is most susceptible are listed. The hazards identified are primarily natural disasters but regularly include the technological (and secondary disasters) such as power failure and communications systems failure as well as human hazards such as vandalism/sabotage.

Most sites appear on ***Map 3: Critical and Community Facilities*** and ***Map 4: Potential Hazards and Losses.***

Potential dollar losses for each of the facilities' ***Structure Replacement Value $*** (not land) have been obtained through the February 2015 Avitar Appraisal System assessments to provide a starting point of the financial loss possible should these structures become damaged or require replacement. These community facility losses are estimated for the value of structure and does not include land (unless indicated), contents, or infrastructure.

Problem Statements were then generated for each type of facility when issues were identified by the Hazard Mitigation Committee during discussion of the facility characteristics and ***Primary Hazard Vulnerabilities.*** These **Problem Statements** are listed here.

Potential dollar losses to buildings in the Hopkinton from flooding and other natural hazards are provided using the methods described in the chapter. The Town's participation in the National Flood Insurance Program (NFIP) offers a way for individuals to obtain insurance coverage for flooding. The Town's history with NFIP claims and repetitive losses are examined.

The Chapter provides an inventory of the community facilities and critical facilities and the most prevalent hazards to which they are vulnerable. Potential structure damage loss is also provided. The detailed information is available in **APPENDIX A Critical and Community Facilities Vulnerability Assessment**:

Facility Name	Street Address (911)	Phone	Structure Replacement Value* $	Primary Hazard Vulnerabilities

Critical Facilities

Critical facilities are categorized as those town or state buildings or services that are first-responders in a disaster. The Fire Department, Police Department, Public Works Department, and Town Offices are crucial in providing and coordinating the emergency services. Other critical facilities would include educational facilities, hospitals, and emergency shelters. Utilities or utility features, such as cisterns, culverts, dry hydrants, pump stations, water and sewer lines, and electric transmission lines are included because of communication and power/water services provided.

Many such facilities are located in Hopkinton. The assessed structure/building only value is provided for each facility where available, otherwise estimates are provided to help ascertain the financial impact a disaster can have on the community. To view the detailed Critical Facilities sites and tables, see **APPENDIX A**. Most of these critical facilities sites appear on ***Map 3 Community and Critical Facilities***.

Essential Facilities include: Hopkinton Fire Department (Contoocook), Hopkinton Fire Station (Hopkinton), Hopkinton Rescue Squad, Hopkinton Police Department, Hopkinton Town Hall, Town Clerk/Tax Collector (Bates Building), Public Works Garage, Water Wastewater Treatment Plant, Contoocook Village Water Precinct (Water Plant), Hopkinton Water Precinct (Facility), School District (SAU #66), and Transfer Station. Assessed structure (only) replacement values for these essential facilities total **$9.8m**.

Utilities include: TDS Telecom Utility (All lines, poles & substations), Multiple TDS Switching Stations, Eversource Power Utility (All lines, poles & substations), Eversource Power Substation, Hopkinton Hydro Plant (Town Dam),Army Corps of Engineers Offices, Waste Water Pumping Station, Contoocook Water Precinct Tank and Pump Station, The Meadows Water Pumping Station, Deer Meadows Water Treatment Facility, Dry Hydrant (Town), several Dry Hydrants (Town), Fire Pond (Deer Meadows); Telecommunication Towers: (TDS) FD Lead Tower, ETS/Eastern, Colocation AT&T Stonynook Farm Silo, American Tower, U.S. Cellular), and Verizon; and a Community Well. Assessed values for all utilities in Town total **$27.3m**

Dams include: High Hazard Dams of D121.019 Hopkinton Flood Control Dam (USACOE) and D121.020 Hopkinton Dike Elm Brook H2 (USACOE); Significant Hazard Dams of D121.001 Hoague Sprague Dam (Enel Green Power NA Inc) and D121.028 Hopkinton Sewage Lagoon (Town); Low Hazard Dams of D121.002 Contoocook Village Dam (Town), D121.004 Grassy Pond Dam (NH F&G), D121.008 Kimball Lake Dam (Town), and D121.009 Drew Lake North Outlet (USACOE). The remaining **24** dams are Non-Menace classified or are exempt from classification. Estimated structure (only) repair values for these dams total **$15.5m** but more realistic costs of Flood Control Dams repair would add an unknown additional amount.

Bridges include: **7** Town bridges and **21** State bridges. Estimated structure (only) rehabilitation values for these bridges total **$47.6m**.

Shelters, Schools, and Medical Facilities include: Hopkinton High School (POD & Shelter), Maple Street School, Harold Martin School, Beech Hill School (Independent 6-8), Contoocook School (NFI North), Family

Tree Health Care, Apple Tree Animal Hospital, Dr. Bruce Trivellini DDS Dentistry, and Dr. Pamela Weitzel DMD Dentistry. Assessed structure (only) replacement values for these schools, medical facilities and shelters total **$19.8m**.

PROBLEM STATEMENTS

During discussion of these Critical Facilities, the Hazard Mitigation Committee identified specific issues or problems that could be further evaluated. **Problem Statements** were developed after ascertaining the ***Primary Hazard Vulnerabilities*** to the sites and known existing issues. These potential hazards were typically those from the **Hazard Risk Assessment**.

- No emergency power at Town Office or Transfer Station.
- Historic documents are located in the basement of the Bates Building and are unprotected from water (mold) and fire.
- Wastewater Treatment Plant requires a new roof and ventilation.
- The Town Hall needs a generator in the event of extended power outages.
- TDS telecommunications tower is readily accessible to the public with no security systems.
- In all Town schools, serious security system issues were identified. A plan is being developed to evaluate human hazards, to be completed after 2016.

Many of these problem statements were developed into Actions discussed later in **7 POTENTIAL ACTION EVALUATION** and **8 MITIGATION ACTION PLAN**.

A table of culverts which are in need of upgrade does not appear with the **Community Facility Vulnerability Assessment** but is included here within this section. Culverts are responsible for carrying volumes of water safely under roadways, and with the prior severe flooding events it is necessary to keep Town infrastructure in adequate condition. **Table 26** displays the condition of culverts in need of upgrade and approximately when the upgrades can occur. The approximate cost for replacement of all these culverts is **$1m**.

Table 26

Town-Owned Culverts in Need of Upgrade

Road Name of Culvert(s)	Number of Culverts	Intersecting Water	Issue(s)	Estimated Upgrade Year	Total Approx. $ Cost for All
Briar Hill Rd.	4	Dolf Brook	Failing	2017	700,000-1,000,000
Rollins Rd.	1	Dolf Brook	Failing	2017	$60,000
Broad Cove Rd.	1	Dolf Brook	preventative	2018/2019	$300,000
Stickney Hill Rd.	1 Bridge	Boutwell Mill Brook	Failing	2017	$300,000
Kearsarge Ave	1	Browns Brook	preventative	2018/2019	$200,000
Bound Tree Rd.	1	Hardy Springs Brook	preventative	2018/2019	$150,000
Various Roads	multiple	run offs	Failing	continuous	10,000-30,000
Totals	**9+**				**$1,010,000**

Source: Public Works Department 2016

A listing of the necessary upgrades to culverts in the community can help begin formulation of a culvert upgrade and maintenance plan. Knowing the location and condition of all culverts to help guide their replacement, maintenance, and monitoring regularly will help alleviate some of the run-off and overtop flooding conditions in Hopkinton, particularly those related to washouts.

Some of the culverts listed in **Table 26** have been developed into **Mitigation Action Plan** items in **8 MITIGATION ACTION PLAN**.

Community Facilities

The Community Facilities inventoried in **APPENDIX A** generally vulnerable to disasters and in need of careful consideration. Some facilities are vulnerable populations, places where people gather, the economic assets of the community, contain the history of the town, or could release hazardous materials during hazard or disaster events. While Critical Facilities are strong with emergency preparedness and mitigation measures, Community Facilities are typically not as well attuned to these issues and would require more emergency services during a hazard event disaster.

Vulnerable Populations include: The Meadows – Manufactured Housing (~75 homes), Park Avenue 55+ Independent Living (~30 apartments), Deer Meadow Manufactured Housing Park (~50 homes), Little Tooky Area (~25 camps transitioned into homes), Sandy Beach Family Campground (~100 sites), Elm Brook Village Manufactured Housing (~30 units), St. Methodios Faith & Heritage Center (Camp Merrimac) (200+ beds), Smithfield Condominiums (~12 units), Boys & Girls Club. Assessed structure (only) replacement values for these vulnerable populations total **$20.0m**.

Economic Assets include those businesses and services that employ a large number of people or contribute to the local economy. They include: Milton – CAT, McLane North East (Distribution Center), Yankee Book Peddler, and Park Ave Plaza (Groceries, Pharmacy, Laundry, Therapist). Assessed structure (only) replacement values for these economic assets total **$14.5m**.

Cemeteries and Churches include: St. Andrew's Church, Countryside Community Church, United Methodist Church, First Congregational Church, Blackwater Cemetery, Clement Hill Cemetery, Contoocook Village Cemetery, New Hopkinton Cemetery, Old Hopkinton Cemetery, Putnam Cemetery, Stumpfield Cemetery, Hardy Cemetery, Putney Hill Cemetery, Hues/Wilson/Koch Cemetery. As cemeteries do not contain structures, the land value was provided instead where available. Assessed structure replacement or land values for these cemeteries and churches total **$5.0m**.

Hazardous Materials Facilities in Town are often major employers too and may or may not be Tier 2 facilities. They include: Sunoco Gas (Mr. Mike's), HR Clough, Inc., and Mobil Gas (Contoocook Auto Clinic). Assessed structure (only) replacement values for these hazardous material facilities total **$1.8m**.

Historic Sites and Buildings include: Hopkinton Historical Society (William H. Long Memorial Building); Rowell Covered Bridge (Town); Contoocook Railroad Depot; and Contoocook Railroad Bridge (NH Div. Historical Resources). Assessed structure (only) replacement values for these historic sites total **$2.0m**.

Recreational and Gathering Sites of both land and buildings include: Hopkinton Fairgrounds, American Legion, Kearsarge Lodge #23 IOOF, Elm Brook State Park, Kimball Pond (Town), Duston Country Club, Houston Fields (Town), Slusser Senior Center, Town Library, George's Park (Town), Kimball Lake Cabins, Bandstand/Gazebo, Gould Hill Apple Orchard, and Beech Hill Farm Stand & Ice Cream Barn. Assessed structure and land value for these recreational facilities total **$6.2m**.

Future Development includes mostly residential development potential as most of the land in Hopkinton is forested or zoned residential. Approved Planning Board developments yet to be built total **$2.9m** for land value only. Assessed lots for sale total **$2.0m** for land value only.

PROBLEM STATEMENTS

During discussion of these Community Facilities, the Hazard Mitigation Committee identified specific issues or problems that could be further evaluated. **Problem Statements** were developed after ascertaining the ***Primary Hazard Vulnerabilities*** to the sites and known existing issues. These potential hazards were typically those from the **Hazard Risk Assessment**.

- Little Tooky septic systems pose a public health hazard as lots are too small and close to the river to support a septic system safely.
- About 20 neighborhoods have limited access on cul-de-sacs, they only have 1 way in and 1 way out.

- The Town has limited availability of goods and services available for purchase and consumption during an emergency.
- A large-scale evacuation has a potential for traffic congestion and vehicular accidents.
- Many historic sites are in the floodplain.
- The Town may not have an evacuation plan for large scale events.
- Potential for civil disturbances when large crowds gather.
- Generally, most sites do not have town water or town sewer, making development of residential, commercial or manufacturing more expensive.
- Generally, any significant development would require substantial town road improvements, including widening of existing roads, installation of bridges or culverts.
- Wetlands and slope impairments would inhibit development. Access to major highways is limited.
- Obtain Dam Emergency Plans of Low, High, and Significant Dam Hazard Classification dams to understand the problem of potential dam breach.
- Establish communication between dam owners and the Town regarding potential issues, maintenance problems with the dam, or water level rise.
- Bridges have been used by people for jumping into the waters below, for recreation.
- Traffic accidents are prevalent on all bridges.

Many of these problem statements were developed into Actions discussed later in **7 POTENTIAL ACTION EVALUATION** and **8 MITIGATION ACTION PLAN**.

Potential Losses from Natural Disasters

Natural disasters, including floods, wind events, severe winter storms and ice storms, secondary disasters as a result of the natural disasters (such as power loss) and to a lesser degree, human and technological hazards as documented in **4 HAZARD RISK ASSESSMENT** have occurred in Hopkinton This section estimates Town-wide structure/building damage in Town from natural hazard events. It is difficult to ascertain the amount of damage caused by a hazard because the damage will depend on the hazard's location and magnitude, making each hazard event somewhat unique. Human and technological hazards are typically even more incalculable. Human loss of life was not included in the potential loss estimates for natural hazards, but could be expected to occur, depending on the severity of the hazard.

While this Plan focuses on being pro-active in those geographic areas of Hopkinton most prone to recurring hazards (like flooding), some initial estimates of measurable property damage and building damage have been discussed by utilizing simple techniques such as the numbers of structures and assessed valuation. This two-dimensional approach of calculating dollar losses from tangible structures offers a basic yet insightful tool to begin further loss estimation analyses.

TOOLS FOR COMMUNITIES WITH GIS

For gauging more three-dimensional estimation of damages, FEMA has developed a software program entitled HAZUS-MH (for multi-hazard), which is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest Geographic Information Systems (GIS) technology to produce estimates of hazard related damage before, or after, a disaster occurs. Developed for ARCGIS which produced the ***Maps*** for this Plan, HAZUS-MH takes into account various effects of a hazard event such as:

- Physical damage: damage to residential and commercial buildings, schools, critical facilities, and infrastructure;
- Economic loss: lost jobs, business interruptions, repair and reconstruction costs; and
- Social impacts: impacts to people, including requirements for shelters and medical aid.

Federal, State and local government agencies and the private sector can order HAZUS-MH free-of-charge from the FEMA Distribution Center. Hopkinton should first ascertain whether a municipal geographic information system (GIS) of hardware and software is appropriate, and if so, consider training staff to perform models. With many Town existing and under-development infrastructure GIS data layers available, HAZUS-MH could prove very helpful for estimating losses for the community on a disaster-specific basis. However, much staff time is necessary to train staff and maintain a GIS system. Official map generation is typically subcontracted out to other agencies now, including Avitar Assessing and the Central NH Regional Planning Commission.

METHODS OF POTENTIAL DOLLAR LOSSES BY NATURAL HAZARDS

A more manageable technique was used for loss estimation for the purposes of this **Hazard Mitigation Plan Update**. Natural hazard losses are calculated based on dollar damage ranges over the entire community, or in the case of flooding, buildings in the Special Flood Hazard Areas (SFHAs) are counted and their value is collected. The number of total parcels in the community as of February 2015 is **3,237**. **Using February 2015 Avitar assessment data, the total assessed value of all residential and non-residential structures in Hopkinton (**$442,433,700**) is the basis for loss estimation calculations.**

Potential Building Dollar Losses by SFHA Flooding

Parcels within the floodplain were identified using Hopkinton's 2015 tax maps concurrently with the 2010 FEMA Digital Flood Insurance Rate Maps (DFIRMs). Next, parcels containing buildings were identified using the Town tax assessor's database for the Town. Building type was characterized into one of four categories. The categories are single-family homes, multi-family homes, manufactured homes, and non-residential buildings. Building value was taken from the assessing database. ***Land value and building content value were not considered in these calculations.***

Table 27

Building Value in the Special Flood Hazard Areas (SFHAs)

Building Type	Number of Buildings	Total Value of Buildings	Average Replacement Value
Single Family Homes	15	$1,244,100	$82,940
Multi-family Homes	0	$0	$0
Manufactured Homes	1	$48,400	$48,400
Non-Residential Buildings	1	$79,900	$79,900
Totals	**17**	**$1,372,400**	-----

Sources: Town of Hopkinton Avitar Assessing System 02-18-15; 2010 DFIRMs

In Table 27, **15** single family residential homes, **0** multi-family homes, **1** manufactured home, and **1** non-residential building were considered to be situated the Special Flood Hazard Areas (SFHAs). The average replacement value is **$83,000** for a single-family home, **$48,000** for a manufactured home and **$80,000** for a non-residential building. The total value of all buildings in the Special Flood Hazard Areas is about **$1.4m** for the **17** structures.

In the following calculations, the average replacement value was calculated by adding the assessed values of all structures in the special flood hazard areas and dividing by the number of structures. The Federal Emergency Management Agency (FEMA) has developed a process to calculate potential loss for structures during flooding. The potential loss was calculated by multiplying the average replacement value by the percent of damage expected from the hazard event, and then by multiplying that figure by the number of structures.

The costs for repairing or replacing infrastructure such as bridges, railroads, power lines, roads, drainage systems, telephone lines, or natural gas pipelines, and land value and the contents of structures have not been included in these estimates in the following figures.

Table 28

Dollar Damage Ranges for Total Buildings in Special Flood Hazard Areas (SFHA)

Building Type	Total Value of Buildings in SFHA	Total Value of Potential Damages in SFHAs by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	**$1,244,100**	$609,609	$348,348	$248,820
Multi-Family Homes	**$0**	$0	$0	$0
Manufactured Homes	**$48,400**	$23,716	$13,552	$9,680
Non-Residential Buildings	**$79,900**	$39,151	$22,372	$15,980

Sources: Town of Hopkinton Avitar Assessing System 02-18-15 (See Table 27); FEMA

Table 28 represents the worst-case scenario of *all* single-family homes, multi-family homes, manufactured homes, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event.

If all **15** single family homes were damaged by a ***Two-Foot Flood (20% Damage)***, the dollar damage to the buildings *only* could be **$249,000** while an ***Eight-Foot Flood (49% Damage)*** could yield **$610,000** in damage. All, or in this case the single (**1**), manufactured home experiencing this ***Two-Foot Flood (20% Damage)*** could be damaged **$9,700** and could be damaged **$24,000** by an ***Eight-Foot Flood (49% Damage)***. All, or in this case the single (**1**), non-residential building in the SFHA damaged in the same ***Two-Foot Flood (20% Damage)*** could total **$16,000** versus an ***Eight-Foot Flood (49% Damage)*** of **$39,000** in damage. Dollar damage estimations vary per the standard percentages of damage levels associated with flooding le4vels set by FEMA.

Table 29

Dollar Damage Ranges for Individual Buildings in Special Flood Hazard Areas (SFHA)

Building Type	Average Value of Individual Buildings in SFHA	Individual Value of Potential Damages in SFHAs by Respective Building Type		
		Eight-Foot Flood 49% Damage	Four-Foot Flood 28% Damage	Two-Foot Flood 20% Damage
Single Family Homes	**$95,847**	$46,965	$26,837	$19,169
Multi-Family Homes	**$175,385**	$85,938	$49,108	$35,077
Manufactured Homes	**$3,015**	$1,478	$844	$603
Non-Residential Buildings	**$96,271**	$47,173	$26,956	$19,254

Sources: Town of Hopkinton Avitar Assessing System 02-18-15 (See Table 27); FEMA

Table 29 also represents the worst-case scenario, but of *individual* single-family homes, multi-family homes, manufactured houses, and non-residential buildings within the Special Flood Hazard Area that are damaged by a flood hazard event.

If one single family home was damaged by a ***Two-Foot Flood (20% Damage)***, the projected dollar damage to the building *only* could be about **$17,000** while an ***Eight-Foot Flood (49% Damage)*** could yield over **$41,000** in damage. The only single manufactured home damaged by a ***Two-Foot Flood (20% Damage)*** could total **$9,700** in losses, and could be damaged **$24,000** in an ***Eight-Foot Flood (49% Damage)***. If damage was sustained to the only non-residential building, the projected dollar damage could be **$16,000** from a ***Two-Foot Flood (20% Damage)*** but **$39,000** for an ***Eight-Foot Flood (49% Damage)***.

Potential Building Dollar Losses by Other Natural Hazards

Flooding is often associated with heavy rains and flash floods, hurricanes, ice jams, rapid snow melting in the spring, and culvert washouts. These are all types of flooding hazards discussed or evaluated previously but can also occur outside of the SFHA.

Building damage by natural disasters in New Hampshire is not limited to SFHA flooding alone, which is easier to quantify and predict. Simple calculations can be made based upon generalizations of a disaster impacting a certain percentage of the number of buildings in the Town. **The February 2015 Avitar assessed value of all residential, commercial, and industrial structures in Hopkinton is $442,433,700 (no land).** Disaster damages are often illustrated in the following section utilizing a percentage range of town-wide building damage. At **2,381** housing units in Hopkinton from the US Census 2010, a disaster impact to **10%** of them would yield **238** damaged units. The number of parcels in Town is **3,237**.

The inventory of Town sites or buildings in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** indicates which hazards each site is most susceptible to and provides its assessed valuation. This dollar value can be used as a damage estimate from the natural hazard events listed below. Yet the potential losses discussed in this section involve all buildings across the community to provide a more distinct portrait of potential losses using the assessed valuation of all town buildings. Damages from natural hazards to anything other than buildings, such as infrastructure, land, humans or building contents, are not examined here. Specific individual studies would be needed to assess more detailed scenarios.

Wind Events

Damage caused by wind events such as **tropical storms & hurricanes**, **downbursts**, **tornadoes** and **severe wind storms** can be both excessive and expensive. The assessed value of all residential, commercial, and industrial structures in Hopkinton is **$442,433,700** (no land).

With a scenario range of **1%** to **5%** of buildings damaged by wind events throughout the Town, a wind event could potentially cause up to **$4.4m (for more localized downburst, high winds, or tornadoes)** to **$22.1m (for more damaging and widespread tropical storms and hurricanes)** in building-only damage costs alone, not including contents, infrastructure, or land.

Severe Winter Weather

Heavy **snow loads**, **icy conditions**, **extreme cold**, **wind chill**, and the secondary hazards (including **power failure**, **transportation accidents** and **debris impacted infrastructure**) are result of **winter storms**. Storms with these conditions have been felt in Hopkinton in the past. These hazards and secondary impacts are a risk to the community, including isolation, more falls, (especially by the older residents), and the potential for roof collapse. Damage caused by this type of hazard varies according to wind velocity, snow accumulation, and duration.

With a scenario range of **1%** to **5%** of buildings damaged throughout the Town, **severe winter storms** could potentially cause up to **$4.4m** to **$22.1m** in building-only damage costs.

Rapid Snow Pack Melt

Flooding caused by **rapid snow pack melt** is often found along roadways and from watercourses such as rivers like the Contoocook River, the short segments of the Warner River or Blackwater River in Hopkinton, and Dolf Brook, Hardy Spring Brook, Boutwell Brook or Meadow Brook. Those locations which are particularly susceptible would be the floodplain, along roadways, and especially along hilly gravel roads, but anywhere the water cannot yet percolate into the frozen ground could be vulnerable.

With a scenario of **0.5%** of buildings flooded throughout the Town, **rapid snow pack melt flooding** could potentially cause up to **$2.2m** in building-only damage costs alone, not including contents, infrastructure, or land.

River Ice Jams and Debris Impacted Infrastructure

Ice jams on the Contoocook River would be the major causes of **ice jam flooding** and **debris impacted infrastructure** in Hopkinton. Multiple bridges on Routes 9/202, NH 127 and other state and local roads that rest on top of these watercourses were identified previously. Multiple additional small streams culverts and drainage systems abound. The ***2017-2026 NH Department of Transportation Ten Year Plan (TYP)*** provides many examples of basic cost estimates bridge replacement and rehabilitation. Within or near the Central NH Region rehabilitation of small local bridges can average **$450,000** while replacement of small local bridges can average over **$600,000**.

This average figure of **$600,000** can be used for one (**1**) local bridge replacement in Hopkinton due to the physical damage caused by **river ice jams** or **debris impacted infrastructure**. The same bridge damaged by **ice** or **debris** which only requires rehabilitation could cost **$450,000**.

Or, if half of the **15** single family homes in the floodplain were damaged by **Two-Foot Flooding** ***(20% Damage)*** resulting from **river ice jams** or **debris impacted infrastructure**, there could be up to **$125,000** in building damage costs.

Earthquake or Landslide

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric, and phone lines and are often associated with landslides and flash floods. Buildings that are not built to a high seismic design level could be susceptible to structural damage. Contoocook Village could be more vulnerable to earthquakes as buildings are older, closer together, and the area is heavily populated. Buildings which are located on or near the sides of river and stream banks or that are located on a hill over **15%** could be subject to **landslide** triggered by rains or **erosion**.

With a scenario of **0.5%** of buildings damaged throughout the Town, an **earthquake** or **landslide** could potentially cause up to **$2.2m** in building-only damage costs alone, not including contents, infrastructure, or land.

Wildfire

The risk of **wildfire** is difficult to predict based on location. Forest fires are more likely to occur during years of **drought**. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. Humans can contribute by accidents in the woods or dry fields, or by the deliberate setting of **fire** in a structure. Fire danger is generally universal and could occur at any time. Dollar damage would depend on the extent of the fire, the number and type of buildings burned, and the amount of contents destroyed within the buildings.

With a scenario of **1.0%** of buildings damaged in the Town, a **wildfire** could potentially cause up to **$4.4m** in building-only damage costs alone, not including contents, infrastructure, or land.

Lightning

Damage caused by **lightning** would not be Town-wide because it typically strikes in smaller areas. Few places in Hopkinton are at specific risk but lightning strikes can cause fires. In the future, damages will vary according to the value of the structure and home and the contents inside, and dollar amounts would depend on if the hazard hit an area with a high density of buildings.

With a scenario of **0.5%** of buildings damaged throughout the Town, a **lightning** could potentially cause up to **$2.2m** in building-only damage costs alone, not including contents, infrastructure, or land, through fire spreading.

Drought

Drought is often declared on state-wide or region-wide basis, and sometimes by individual town. Dollar damage caused by drought would be difficult to quantify, but would most likely impact the agricultural and economic base of a community. Although everyone could be charged to conserve water, orchards, farms, and nurseries would be most affected.

As physical damage is usually isolated to specific locations, the effects of potential disasters at certain facilities could be researched utilizing the Town's assessor's database for valuation on targeted land. Agricultural land may be among the most affected by drought. People who rely on well water, which is nearly all of the community, might find their wells running dry, especially dug wells. The Town has **1,763** acres, or **6%** of its land in agricultural use, which could be physically and economically damaged by a **drought**.

Critical Facilities Buildings

These dozens of essential facilities, utilities, dams, bridges, and shelters and medical facilities inventoried in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** provide the **Structure Only Value $** from the Vision Appraisal System. Multiple hazards are identified which may damage each inventoried building. Therefore, if the Town wanted to ascertain the damage cost from any natural hazard to an individual critical facility, this dollar value is available for evaluation.

Community Facilities Buildings

Dozens of community facilities such as vulnerable populations, recreation and gathering sites, historic sites, economic assets, hazardous materials facilities, and more are inventoried in **APPENDIX A Critical and Community Facilities Vulnerability Assessment** provide the **Structure Only Value $** from the Avitar Appraisal System. Multiple hazards are identified which may damage each inventoried building. Therefore, if the Town wanted to ascertain the damage cost from any natural hazard to an individual critical facility, this dollar value is available for evaluation.

National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities such as Hopkinton agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding. For more information on the National Flood Insurance Program, visit https://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp.

Hopkinton has been a participant in the National Flood Insurance Program (NFIP) since **May 17, 1988**, the date of the Town's first effective National Flood Insurance Rate Maps (FIRMs). The original Flood Insurance Study (FIS) was also dated **May 17, 1988** although initial identification of flood hazard areas occurred on **August 23, 1974** and the Flood Hazard Boundary Map was dated **September 3, 1976**.

In the present day, Hopkinton's effective FIRMs are digital (DFIRMS) dated **April 19, 2010** as is the Merrimack County Flood Insurance Study (FIS) which includes Hopkinton (community **#330116**); individual community FIS are not being developed. These newest documents were adopted by the Select Board and supercede all previous FIRMs and FISs. **Table 30** summarizes the historical background of the Town's NFIP effective dates.

Table 30

NFIP History of Hopkinton – Effective Dates

Flood Insurance Study (FIS)	Flood Insurance Rate Maps
May 17, 1988	May 17, 1988
April 19, 2010	April 19, 2010

Source: Merrimack County Flood Insurance Study (FIS) Table 7, 2010; Bibliography p. 65

HOPKINTON'S NFIP STATISTICS

In Table 31 is a cumulative history of the trends and overall totals of flood insurance policies and losses of those property owners utilizing the NFIP insurance in Town. Three snapshots in time, one from each of Hopkinton's **Hazard Mitigation Plan** versions, display the number of NFIP policies in force and paid loss statistics between **December 2003 - February 2016**.

In December 2003, the number of NFIP flood insurance policies in force was **0**, which rose to **23** in 2009, then rose again to total **28** policies by February 2016. The increases between 2003 and 2016 can be explained by the significant flooding events damaging properties in Hopkinton between 2005-2008. The lack of further purchase could be influenced by the recent changes is flood insurance regulation and cost. Over this same period of time, the number of paid losses to individuals through the NFIP since 1978 has risen from **1** insurance claim loss (**$7,800** paid) to **4** paid losses (**$25,000** total) by February 2016.

Table 31

History of NFIP Policy and Paid Loss Statistics

Date	Policies in Force	Insurance in Force	Number of Paid Losses (since 1988)	Total Losses Paid (since 1988)
December 2003	0	$1,827,000	1	$7,767
January 2009	23	$4,404,800	1	$14,585
February 2016	28	$6,229,700	4	$25,056

Source: Hopkinton Hazard Mitigation Plans 2011, FEMA last accessed 03-16

Table 31 also illustrates that while the entire Town of Hopkinton is eligible to purchase flood insurance, only **28** parcels out of the **3,237** total parcels in the community are presently insured against flooding. This is the highest number noted among the snapshots. As described previously, a total of **17** homes and non-residential buildings are approximated to be situated in the Special Flood Hazard Areas. However, flooding conditions can occur anywhere due to runoff, debris impacted infrastructure (culverts), drainage overflow, rapid snowpack melt, road washouts, etc. The vast majority of properties in Town are uninsured for when the next flooding event occurs in Hopkinton.

REPETITIVE LOSS PROPERTIES

A specific target group of properties is identified and serviced separately from other NFIP policies when repetitive losses occur on the same properties. The group includes every NFIP-insured property that, since **1988** and regardless of any change(s) of ownership during that period, has experienced four or more paid flood losses of more than $5,000 each or two or more separate claim payments (building payments only) where the total of the exceeds the current value of the property. Two of the claim payments must have occurred within 10 years of each other. The loss history includes all flood claims paid on an insured property, regardless of any changes of ownership, since the building's construction or back to **1988**.

Hopkinton has never had a repetitive loss property, even after the significant flooding and infrastructure damage sustained over the latest hazard event period of **2005-2016** (See 4 Hazard Risk Assessment). This correlates with the relative lack of NFIP policies and paid loss claims in the community. **Table 32** displays the repetitive loss data:

Table 32

Number of Repetitive Loss Properties

Building Type	Number of Repetitive Loss Properties as of 12-12
Single Family	0
Multi-Family	0
Non-Residential	0
Total Properties	**0**

Source: NH Office of Energy and Planning on behalf of FEMA, December 2012

FLOODPLAIN ORDINANCE

A major objective for floodplain management is to continue participation in the National Flood Insurance Program. Communities that agree to manage Special Flood Hazard Areas shown on NFIP maps participate in the NFIP by adopting minimum standards. The minimum requirements are the adoption of the Floodplain Ordinance and Subdivision Regulation / Site Plan Review requirements for land designated as Special Flood Hazard Areas (SFHAs). Flood insurance is available to any property owner located in a community participating in the NFIP.

Community Assistance Visits in Hopkinton

A Community Assistance Visit (CAV) is a process required by the National Flood Insurance Program (NFIP) as a way of reviewing a town's compliance with established floodplain regulations to be sure that they meet NFIP requirements. If the Town is not in compliance with regulations in any way, the officials that conduct the CAV provide assistance and guidance to assist with correcting any violations.

If the NH Office of Energy and Planning (NHOEP) identifies Hopkinton as a repetitive loss community, which is based upon **Table 32** data, a new CAV will be undertaken every five years or if there is a severe flooding event. In past years, Hopkinton has had knowledgeable Land Use Department planning staff who were experienced with NFIP policies.

On **January 6, 1997**, a Community Assistance Visit (CAV) was held in Hopkinton to review compliance with NFIP policies and educate staff on the policies. A minor problem with the adoption of a model flood ordinance was discussed with the Planning Department and Town Administrator. No violations were identified at the **1997 CAV**. Additionally, recommended changes to Hopkinton's Site Plan Regulations proposed during the CAV were enacted at a Planning Board Public Hearing held on **July 15, 1997**.

In **2005**, another CAV was conducted in Hopkinton which reviewed progress from the previous 1997 CAV and considered new NFIP policies. The Town's Zoning Ordinance was found to be compliant, and there no problems with administrative and enforcement procedures. This was the last known CAV, although a follow-up telephone call may have been made by NHOEP in 2012 to review Land Use Department procedures and the contents of the Floodplain Ordinance, Subdivision Regulations and Site Plan Review Regulations. Following this basic schedule, another call would be anticipated for 2017.

Floodplain Ordinance Amendments

Hopkinton has a Floodplain Ordinance that was adopted as part of the Zoning Ordinance on **March 9, 1988**. On **March 11, 1997** following the CAV, the Zoning Ordinance was amended to meet FEMA's model regulations and was adopted by the Town as required in New Hampshire.

The last Floodplain Zoning regulation revisions were in **March 2008** to correct and add language and in **2010**, when the Town adopted the new FEMA effective Digital Flood Insurance Rate (DFIRM) maps dated **April 19, 2010**. In **March 2010**, the Town also adopted the amended Floodplain Development Ordinance incorporating the necessary FEMA revisions

NFIP Familiarity in Hopkinton

According to NFIP policies, when an applicant files a request for a building permit in the floodplain, the applicant must include an elevation certificate in order to be in compliance. In addition, if an applicant intends to fill onsite, a letter of map of revision must be submitted along with the application. Per NFIP requirements in the Floodplain Ordinance, building permits should be reviewed to assure sites are reasonably safe from flooding and require anchoring to prevent flotation, collapse, or lateral movement and construction out of flood resistant materials.

Ongoing attention and familiarity with the NFIP will keep Town staff and volunteers in top form. To reduce flood risks, the Land Use Department, including the Code Enforcement Officer and Planning Director and other Town staff whose duties include review/inspection of development or construction, should be familiar with the Floodplain Ordinance and the NFIP.

Because of their unique position to ensure development conforms with ordinances prior to approval, the Planning Board should be familiar with NFIP policies, especially those regulations that are required to be incorporated into the Subdivision and Site Plan Review regulations. A workshop sponsored by the NH Homeland Security and Emergency Management (NHHSEM) or the NH Office of Energy and Planning (NHOEP) would be appropriate to educate current staff and volunteers. Or, for online training taken at the convenience of the individual, see the ***FEMA Emergency Management Institute's*** current training course index for flooding: **https://www.training.fema.gov/is/searchis.aspx?search=Flood&all=true.**

An essential step in mitigating flood damage is Town and property owner participation in the NFIP. Hopkinton should work to consistently enforce NFIP compliant policies to continue its participation in this program. Currently, Town staff are fielding many property owners who are asking for assistance because their mortgage lenders are asking for proof that the properties in question are not located in a Special Flood Hazard Area to determine whether NFIP flood insurance is required. The only way to rectify this growing problem is to have a survey done of the property to complete a Certificate of Elevation to keep on file at the Town Office. If the property is shown to be located out of the floodplain, a Letter of Map Amendment should be completed by the owner or by the Town to ensure future flood maps are corrected.

This time of interaction with property owners is emotional and intense and may therefore not be the best time to advertise the availability of flood insurance. When possible, Town staff should try promote flood insurance to property owners in Town; only **28** properties out of the **3,237** parcels in Hopkinton are protected by flood insurance and currently take advantage of the NFIP insurance opportunity.

6 CAPABILITY ASSESSMENT

Local mitigation capabilities are existing authorities, plans, ordinances, policies, mutual aid, programs, staffing, technical skills and assets, funding, outreach, public education, and resources that reduce hazard impacts or that could be used to help implement hazard mitigation activities. These capabilities were inventoried for the **Hopkinton Hazard Mitigation Plan Update 2017**.

The **Capability Assessment** contains an inventory of locally-important existing mitigation support activities, or capabilities, which have a positive impact on the way hazard events are handled within the community. Most capabilities are not hazard mitigation Actions but support the Action Plan and help decrease the community's hazard risk. These community-strengthening capabilities are not STAPLEE-rated (Social Technical Administrative Political Legal Environmental and Economics questions) like the Actions**,** but instead the capabilities serve to sustain and assist the community to maintain and accomplish its hazard mitigation Actions and priorities. Selected ***Future Improvements*** (mitigation-oriented) to some of these capabilities have the potential to be considered as Actions in **7 POTENTIAL ACTION EVALUATION** and **8 MITIGATION ACTION PLAN**.

Capability Assessment Types
Planning & Regulatory
Administrative and Technical
Financial Resources
Education and Outreach

There are four overall Capabilities considered for which an inventory of mitigation support items was identified by the Hazard Mitigation Committee, **Planning & Regulatory**, **Administrative and Technical**, **Financial Resources**, and **Education and Outreach**.

Each Capability had inventoried the latest version or adoption Date; a Description of the item; the location of the capability in Town; the Level of Effectiveness of the Capability; which Department, Board or other has Responsibility for the capability; what Changes were made to the capability since the **2011 Hazard Mitigation Plan**; and Future Improvements to the Capability.

Town Capabilities

A summary of the items within the four Capability tables is provided here to offer a portrait of resources Hopkinton has at hand to assist with mitigation. Careful consideration of each Capability's ***Level of Effectiveness*** helped the Departments to determine any clear ***Future Improvements*** to undertake. Many of the Town's Capabilities involved existing plans, procedures, reports, policies, regulations, and resource documents from individual Departments. These plans and documents were reviewed and incorporated into the **Capability Assessment**. ***Future Improvements*** to these documents were identified and many later became Action items in **8 MITIGATION ACTION PLAN**. Capabilities of all Town Departments and the School District as related to hazard mitigation are detailed within the following tables.

Level of Effectiveness	Description
High	Capability is working well and is regularly followed
Moderate	Capability could use some revisions but is followed
Low	Capability is not working and needs revisions

PLANNING AND REGULATORY CAPABILITIES

The planning and regulatory capabilities displayed in **Table 33** are the plans, policies, codes, and ordinances that reduce the risks or impacts of hazards. There are 3 categories: Plans, Codes, and Regulations. Most of the documents listed below are the Town's documents, but others are School, local, regional, state and federal which support the Town's the hazard mitigation goals, objectives, and/or Actions.

Table 33

Planning and Regulatory Capabilities

Latest Adoption or Version Date	Capability Assessment: Planning and Regulatory Resources	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
	PLANS						
April 2011	**Hazard Mitigation Plan**	Latest FEMA approved Haz Mit Plan will expire (April 2015), currently updating as of 12-15	Entire Town	High	Emergency Management	Reviewed Plan, completed some projects	Implement the Haz Mit Plan by meeting quarterly to review Action progress and evaluate the Plan, changing Action priorities as needed.
April 2014	**Emergency Operations Plan**	Updated EOP, ESFs included, WebEOC	Entire Town	High	Emergency Management	Updated in 2014	Ensure that EOP addresses all existing and potential emergency situations.

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2015	**Public Health Emergency Management Plan Components**	Emergency Response Plan (includes West Nile, EEE, Smallpox, more) for public health coordinates all Town departments and officials. Hopkinton Middle/High School is designated Point of Distribution (POD) by NH HSEM. The plan is tested annually with participating communities through the Capital Area Public Health Network (CAPHN)	Entire Town, CAPHM Communities	High	Emergency Management	POD activated in 2014 for local Hopkinton hepatitis incident, regular tabletop exercises with CAPHN, drills on POD in 2013	Place all components of the Public Health EMP into 1 document as a Plan and continue drills and annual updates as needed.
2016-2021	**Capital Improvements Program**	Includes Police, Public Works, Fire, and other Depts' capital expenditures over a 6-year period. Can contain haz mit Actions funded in CIP, infrastructure improvements	Entire Town	High	CIP Committee (Select Board)	Updated annually	Continue to update the CIP on a yearly basis and add hazard mitigation actions to the 2016-2020 CIP.
May 2002	**Master Plan**	Improve Town infrastructure, protect environmental, guideline for Depts, basis for ordinances and regulations	Entire Town	High	Planning Board	Referenced regularly at PB meetings, on PB Agenda monthly	Update the Master Plan and include discussion and recommendations from Hazard Mitigation Plan
10/2011	**Road Maintenance Program**	Road maintenance program is a 10 year schedule program with funding from the Highway Block Grant and Town's budget.	Town Roads	Moderate	Public Works Department	Updating began in 2015	Update the Plan annually to make the existing document more useful
May 1988	**Natural Resource Inventory**	The 2004 National Resource Inventory was prepared with the assistance of the Society for the Protection of NH Forests. Includes: Natural Resource Co-occurrence, Wildlife Habitat Co-occurrence, Conservation Lands, Upland Habitat and Water Resources	Entire Town	High	Conservation Commission	Used by the Planning Board and Conservation Commission in application reviews	Review and update as needed; protect areas that are important natural resources for the Town
April 2004	**Open Space Plan**	Plan identifies areas in Town that are highly desirable to protect from development	Entire Town	High	Conservation Commission	Last purchase was a 2015 easement	Update the Open Space Plan
August 2015	**Hopkinton High School Emergency Management Plan (School)**	High School has its own EMP since it will become Town shelter during disasters. Subcommittees oversee	Hopkinton High School	High	School District	Revised annually, regular drills, new safety features such as locking door mechanisms, controlled	Continue to update the High School EMP and undertake improvement

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		different components. Includes contingency plans. Have been working with NH HSEM and had an independent consultant to assess all 3 school facilities				access, keyed entry, etc.	measures for the 3 schools (School)
August 2015	**Harold Martin School (K-3) Emergency Management Plan (School)**	Safety Comms include faculty, parallel preparations for all 3 schools. Subcommittees oversee different components. Includes contingency plans. Have been working with NH HSEM and had an independent consultant to assess all 3 school facilities	Harold Martin School	High	School District	Meets 4 times annually	Continue to update the Plan and undertake improvement measures for the 3 schools (School)
August 2015	**Maple Street School (4-6) Emergency Management Plan (School)**	Safety Comms include faculty, parallel preparations for all 3 schools. Subcommittees oversee different components. Includes contingency plans. Have been working with NH HSEM and had an independent consultant to assess all 3 school facilities	Maple Street School	High	School District	Meets 4 times annually	Continue to update the Plan and undertake improvement measures for the 3 schools (School)
August 2015	**School District SAU #66 Emergency Management and Response Plan (School)**	Plan includes activation of emergency responders in Town, evacuation, lock down, shelter in place, etc procedures. Covers the entire District. Subcommittees oversee and update the 3 different school EMPs.	School District (3 Hopkinton Public Schools)	High	School District	Procedures have been drilled	Practice using alternate evacuation routes in schools, ensure adequate exit signage, revise if changes are made to individual school EMPs (School)
September 2015	**Beech Hill Independent School Emergency Management Plan (private)**	Safety Comm in place. Plans include contingency operations to address various hazards.	Beech Hill School	High	Beech Hill School (Private)	Reviewed annually	Continue to be involved with Plans, encourage the Board to review and update the EMP annually and to provide a copy to the Town. (Private)
September 2015	**Contoocook NFI Independent School Emergency Management Plan (private)**	Evacuation and shelter plans, utilize several concepts from SAU 66.	Contoocook NFI School	High	Contoocook NFI School (Private)	Reviewed annually	Continue to be involved with Plans, encourage the Board to review and update the EMP

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							annually and to provide a copy to the Town. (Private)
August 2015	**Hopkinton Fairgrounds Emergency Management Plan (private)**	Plans identify evacuations, fires, bombs, medical emergencies, and dignitary security operations.	Hopkinton Fairgrounds	High	Hopkinton Fairgrounds Board of Directors (Private)	Reviewed annually by Board of Directors, changes made as necessary to accommodate various types of events.	Continue to be involved with Plans, encourage the Board to review and update the EMP annually and to provide a copy to the Town. (Private)
December 2015	**McLanes of New England Emergency Management Plan (private)**	Plans include alarms, work place violence, evacuations, safety oversight team, structural catastrophes.	McLane Concord, Maple Street	High	McLanes NE (Private)	Reviewed annually	Continue to utilize, monitor, evaluate, and update plan. (Private)
November 2015	**Yankee Book Emergency Management Plan (private)**	Plans include alarms, off sight evacuation, hazards in the workplace.	Yankee Book, Maple Street	High	Yankee Book (Private)	Reviewed annually	Continue to utilize, monitor, evaluate, and update plan. (Private)
September 2013	**Boys & Girls Club Emergency Management Plan (private)**	Plans include alarms, work place violence, evacuations, safety oversight team, structural catastrophes.	Boys & Girls Club	High	Boys & Girls Club (Private)	New in 2013	Evaluate the Boys & Girls EMP Annually with the Organization
June 2015	**Park Avenue Apartments Emergency Management Plan (private)**	Affordable housing community on Park Lane, 30 residences, 1 bedroom apartments to qualified residents. Plans include alarms, off sight evacuation, hazards in the workplace.	Park Avenue Apartments, Park Lane	High	Park Avenue Apartments (Private)	Reviewed annually, no recent changes	Continue to utilize, monitor, evaluate, and update plan. (Private)
BUILDING	CODES,	PERMITTING,	INSPECTIONS				
2009	**State Building Code (International Building Code 2009)**	Contains a suite of residential, commercial, plumbing, electrical, mechanical, energy, and existing buildings	Entire Town	High	Building Inspection	Town still follows the code from 2009	Educate public as needed to ensure safety and compliance with codes
April 19, 2010	**FEMA Flood Insurance Rate Maps**	Adopted by Town in, used for Merrimack River, streams, brooks	Floodplains	High	Select Board	FEMA has not provided new maps since then	Continue using maps in Town offices and noting any substantial deviations
2009	**Fire Inspection and Life Safety Code**	NFPA codes, but considering making changes to fit the Town	Entire Town	High	Fire Department	Continued to follow codes, began making revisions for ordinance in 2016	Complete the new Town Life Safety Code for Town Meeting 2017 vote

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2009	**NFPA 101 Life Safety Codes Occupancy Inspections**	Contains 15 types of occupancies that may be inspected by Fire Departments, although it's not well communicated to residents: **- Places of Assembly** - Mercantile - Business - Health Care - Ambulatory Health Care - Residential Board and Care **- Day Care** **- Educational** - Apartment Buildings - Lodging or Rooming Housing - Hotel or Dormitory - 1 and 2 Family Dwellings - Industrial - Storage - Detention and correctional	Places of Assembly, Day Cares, and Educational sites	Moderate	Fire Department	Continued inspections for these 3 types	Appoint a Life Safety Task Force to Consider Life Safety Inspection Classifications, Frequency, and Ability to Develop a Fee Schedule to Add to the Zoning Ordinance
2009	**NFPA 1 Fire Codes Permitting**	Section 1:12, and Table 1.12.7a specifically outline instances when permits are required. There are no Town regulations identifying when permits are required or the process to be taken when permits are needed, life safety and fire codes are violated, but no permit has been obtained by the property owner (2 Actions)		Moderate	Fire Department	Continued to issue permits	Enable the Life Safety Task Force to Define when Permits are Required, Either per the NFPA Table or an Alternative Table, and Add to the Zoning Ordinance
LAND USE	PLANNING,	ORDINANCES,	REGULATORY				
June 2006	**PB Procedure for New Homes Beyond 1,000' from Intersection Required to be Sprinklered**	Any new home which is located beyond 1,000' of road from an intersection is required to be sprinklered. This is a standard practice that PB uses as a condition of approval	Entire Town	High	Planning Board	PB follows procedure, but not used since June 2006	Investigate the possibility of mandating (ordinance) the NFPA testing and maintenance of existing residential sprinkler systems
November 1988	**Septic System Setbacks**	No closer than 75-feet from a well or a water body	Entire Town	Moderate	Planning Board	Planning Board followed and enforced regulations	Continue to utilize, monitor, and evaluate and

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							review for revisions
April 19, 2010	**Floodplain Development Ordinance (Zoning Ordinance)**	Adopted 1987 and amended in 1994, 1997 and 2007 in accordance with the National Flood Insurance Rate Program	Entire Town-Floodplains	**Moderate**	Planning Board	Town followed FEMA changes	Update the Floodplain Ordinance When Changes are Required
1999	**Wetlands Overlay District Ordinance (Zoning)**	Adopted 1988 and amended in 1994 and 1999. Wetlands are not considered part of the minimum size of a lot in all districts	Entire Town-Wetlands	**Moderate**	Planning Board	Planning Board followed and enforced ordinance	Continue to utilize, monitor, and evaluate and review for revisions
March 2005	**Shoreline Protection Ordinance (Zoning)**	Hopkinton adopted more stringent standards than the minimum State standards as it relates to solid waste facilities or facilities which store or incinerate solid waste, construction or demolition debris	Entire Town-Shorelines	**Moderate**	Planning Board	Planning Board followed and enforced ordinance	Continue to utilize, monitor, and evaluate and review for revisions
April 2012	**Site Plan Review Regulation Requirements**	Adopted 2012; detail design standards include erosion control, pedestrian and vehicular safety.	Entire Town	**Moderate**	Planning Board	PB revised to address current design standards.	Continue to utilize, monitor, evaluate and review for revisions
2012	**Subdivision Regulation Requirements**	Adopted 1989 and amended in 1991, 1992, 1995, 1997, 2002, 2003, 2005, 2007 and 2012. Stormwater run-off, erosion and sediment control, adequacy of existing and/or proposed drainage facilities, road design standards, flood hazard area impact, requires underground utilities, environmental restoration plan, and addresses the need for fire protection.	Entire Town	**Moderate**	Planning Board	PB revised to require restoration of disturbed areas.	Continue to utilize, monitor, evaluate and review for revisions
March 2015	**Zoning Ordinance**	Adopted 1988 and amended each year from 1989 through 2015. Density and Growth Management controls, Flood Plain development, Wetlands protection standards, and expanded public open space.	Entire Town	**Moderate**	Planning Board	PB revised to readopt Growth Management Control, Excavation standards, definitions, and uses permitted.	Continue to utilize, monitor, evaluate and review for revisions
March 2012	**Growth Management Ordinance (Zoning Ordinance)**	Adopted 1988 and readopted every five years. Monitors, evaluates and establishes a rate of residential	Entire Town	**Moderate**	Planning Board	PB monitored growth, reviewed standards and revised to address recognize capacity of services.	Continue to utilize, monitor, evaluate and review for revisions

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		growth that is intended to not unreasonably interfere with Hopkinton's reasonable expansion of services.					
March 2007	**Conservation Subdivisions Ordinance (Zoning Ordinance)**	Provides standards for residential development of land in conjunction with the permanent protection of a portion of the property as undeveloped open space.	Entire Town	Moderate	Planning Board	Planning Board followed and enforced ordinance	Continue to evaluate to ensure that reasonable development standards are permitted while continuing to provide opportunities to preserve open space.
May 2003	**Stormwater Construction and Maintenance Standards (Subdivision Regulations)**	Stormwater drainage system construction in accordance with drainage laws of NH, NH Standard specifications for Road and Bridge Construction and American Association of State Highway and Transportation Officials.	Entire Town	Moderate	Planning Board	Planning Board followed and enforced regulations	Continue to utilize, monitor, evaluate and review for revisions
May 2003	**Road Design and Construction Standards (Subdivision Regulations)**	Specifies method of construction and materials. Contains NH DOT roadway and drainage standards.	Entire Town-Roadways	Moderate	Public Works, Selectmen, Planning Bd	Depts followed and enforced regulations	Continue to utilize, monitor, evaluate and review for revisions
August 2005	**State 911 Street Address System Ordinance (Selectmen Ordinance)**	House numbering and street naming ordinance	Entire Town	High	Select Board	Selectmen followed and enforced regulations	Continue to evaluate to ensure that every effort is made to address public safety.

Source: Hopkinton Hazard Mitigation Committee

ADMINISTRATIVE AND TECHNICAL CAPABILITIES

The administrative and technical capabilities in **Table 34** include staff, volunteers, and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. Smaller jurisdictions without local staff resources often rely on public or shared resources. There are 3 categories: Admin Programs, Staffing, and Technical Capabilities.

Table 34

Administrative and Technical Capabilities

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
	ADMINISTRATIVE PROGRAMS AND POLICIES						
January 2015	**Fire & Rescue Mutual Aid Agreement**	Member of Capital Area Fire Compact, renews annually. 20 Towns provide assistance. Meet nine times per year. Pay dues annually. Have access to Haz mat team as result of membership. All computerized through dispatch	Entire Town, Compact Area Communities	High	Fire Department	Updated the Towns involved in Compact, participated in monthly drills	Propose more training such as technical rescue-specific trainings.
December 2015	**Central NH Hazardous Materials Team Member**	Strike Team from Capital Area Compact can assist with different alarms and bring specific equipment. Massive undertaking, Towns get billed for the services rendered.	Entire Town, Compact Area Communities	High	Fire Department	Team developing Haz Mat Transport Study, met quarterly	Continue Fire Dept's participation in drills and meetings
June 2015	**Fire Department Standard Operating Guidelines (SOGs)**	Standard Operating Guidelines recently updated, emergency response, operations, support, incident command	Entire Town	High	Fire Department	Updated the SOGs	Coordinate more first responder drills (traffic management, rolling, sim-labs, etc), and ensure and improve minimum company Fire & EMS standards competency.
Currently & regularly in use (12-15)	**On-Call Fire & Rescue Coverage**	Members arrive for incidents. Have 37 firefighters presently. Coverage is 24/7.	Entire Town	High	Fire Department	Began developing SOPs	Increase participation of members in training
August 2015	**Police Department Mutual Aid Agreements**	Perpetual mutual aid contract with Hopkinton's 7 abutting communities, including other communities as needed during special events such as the Hopkinton Fair	Entire Town, Mutual Aid Communities	High	Police Department	Reviewed and updated in Aug 2015	Amend PD MUAs as determined necessary and as statutorily required
September 2015	**School Violence Prevention Program**	Contingency and Response Plan for acts of school violence or other major incidence. Monthly drills occur involving School Officials, Merrimack County Dispatch and surrounding agencies	Hopkinton High School, Maple Street School, Harold Martin School	High	Police Department	Total update was completed in late 2015	Continue the PD's School education and training and conduct annual updates to the program as needed
August 2015	**Violence Prevention Initiative**	Second Step Program for grades K – 6 in the Public school system. There is a separate program for the Middle/High School	Maple Street School, Harold Martin School	High	Police Department	Ongoing program with the schools	Continue PD's School violence prevention education and training and conduct annual updates to the

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							program as needed
December 2015	**Critical Incident Management Program**	All Police Officers trained in Incident Command System (ICS) 100-700 to ensure NIMS compliance	Entire Town	**High**	Police Department	Training Event occurred in Dec 2015	Continue ICS training for existing and new Police Officers
July 2015	**Police Department Standard Operating Procedures (SOPs)**	Follow General Policies & Rules of Conduct, training at Police Academy & in-service training: firearms, CPR, first aid, batons, etc.	Entire Town	**High**	Police Department	Updated in accordance with changes to State laws	Amend SOPS as determined necessary and as statutorily required
April 2001	**Police Department Detail Policy**	Policy includes a list of roads in Town that require Police detail for construction or utility work or public events, interfering with regular traffic flow	Entire Town	**High**	Police Department	Policy is used when events occur	Continue to utilize, evaluate and update PD detail policy annually as required
January 2015	**NH Public Works Mutual Aid Agreement Member**	PWD pays $25/year to join NH's network of public works officials. Mutual aid of staff and equipment available across the state	Public Works Department, Entire State	**High**	Public Works Department	Updated annually	Maintain current effectiveness by monitoring, evaluating, and updating agreement
May 1992	**Winter Maintenance Policy**	Snow plowing, sanding and salting roads vary based on the temperature, type of storm, and condition of road. Originally Adopted 1978, Recorded 1992	Roadways, Entire Town	**High**	Public Works Department	PWD followed policy	Amend the Winter Maintenance Policy as Determined necessary, such as Emergency Parking and Sidewalk Maintenance and as Statutorily Required
October 2013	**Culvert Condition GPS Inventory**	Inventory using GPS in 2013 by CNHRPC records condition of culverts, can be used on maps or as database	Roadways, Entire Town	**Moderate**	Public Works Department	Developed in 2013	Continue the culvert inventory and incorporate into a culvert replacement program
Currently & regularly in use (12-15)	**Communication with US Army Corps of Engineers**	Communication with representatives of the Army Corps of Engineers and the Emergency Management Director is regular. Various meetings to review activities at State Park, water quality and flooding	Entire Town, Hopkinton-Everett Reservoir Dam	**Moderate**	Emergency Management	Met at least monthly	Continue on-going communications which include contact via radio
June 2015	**Emergency Operations Center (EOC)**	Emergency Command Center in Contoocook Fire Station. Includes: antennas, radios, computers, satellite television, telephone lines.	Contoocook Fire Station	**High**	Emergency Management	New EOC constructed 2015	Develop EOC policy updates regarding its use, activation, and emergency procedures.

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September 2015	**Culvert and Storm Drain Maintenance Program**	Protocol is to replace when a culvert fails.	Town Roads	Moderate	Public Works Department	Culverts maintained & replaced	Upgrade Culverts as Needed and Incorporate into Maintenance Program
Jul 2015	**Procedure on Tree or Limb Reporting to Utility Companies**	Limbs down are reported to 911 or Utility Company or Highway Dept. Assessment is taken and either handled or correct agency is notified.	Town Roads	High	Public Works Department	Used procedure at least annually	(Consider developing a written policy on handling trees or limbs down on electric wires or roadways.) Maintain current effectiveness by monitoring, evaluating, and updating agreement
Sep 2013	**Conservation Commission Acquisition of Easements**	Program evaluates and purchases key open space parcels and/or easements when opportunities arise	Entire Town	Moderate	Conservation Commission	Reviewed properties to ascertain suitableness for acquisition	Continue property review and evaluation to make priority purchases
Currently & regularly in use (12-15)	**Communication Among Town Departments**	Work cooperatively during emergencies. Use cell phones and digital radio and personal communication. Multi-channel frequencies	Entire Town	High	Town Administration	Reviewed and followed procedures	Continue to utilize, evaluate and update procedures annually as required
December 2015	**Town Disaster Drills**	Mass casualty and other drills for Town emergency personnel. Mutual aid requires hosting one drill a year, as well as attendance at 6-7 other events hosted by other nearby towns	Entire Town, Schools, Surrounding Towns	High	Emergency Management	Drills regularly attended and hosted at least 1 per year	Maintain current disaster drill schedule and enhance where needed.
January 2016	**School District Drills**	8 drills in each of the 3 schools required annually. 4 fire, intruder, shelter in place, lockdown, general evacuation. Town FD and PD are often involved in drills.	Hopkinton High School, Maple Street School, Harold Martin School	High	School District	Drills held at least 8 times/year in each school	Continue undertaking drills and revising procedures including developing an alternate evacuation route for each School for fires and for the Hopkinton Fairground. (School)
TOWN STAFF AND VOLUNTEERS							
Staff- 3	**Administration and Finance Department**	3 FT staff	Entire Town, Town Hall	High	Town Administration	Positions continue	Review positions annually for effectiveness and make necessary adjustments

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Volunteer- 5	**Select Board**	5 Volunteers	Entire Town, Town Hall	High	Town Meeting	Volunteers change	Review positions annually for effectiveness and make necessary adjustments
Staff- 1	**Planning and Land Use Department**	1 FT staff	Entire Town, Town Hall	High	Town Administration	Position continues	Review positions annually for effectiveness and make necessary adjustments
Volunteer - 7 regular & 3 alternate	**Volunteer Planning Board**	10 volunteers, 7 regular members & 3 alternates	Entire Town, Town Hall	High	Planning Board	Volunteers change	Review positions annually for effectiveness and make necessary adjustments
Staff- 1	**Police Department Chief**	Full time, training in line with State requirements	Entire Town, Police Department	High	Police Department	Annual update SWOT analysis	Undertake 3 and 5 year plans to address efficiency of the Police Department.
Staff- 8	**Police Officers**	6 full time, 2 part time, 1 ACO, 1 civilian part time secretary. Annual training in accordance with Federal and State labor standards, Officers comply with PSTC and Attorney General requirements regarding training requirements	Entire Town, Police Department	High	Police Department	New staff members updated with emergency response procedures	Develop greater Police Officer integration with outside resources to address emergency response capabilities.
Staff- 1	**Fire Department Chief**	1 FT Chief	Entire Town, Fire Department	High	Fire Department	Position continues	Review positions annually for effectiveness and make necessary adjustments
Staff- 7	**Fire Officers**	7 FT Officers positions are filled, 3 are vacant, for 10 total officer positions (are part of the 52 FFs)	Entire Town, Fire Department	High	Fire Department	Positions continue	Review positions annually for effectiveness and make necessary adjustments
Volunteer- 35	**Fire Fighter Level 1, 2, 3**	35 PT Firefighters, volunteer hourly	Entire Town, Fire Department	High	Fire Department	Positions continue, volunteers change	Review positions annually for effectiveness and make necessary adjustments
Volunteers - ~10	**Fire Department Explorers**	Meet every Wed, learning fire behavior techniques	Fire Station	Moderate	Fire Department	Regular meetings continue every Wednesday night	Continue to meet and provide training, evaluate and adjust as necessary
Staff- 3	**Public Works Department Supervisors**	1 Director, 1 Supt. of Highway, 1 Supt. of B&G	Roadways, Public Works Department	High	Public Works Department	Position continues	Maintain current effectiveness by monitoring, evaluating, and updating capacity
Staff- 7	**Public Works Road Crew**	6 FT. 1 PT. Yearly classes through T2 program, in house training	Roadways, Public Works Department	High	Public Works Department	Positions continue	Hire Another Full-time Highway

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							Department Crew Member
Staff - 1	**Emergency Management Director**	Police Chief also serves as the EMD	Police Department, EOC in Contoocook Fire Station	High	Police Department	Completed updates to EOP	Conduct outreach with volunteer groups to hold and promote emergency awareness events.
Staff- 17	**EMTs/Paramedics**	6 FT & 11 PT EMTs & paramedics (some are of the 52 FFs and some are not)	Fire Department	High	Fire Department	Positions continue	Review positions annually for effectiveness and make necessary adjustments
Staff- 1	**Health Officer**	Town Administrator also serves as the Health Officer	Entire Town, Town Hall	High	Town Administration	Position continues	Review positions annually for effectiveness and make necessary adjustments
Staff- 7 & Volunteer- 5	**Hazard Mitigation Committee**	Department staff & Board volunteers meet to update Plan every 5 years. Meetings also occur during the interim to maintain and implement the Plan.	Entire Town, Town Hall	High	Emergency Management	New Committee Members	Appoint a permanent Hazard Mitigation Committee to meet quarterly to fulfill the commitments stated within the Plan.
Volunteers- 7 regular members & 3 alternates	**Conservation Commission**	9 members (7 regular members + 2 alternates) monitor properties annually, review NHDES and PB apps	Entire Town, Town Hall	Moderate	Conservation Commission	Volunteers change	Review positions annually for effectiveness and make necessary adjustments
Volunteers- 6	**Hopkinton Rescue (private, non-profit)**	Private non-profit group has extended critical equipment and skills available to the Town on an on-call basis if they are available. Works under the general direction of the Fire Department. There is no fee involved for their service	Entire Town, Fire Department	High	Fire Department	Volunteers change	Provide regular training opportunities for these volunteers
Staff- 7	**Joint Loss Committee / Employee Safety Program**	7 staff members on Committee to promote safe and healthful work environment. Use of safety equipment; personal protective equipment; training courses and materials	Entire Town, Town Hall	Moderate	Town Administration	Positions continue	Review the Employee Safety Program every five years.
TECHNICAL	SKILLS AND	RESOURCES					
52 Staff & Volunteer	**Firefighter Training**	All firefighters and EMTs are certified as Fire Fighter level 1 (<30), level 2 (15), and level	Fire Department	High	Fire Department	Increased training for firefighters	Continue to certify both FT and PT firefighters

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		3 (4), and the rest are not yet certified FF 1.					through the Fire Academy
39 FD Pagers	**FD Pagers**	Used for emergency Notification for Fire, Rescue, EMS and Haz Mat Materials. Most FFs have pagers, except the PT. Have enough for everyone in the Dept.	Fire Department	High	Fire Department	Pagers have continued to be used	Moving toward alerts being through cell phones. Continue to use technology to provide the best communication.
3 computers w/CAMEO	**FD CAMEO Usage**	Program tracks impacts of chemical hazards. Fire & Rescue needs newest program on portable laptops for efficiency	Fire Department	High	Fire Department	CAMEO implemented in 2014	Install and Update the Newest CAMEO Software on 3 FD Laptops
37 Staff & Volunteers	**FD Hazardous Materials Skills Training**	Most are Operational Level 2 (18), and some are Awareness Level 1 (16 members). At least three (3) have technician Level 3	Fire Department	High	Fire Department	Continued Haz Mat training	Continue access to hazardous materials training
1 program	**FD Firehouse Incident Management Program**	State required reporting NFIRS, have latest software, updates are annually	Fire Department	High	Fire Department	Continued to use, mandated by State for use and update	State wants to move to TEMSIS, town will follow state direction
17 Staff & Volunteers	**FD EMT/Paramedic Skills Training**	Currently have 17 EMTs/paramedics. Rescue Department is separate from Town services.	Fire Department	High	Fire Department	Continued rescue skills training	Maintain certification and attain more EMTs
5 portable generators	**FD Portable Generators**	Currently have four (4) on wheels, one (1) permanent. Permanent is at the Contoocook Fire Station. Used for scene lighting	Fire Department, available for Entire Town	High	Fire Department	Generators tested	Fire Department needs are met, but permanent generator needed for Town Hall
9 hazard suits	**FD Hazard Suits**	Encapsulated level B disposable suits for hazard materials/biological terrorism protection, one time use only. Purchased by grant. Police Department has access to these suits as well.	Fire Department	High	Fire Department	Suits are available when needed	Continue training on hazardous materials
12 AEDs	**FD Automatic Defibrillators (AEDs)**	Located in all schools and Town facilities, and for sports events for a total of about 12	Hopkinton High School, Maple Street School, Harold Martin School, Police, Fire, Public Works, Town Office	High	Fire Department	AEDs tested	Continue staff CPR and AED recertification bi-annually.
44 FD Radios	**Fire Department Digital Radios**	Mobile radios are in all trucks plus Portables are in officers' vehicles	Fire Department, Entire Town	High	Fire Department	Radios are regularly used	Maintain current effectiveness by monitoring, evaluating, and updating digital radios annually

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24 Sandbags	**Sandbags**	Sandbags are used to protect roads/structures/equipment Town-wide during changing flood conditions	Public Works Department, EOC	High	Emergency Management	Sandbags were available to use	Continue efforts to ensure enough sandbags are available always
N/A	**Radio Compatibility Between Police and Fire Departments**	Police and Fire Departments have digital equipment and therefore can communicate always via radio	Police Department	High	Emergency Management	Radio communication works between the two Depts	Maintain current radio compatibility effectiveness by monitoring, evaluating, and updating radio compatibility annually
N/A	**IAmResponding**	Communications web-based information tool to help first responders respond to emergency calls. Mutual Aid will be getting 15 towns onboard within the next year.	Entire Town	High	Fire Department	Not yet enacted	Add a pre-plan module to increase ability to communicate Different Information Among First Responders
35 Staff & Volunteers certified	**Red Cross CPR Certification**	Town staff and volunteers earned CPR certifications. , PWD, all town staff trained in CPR each year	Entire Town	Moderate	Emergency Management	Staff recertified in CPR	Update CPR certifications on regular basis
3 Generators	**Town Generators**	Enables running of heat & electricity during power failure at Public Works, Fire Department and High School	High School, Highway Garage, Fire Dept	High	Fire Department	Added generators to High School & Highway Garage	Add a generator set up at the Town Hall
8 spreaders and 12 snowplows	**De-icing Equipment for Public Works Department**	De-icing equipment improves transportation systems throughout the town during severe winter weather conditions. This in-turn aids essential support services during response and recovery	Public Works Department	High	Public Works Department	Replaced equipment as needed	Continue to seek out new alternatives to snow and ice removal while maintaining current effectiveness.
10 staff	**Public Works Department Skills Training**	Can learn safety/ operation of chain saws during tree and limb debris clearing after storms, fire safety/ extinguishing, other related training	Public Works Department	High	Public Works Department	Completed additional training.	Maintain current effectiveness by monitoring, evaluating, and updating training program
10 staff	**T2 Educational Program**	Personnel have taken courses on road maintenance and safety to ensure use of Best Management Practices	Public Works Department	High	Public Works Department	Completed additional training.	Maintain current effectiveness by monitoring, evaluating, and updating training program
10 staff	**Public Works Department Training on Driver Safety Class**	Staff should be refreshed on driver safety by taking a class	Public Works Department	Moderate	Public Works Department	Completed additional training.	Seek out available classes to enhance PWD staff, driver safety skills.
1 flood light	**PD Additional Flood Lighting**	Currently have one flood light (1) for Police Department. Used for scene lighting.	Police Department	High	Police Department	Light used when needed	Maintain current effectiveness by maintaining, evaluating, and

Latest Adoption or Version Date	Capability Assessment: Administrative and Technical	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
							upgrading flood lighting.
5 PD AEDs	**PD Automatic Defibrillators (AEDs)**	5 Portable AEDs used by the Police Department to have in their cruisers, have officers trained on their use.	Police Department, mobile	High	Police Department	Continue Police Department CPR and AED recertification annually.	Continue Police Department CPR and AED recertification annually.
All paid staff	**School District Training**	All School staff, including custodians, trained bloodborne pathogens, and global harmonization system MSDS standardized every 2 years for every staff member. 13 staff are certified in UST Class C.	Hopkinton High School, Maple Street School, Harold Martin School, SAU Office	High	School District	Continued to train staff every 2 years	Enhance the School emergency training required by all School District Employees (School)
14	**School Administrative Office & SAU Panic Buttons**	Every Principal and Office Manager in the 3 schools have one, plus 4 are in the High School, SAU has 4. Now on the SD schedule to change the batteries.	Hopkinton High School, Maple Street School, Harold Martin School, SAU Office	High	School District	Tested and reset batteries, never been used	Continue to test and train to use the panic buttons in the event of an emergency at school.
1 generator	**Generator for Police Department**	Enables running of heat & electricity of the Police Department during power failure	Police Department	High	Police Department	Generator tested	Consider the generator permanently situated at the Police Station.
10 digital radios	**PD Inter-Operable Digital Radios**	Digital radios have ability to communicate with all Police, Fire and EMS services in the state who also have digital equipment	Police Department	High	Police Department	Continued using radios and replaced as needed.	Continue seeking grants for PD radio upgrades & replacements.
10 Barriers	**Jersey Barriers**	Barriers readily stabilize a dangerous condition (shoulder washout) and/or direct traffic to alternate route without tying up Town personnel (directing traffic, etc.)	Public Works Department	High	Public Works Department	Barriers were used when needed	Acquire additional barriers as needed
5 Staff	**Transfer Station Employee Training**	Attend classes on haz waste, C&D, mixed paper, fire, etc held by NHDES. To maintain certification, employees must attend one workshop a year. # is certified in Haz Mat.	Transfer Station	High	Transfer Station	Continued regular training	Continue transfer station employee training
N/A	**Cartographic**	Provides layout of all parcels in town. Digital tax parcel maps can overlay onto critical facility sites and hazard event areas	Entire Town	High	Town Administration	Tax maps were updated annually.	Continue to have digital tax parcels updated for parcel accuracy.

Source: Hopkinton Hazard Mitigation Committee

FINANCIAL CAPABILITIES

The financial resources in Table 35 available for hazard mitigation projects are those the Town has access to, has used in the past, or may be eligible to use in the future for hazard mitigation projects. These often include FEMA Public Assistance Grants (Disaster Recovery Costs), Warrant Articles, Town Capital Improvements Program (CIP) 2016 Project Funding, Department Operating Budgets, Bonds and FEMA and NH Department of Transportation grants.

Table 35

Financial Capabilities

Latest Adoption or Version Date	Capability Assessment: Financial	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
FINANCIAL	PROGRAM OR	FUNDING RESOURCE FOR	HAZARD	MITIGATION			
March 2013	**FEMA Public Assistance Grants (Disaster Recovery Costs)**	Public Assistance Categories A-G may become available when disasters are declared if the community has an unexpired approved Haz Mit Plan. Continue to utilize the FEMA funding to help recover from declared disasters.	Entire Town	High	Town Administration	Used for PA-B Protective Measures	Continue to utilize the FEMA PA program to help with disaster costs
March 2015	**Fire Department Operating Budget**	Budget can contain funding for cisterns, dry hydrants, outreach programs	Entire Town	High	Fire Department	Continued developing the FD operating budget	Use FD Operating Budget to finance future hazard mitigation improvements
March 2015	**Emergency Management Operating Budget**	Budget can contain funding for outreach programs, mitigation projects	Entire Town	High	Emergency Management	Continued developing the emergency management operating budget	Use Emergency Management Operating Budget to finance future hazard mitigation improvements
November 2015	**Town Capital Improvements Program (CIP) 2016 Project Funding**	Sets aside funds for large equipment/projects.	Entire Town	High	CIP Committee	Updated associated costs during annual updates	CIP is annually updated and could include expensive or long-term hazard mitigation projects
April 2016	**User Fees for Water, Sewer, Gas, or Electric**	Portions of water and sewer user fees are set aside to upgrade infrastructure.	Portion of Town with service	High	Select Board (Sewer, Gas, Electric), Water Commission	Rate increase has occurred	Continue to make ongoing improvements to water and sewer infrastructure.
2024 (maybe)	**NH Department of Transportation (NH DOT) Bridge Program**	The bridge program is an 80/20 funding opportunity, with only 20% required by towns. Using the CIP Capital Reserve Funds, towns can set aside money for the several years it takes for the state to	Currently have 1 bridge in program to receive funds in 2024 (maybe)	Low	Public Works Department	New Program to the Town	Place bridges on list well before expected failure

Latest Adoption or Version Date	Capability Assessment: Financial	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
		undertake the local bridge project.					
PROGRAMS	WHICH COULD	POTENTIALLY BE USED BY	THE TOWN	FOR FUTURE	PROJECTS		
Not Yet Used	**Warrant Articles**	Warrant Articles could be used in the future to fund large Hazard Mitigation projects	N/A	High	Select Board	Continued developing yearly warrant articles	Use warrant articles to finance future hazard mitigation improvements
Not Yet Used	**Impact Fees for New Development**	PB is authorized to develop and implement, but currently have no documentation in place to implement	New development, Community Facilities	N/A	Planning Board	N/A	If Planning Board develops Impact Fee Studies, fees they may be used for future development.

Source: Hopkinton Hazard Mitigation Committee

EDUCATION AND OUTREACH CAPABILITIES

In Table 36, identifying Town Department education and outreach programs and methods already in place or those which could be implemented can supplement or encourage mitigation activities and communicate hazard-related information to residents, businesses and the general public.

Table 36

Education and Outreach Capabilities

Latest Adoption or Version Date	Capability Assessment: Education and Outreach Programs	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effective-ness	Respons-ibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
PUBLIC	OUTREACH	PROGRAM					
Currently & regularly in use (12-15)	**Town Website**	Used by multiple Town Depts, available to residents and visitors, hosts Zoning amendment changes	Entire Town, General Public	High	Town Administration	Updated regularly with announcements, agendas, meeting notices, more	Make ongoing improvements to Town website to accommodate user needs.
Currently & regularly in use (12-15)	**NIXLE**	People choose to receive notification calls. Town has advertised for people to join, used by Police, Public Works, and Fire Departments	Entire Town, General Public	Moderate	Fire Department	Continued participation in program	Continue to utilize, monitor, and evaluate NIXLE review program for necessary changes.
Currently & regularly in use (12-15)	**Town Facebook Page**	Town Facebook Page with EM, Public Health, and Police info	Entire Town, General Public	High	Town Administrator	Implemented new FB page	Continue to utilize and update Town Facebook page to

Latest Adoption or Version Date	Capability Assessment: Education and Outreach Programs	Description Related to hazard mitigation planning and coordination	Location of Capability Entire Town or Selected Areas	Level of Effectiveness	Responsibility	Changes Since Last Haz Mit Plan (2011)	Future Improvements to Plans
							provide constant information.
September 2015	**Police Department Drug Take Back Box**	Procedure to assist residents with disposal of outdated prescription drugs	Police Department General Public	**High**	Police Department	Nearly 500 pounds of prescription drugs collected	Continue work with DEA and prescribing medical officials to collect outdated medications.
October 2015	**Police Department School Resource Officer/Education for Students**	Educational tool not only for drugs but safety protocol for children	Public Schools	**High**	Police Department	"DARE" removed, lessons integrated with other school health and safety education	Continue updating the School Resource Officer Education program to address changes in technology, new drug trends, etc.
July 2015	**Police Department Bicycle Safety Rodeo**	School District/PD organizes	Entire Town, General Public	**High**	Police Department	Helmets purchased through donations/grants	Continue the Police Department bike rodeo public safety education program.
December 2015	**Fire Prevention Program in Schools**	Fire prevention discussion held at all schools and Driver's Educations class. CPR and "Leaving the Nest" classes also given. Visits preschool-6th grade during Fire Prevention Week. High School is "Leaving the Nest" course that discusses fire and careers. FT program with schools	Hopkinton High School, Maple Street School, Harold Martin School	**High**	Fire Department	Program reviewed and updated yearly.	Will require full-time intermediate to replace the on-call
Currently in use (12-15)	**Fire Department Facebook Page**	Fire Department Facebook Page used to provide information to the public about the Fire Department	Entire Town, General Public	**Moderate**	Fire Department	Updated Occasionally	Continue to utilize page and provide regular public information.
Sep 2015	**Fire Department Annual Open House**	Open House each fall, introduce fire safety to the community	Entire Town, General Public	**Moderate**	Fire Department	Renovations completed for public visitation	Maintain effectiveness of Open House to community.
June 2015	**Fire Department Blood Drive**	FD holds a blood drive once or twice per year	Entire Town, General Public	**Moderate**	Fire Department	Annual or semi-annual event	Continue to provide blood drive service.
Oct 2015	**Transfer Station Household Hazardous Waste Disposal**	Household hazardous material disposal program permits disposal of dangerous materials at the Transfer Station: propane tanks, dried paint cans, waste oil, waste antifreeze, batteries, tires	Transfer Station	**Moderate**	Transfer Station	Held HHW disposal in 2015	Continue to provide annual household hazardous waste disposal day service
Jan 2016	**School District Automated Calling System**	Used only for emergencies. Automated phone, text, email service to parents for alert. Used for snow delays and snow days. A new version is being tested - text, then audio from superintendent	Public Schools, Entire Town	**High**	School District	Used successfully	Update regularly when parents require notification

Source: Hopkinton Hazard Mitigation Committee

Review of Existing Plans

As described above, during the Hazard Mitigation process and the identification of existing mitigation **Capabilities**, the Hazard Mitigation Committee used their knowledge of the existing plans, policies, procedures and other documents utilized for their Department duties to develop Capability ***Future Improvements***. However, several additional documents not listed in the **Capability Assessment** are also utilized by the community and have a positive relationship to the **Hazard Mitigation Plan 2017**. Most of the documents below are not the Town's documents, but the hazard mitigation goals, objectives, and/or Actions in this Plan are supported by the **Mitigation Support and Resource Documents** listed below in **Table 37**.

Table 37

Mitigation Support and Resource Documents

Latest Adoption or Version Date Month & Year	Mitigation Support and Resource Documents Not Listed within Capability Assessment Tables
February 2015	**Central NH Regional Plan**
October 2013	**State of NH Multi-Hazard Mitigation Plan Update**
July 2015	**NH HSEM Recovery Plan with RSFs**
April 2014	**CNHREPC Central New Hampshire Regional Emergency Planning Committee Regional Hazardous Materials Emergency Plan**
June 2010	**CAPHN Capital Area Public Health Network Public Health Emergency Preparedness and Response Plan for the Capital Area**
April 2010	**FEMA Flood Insurance Study for Merrimack County**
August 2015	**NH DOT Recommendations for the Ten-Year Transportation Improvement Plan (Projects) 2017-2026**
August 2011	**NH DHHS NH Excessive Heat Emergency Response Plan 2011**
July 2015	**NH DHHS NH Arboviral Illness Surveillance, Prevention and Response Plan**
February 2007	**NH DHHS NH Influenza Pandemic Public Health Preparedness & Response Plan**
2013	**NFPA 1971: Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting**
2016	**NFPA 1730: Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations**
2016	**NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Depts**
2016	**NFPA 1906: Standard for Wildland Fire Apparatus**
2014	**NFPA 70: National Electrical Code (NEC) and Handbook**
2015	**Hopkinton Dam Flood Emergency Plan (US Army Corps of Engineers)**
Current 02-16, 5-year updates w/ annual review	**Merrimack River Basin for Flood Regulation: Master Plan (US Army Corps of Engineers)**
2015	**Hopkinton Dam Flood Analysis (US Army Corps of Engineers)**

Source: Hopkinton Hazard Mitigation Committee 2017

7 POTENTIAL ACTION EVALUATION

With the completion of the inventory of the ***Overall Risks*** of hazards in the **Hazard Risk Assessment,** the historical recording of hazard events and declared disasters occurring in Hopkinton and what could happen in the future documented in the **Potential Future Hazards**, and the Town's evaluation of its mitigation and support activities in the **Capability Assessment** have all provided the opportunity to develop mitigation Actions. These mitigation Actions can be evaluated using these tools to develop the **Potential Action Evaluation**. Mitigation Actions developed emphasize both new and existing buildings and infrastructure to better protect populations of Hopkinton.

The **Hazard Mitigation Plan Update 2011** provided a basis to begin Action development. A review of the 2011 Actions is provided by the Hazard Mitigation Committee, determining which Actions have been **Completed**, **Deleted**, or **Deferred** to the **2017 Plan**.

New Actions were evaluated using the **Problem Statements** discovered during discussion of critical facility and community facility sites' potential vulnerability to hazards in the **Critical Facility and Community Facility Vulnerability Assessment**. Many of these problems were evaluated and later developed into mitigation Actions.

The **Capability Assessment** yielded a wealth of information from the ***Future Improvements*** of the plans, programs, ordinances, policies, agreements, technical skills, financial resources, and other resources the Town Departments, School District, and Stakeholders had available. Many of these were also evaluated and later developed into **New** Mitigation Actions.

The Chapter provides a summary discussion of the Actions the community can consider taking to help mitigate the effects of hazard events.

Action Status Determination

The status of all Hazard Mitigation Plan Actions varies. Priorities over the previous five years can change, budgets are uncertain, and staff are allocated time for certain tasks. To accommodate the **2011 Plan's** original **25** Actions in addition to the **New** Actions from the **2017 Plan**, there are **4** designated Action types to describe the detailed Actions following within the **7 POTENTIAL ACTION EVALUATION** and/or **8 MITIGATION ACTION PLAN**:

- **Completed**
- **Deleted**
- **Deferred**
- **New**

Actions which were **Completed** from the **2011 Plan** are listed in **Table 38**. The date of completion is provided.

Actions which were **Deleted** from the **2011 Plan** might have been no longer necessary or a priority to the Town, no longer relevant to the Town's situation or objectives, could not realistically be undertaken, were not financially feasible, were modified and incorporated into other existing Actions, or duplicated existing efforts of Hopkinton's activities. Deleted Actions are listed in **Table 39.**

Actions which were **Deferred** from the **2011 Plan** are still important to the Town but were not completed because they did not have the staff capability or the funding to undertake them, other Actions took higher priority, more time was required for completion, or they may need to be repeated to be effective. These **Deferred** Actions are in **Table 40** and have been re-prioritized with the **New** Actions in the **Mitigation Action Plan.**

Changes in priority of the **Deferred** 2011 Actions occurred over the last five years. The **2011 Plan** also used the **12-36 Priority Score STAPLEE** system while the **2017 Plan** included both a ***Ranking Score*** and an ***Action Timeframe*** to determine priorities. Both methods are described.

DEFINITIONS

The following definitions were used to ascertain which Actions should be considered *mitigation* Actions versus which should be considered *preparedness* Actions more suitable for incorporation into the ***Town Emergency Operations Plan***. The mitigation Actions are those which are carried forth in this **2017 Plan** into the **Mitigation Action Plan**.

Action Type	Time Frame	Definition or Characteristics
Mitigation	**Long Term**	**Action supports sustained risk prevention or reduces long-term risk to people, property and infrastructure.** ↪ Best suited for Town Hazard Mitigation Plan.
Preparedness	Short Term	Actions assist/support planning, protection, training/exercise, and response personnel. ↪ Best suited for Town Emergency Operations Plan.
Response, Recovery, Other Related	Short Term	Other Actions support preventative, response, recovery-related, repeated or deferred maintenance activities. ↪ Best suited for Town Emergency Operations Plan.

Review of 2011 Actions

The **2011 Hazard Mitigation Plan** was written in a different format and its content had to comply with less specific review guidelines before the ***Local Hazard Mitigation Review Guidebook (FEMA), 2010*** became standardized and tailored by each FEMA Region over the years.

Hopkinton's **25** Actions from 2011 were given **Action Numbers** and each **Project**'s status was determined by the Hazard Mitigation Committee as either **Completed**, **Deleted** or **Deferred**. Out of these **25** Actions, **6** were **Completed** as shown in **Table 38**. Sixteen (**16**) Actions were **Deleted** as shown in **Table 39**. The remaining **3** were **Deferred** to 2017 as shown in **Table 40** and appear within the **Mitigation Action Plan**.

Table 38
Completed Mitigation Actions

Priority Score	Action Number	Action	Completed By Date	Who is Responsible	Approx. Cost	Hazards Addressed
35	**#03- 2011**	**Provide Potable Water Supply to Residents with Contaminated Wells in the Area of the Former Landfill**	Sep-10	Select Board	$700,000 or $3.5 million	Natural
31	**#05- 2011**	**Raise Road Surface of Branch Londonderry Turnpike and Replace Existing Steel Culvert with Concrete Box Culvert**	Fall 2009 emergency culvert fix	Public Works Department	$400,000	Natural
32	**#06- 2011**	**Upgrade 24" Steel Culvert Along Pleasant Pond Road with a 36" ADS Culvert**	Fall 2014	Public Works Department	$50,000	Natural
36	**#08- 2011**	**Install Additional Phone Lines at Fire Station**	May-12	Fire Department	$3,000	All
35	**#09- 2011**	**Acquire Generator for High School for Emergency Town Shelter**	Jul-11	Fire Department	$110,000	All
33	**#22- 2011**	**Develop Residential Site Plan and Subdivision Regulation Changes for Emergency Vehicles**	Apr-12	Planning Board	$500	All

Source: Hopkinton Hazard Mitigation Committee

The pink highlighted rows indicate the **16 Deleted** Actions in **Table 39**. Many of the Actions were deleted because they were preparedness, response or recovery items and more appropriately belonged in the Town's ***Emergency Operations Plan.***

Table 39

Deleted Mitigation Actions

Priority Score	Action Number	Action	Deleted Date	Who is Responsible	Approx. Cost	Why Deleted? The Action…	Hazards Addressed
35	#02- 2011	Study Dam Breach Effect to the (Contoocook River) Kimball Stone Bridge (Dam)	03-16	Emergency Management	General Fund, Homeland Security Grant	No longer necessary	All
33	#04- 2011	Encourage Tree Trimming by Unitil and PSNH	03-16	Public Works Department	N/A	No longer necessary	All
33	#10- 2011	Acquire Bulldozer for Public Works Department	03-16	Public Works Department	Public Works Department Equipment Replacement (Capital Improvement Plan)	This is a preparedness, response or recovery item	All
33	#11- 2011	Acquire Portable Digital Sign Board	03-16	Public Works Department	Homeland Security Grant, Public Works Department Budget, or CIP Capital Reserve	This is a preparedness, response or recovery item	All
33	#12- 2011	Improve Radio Equipment for Public Works Department	03-16	Public Works Department	$50,000	This is a preparedness, response or recovery item	All
32	#13- 2011	Acquire Generator for Town Hall for Disaster Operational Ability	03-16	Town Administration	$10,500	This is a preparedness, response or recovery item	All
32	#14- 2011	Continue to Develop Cyber Crimes Intelligence System	03-16	Police Department	$30,000	This is a preparedness, response or recovery item	All
31	#15- 2011	Develop Satellite Police Station at Fairgrounds	03-16	Police Department	$60,000	This is a preparedness, response or recovery item	All
17	#16- 2011	Acquire An Approved Water Rescue Boat	03-16	Fire Department	$22,500	This is a preparedness, response or recovery item	All
36	#17- 2011	Meet with Little Tooky Residential Development and Meadows	03-16	Emergency Management	$0	This is a preparedness,	All

Priority Score	Action Number	Action	Deleted Date	Who is Responsible	Approx. Cost	Why Deleted? The Action…	Hazards Addressed
		Manufactured Housing Development for Evacuation Procedures				response or recovery item	
30	#18- 2011	Develop Informational Brochures on Emergency Preparedness	03-16	Emergency Management	$2,500	This is a preparedness, response or recovery item	All
35	#19- 2011	Hold Training Drills and Mock Exercises with Schools	03-16	Emergency Management	$1,000	This is a preparedness, response or recovery item	All
31	#20- 2011	Participate in NFIP Training	03-16	Planning Department	$0	This is a preparedness, response or recovery item	All
34	#21- 2011	Update Emergency Operations Plan	03-16	Emergency Management	$50	This is a preparedness, response or recovery item	All
33	#24- 2011	Develop and Implement a Residential Sprinkler System Ordinance	03-16	Planning Board	$500	Not relevant - state project	All
29	#25- 2011	Seek Grant Writer	03-16	Town Administration	$0	No longer necessary	All

Source: Hopkinton Hazard Mitigation Committee

The tan highlighted rows in Table 40 indicate the **3 Deferred mitigation** Actions which also appear in the forthcoming **Mitigation Action Plan** for 2017. The Action titles were revised to reflect the new focus on mitigation although the principle for each remains the same.

Table 40

Deferred Mitigation Actions

Priority Score	Action Number	Action	Deferred Date	Who is Responsible	Approx. Cost	Why Deferred? Because…	Hazards Addressed
36	#01- 2011	Update the Zoning Ordinance to Comply with NFIP Requirements	3/1/2016	Planning Department	$0	Must be repeated	All
31	#07- 2011	Replace 12' Diameter Steel Culvert Along East Penacook Road with Box Culvert	3/1/2016	Public Works Department	$200,000	Other actions took priority	All
33	#23- 2011	Develop Site Plan and Subdivision Reg Changes for Underground Utilities	3/1/2016	Planning Department	$500	More time is needed	All

Source: Hopkinton Hazard Mitigation Committee

New Actions from Community Vulnerability and Capability Assessments

After determining the status of the existing Actions, **New** Actions can be determined. The Hazard Mitigation Committee reviewed the ***Problem Statements*** from the **Community Vulnerability Assessment** and developed Actions out of them. The Committee also reviewed the **Capability Assessment's *Future Improvements*** and developed Actions out of those requested by Departments.

These new (and the existing **Deferred** Actions from 2011) were assessed in **Potential Action Evaluation Tables**.

MITIGATION ACTION CATEGORIES

The **2011 Plan** used the following 5 Action categories when developing and categorizing their Actions. This grouping followed the general pattern of usage within the Central NH Region:

- **Prevention**
- **Property Protection**
- **Structural Protection**
- **Emergency Services**
- **Public Information and Involvement**

However, the **2017 Plan** utilizes are more standardized set of Action categories that follow FEMA's own usage recommendation within mitigation handbooks:

Local Planning and Regulation
Structure and Infrastructure Projects
Natural Systems Protection
Education and Awareness

Preparedness and response activities are important to the community. They assist Departments with the procedures, training, regional coordination, and purchases needed to perform their duties effectively. These activities in turn increase the capability for mitigating hazard events. However, most of these non-mitigation Actions were not placed into the **Hazard Mitigation Plan** as they are more appropriate for the Town's ***Emergency Operations Plan*** activities.

The previous Hopkinton Actions and its new Actions translate well over to these new Action categories which will be used for the **Potential Action Evaluation** and **Mitigation Action Plan**.

Potential Action Evaluation

A listing of **3** **Deferred** mitigation Actions from 2011 and **16** **New** mitigation Actions from 2017 important to the Town of Hopkinton was developed for evaluation. Each Potential Action is affiliated with at least one ***Hazard Specific Objective***, a short ***Description*** is provided, and the ***Affected Location*** is provided to ensure easier understanding and reassessment of the Actions in the future during implementation.

The **Potential Action Evaluation** yields **19** mitigation Actions for the **Hazard Mitigation Plan 2017**. These are displayed in **Table 41**, **Table 42**, **Table 43** and **Table 44**.

Table 41

Evaluation of Local Planning and Regulation Actions

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Flood	**#01- 2011**	**Update the Floodplain Zoning Ordinance to Comply with NFIP Requirements to Reduce Flooding Risk**	The Zoning Ordinance needs to be updated as new requirements to the National Flood Insurance Program are necessary for retention of NFIP participation. The Floodplain Ordinance protects life and property by regulating distance of structures to flood hazard areas, regulating elevation, clarifying definitions, regulating new structures and encroachments, stating duties of the Code Enforcement Officer, etc. When FEMA requires future revisions to the Floodplain Development Ordinance, update the language.	Floodplains
Flood, Fire, Wind, Snow & Ice, Earthquake	**#23- 2011**	**Protect Infrastructure Against Earthquakes and Storms by Developing Site Plan and Subdivision Regulation Changes for Underground Utilities**	During recent years, Hopkinton along with most of New Hampshire has experienced severe winter weather that has caused numerous power outages lasting at times for days. Underground utilities will reduce the impact on life and property.	Entire Town, Underground Utilities
Flood, Fire, Wind, Extreme Temperature, Earth, Technological, Human	**#26- 2017**	**Reduce the Risk of Injury from Natural Hazards by Requiring New Road Elevation and/or More than 1 Egress for New Developments**	About 20 neighborhoods have limited access on cul-de-sacs, they only have 1 egress during an emergency. When tree limbs fall and block roadways during winter storms or wind events, evacuation will be curtailed. Regulation revision will be necessary.	Entire Town, New Developments
Flood, Wind, Landslide, Erosion, Rapid Snow Pack Melt	**#27- 2017**	**Revise the Current Drainage, Slope and Elevation Standards in the Town's Road Construction Standards and Class VI Roads Policy to Reduce the Risk of Flooding and Erosion**	Generally, any significant development would require substantial town road improvements, including widening of existing roads, installation of appropriately sized bridges or culverts. Essential for ensuring appropriate drainage, slope, elevation are maintained to avoid flooding, washout or erosion.	Town Roads, Private Roads

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Snow and Ice, Severe Winter Weather	**#28- 2017**	**Reduce the Risk to Travelers During Snowstorms by Amending the Winter Road Maintenance Policy to Accommodate Emergency Parking and Sidewalk Maintenance**	Snow plowing, sanding and salting roads vary based on the temperature, type of storm, and condition of road. Originally Adopted 1978, Recorded 1992. Some additions need to be made such as emergency parking and sidewalk maintenance.	Town Roadways

Source: Hopkinton Hazard Mitigation Committee

Table 42

Evaluation of Structure and Infrastructure Projects

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Flood, Erosion, Debris Impacted Infrastructure	**#07- 2011**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading 12' Diameter Steel Culvert Along East Penacook Road with Box Culvert**	Deer Meadow Brook crosses under East Penacook Road through a 12' diameter steel multiplace pipe arch. The pipe is deteriorating. Replacement of the culvert with a new box culvert should be completed before complete failure to the existing steel culvert. East Penacook Road is a through road into Concord with an estimated 1,300 vehicle trips per day.	East Penacook Road
Flood, Erosion, Debris Impacted Infrastructure	**#29- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #1 at Dolf Brook**	Briar Hill Road along Dolf Brook requires several culvert upgrades.	Briar Hill Road, Dolf Brook
Flood, Erosion, Debris Impacted Infrastructure	**#30- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #2 at Dolf Brook**	Briar Hill Road along Dolf Brook requires several culvert upgrades.	Briar Hill Road, Dolf Brook
Flood, Erosion, Debris Impacted Infrastructure	**#31- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #3 at Dolf Brook**	Briar Hill Road along Dolf Brook requires several culvert upgrades.	Briar Hill Road, Dolf Brook
Flood, Erosion, Debris Impacted Infrastructure	**#32- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #4 at Dolf Brook**	Briar Hill Road along Dolf Brook requires several culvert upgrades.	Briar Hill Road, Dolf Brook
Flood, Erosion, Debris Impacted Infrastructure	**#33- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Rollins Road Culvert at Dolf Brook**	Rollins Road along Dolf Brook requires a culvert upgrade.	Rollins Road, Dolf Brook
Flood, Erosion, Debris Impacted Infrastructure, Scour, Transportation Accidents	**#34- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Broadcove Road Bridge At Dolf Brook**	Broadcove Road Bridge over Dolf Brook needs to be upgraded.	Broadcove Road Bridge, Dolf Brook

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Flood, Erosion, Debris Impacted Infrastructure, Scour, Transportation Accidents	**#35- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Stickney Hill Road Bridge at Boutwell Mill Brook**	Stickney Hill Road Bridge over Browns Brook needs to be upgraded.	Stickney Hill Road Bridge
Flood, Erosion, Debris Impacted Infrastructure	**#36- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Kearsarge Avenue Culvert at Browns Brook**	Kearsarge Avenue over Browns Brook requires a culvert upgrade.	Kearsarge Avenue, Browns Brook
Flood, Erosion, Debris Impacted Infrastructure	**#37- 2017**	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Bound Tree Road Culvert at Hardy Spring Brook**	Bound Tree Road over Hardy Spring Brook requires a culvert upgrade.	Bound Tree Road, Hardy Spring Brook

Source: Hopkinton Hazard Mitigation Committee

Table 43

Evaluation of Natural Systems Protection Actions

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Flood, Erosion, Landslide, Water Quality, Ice, Debris Impacted Infrastructure	**#38- 2017**	**Place Key Wetlands and Slope Parcels Near the Highway into Permanent Conservation to Enhance the Flood Storage Capacity**	Wetlands and slope impairments would inhibit development. Access to major highways is limited.	Land Near I-89
Flood, Erosion, Dam Failure, Debris Impacted Infrastructure, Scour/Erosion	**#39- 2017**	**Upgrade Kimball Lake Dam to Protect Properties from Flooding**	Kimball Lake Earthen/concrete dam is deteriorating. This recreation dam is owned by the Town. Homes and businesses are on Kimball Lake. If the dam failed, water could take out the original Route 202/9 (30mph) roadway.	Kimball Lake Dam
Wildfire, Lightning, Fire	**#40- 2017**	**Identify Additional Locations for and Install Dry Hydrants for Wildfire Suppression**	Developments around the community need dry hydrants to better manage fires in the remote, wooded and forested areas.	Entire Town

Source: Hopkinton Hazard Mitigation Committee

Table 44

Evaluation of Education and Awareness Actions

Fulfills Hazard Objectives	Action Number	Name of Potential Action	Description of Potential Action	Affected Location
Flood, Fire, Wind, Extreme Temperature, Winter Weather, Earthquake, Technological, Human Hazards	**#41- 2017**	**Conduct Outreach with Volunteer Groups to Hold and Promote Natural Disaster Awareness and Mitigation Events**	Town Depts should be holding natural hazard awareness and mitigation events to inform property owners about options and programs. Get an invitation to one of the many volunteer groups in Town and discuss the issues.	Entire Town

Source: Hopkinton Hazard Mitigation Committee

Natural Hazards Evaluated for Which Specific Actions Were Not Identified

The Hazard Mitigation Committee assessed each of hazards and made determinations whether to specifically develop mitigation Actions for all natural hazards. Nearly all the potential Actions can be applied to multiple natural or other hazards based upon the generality of the Action's effect. Still, there could be no solutions or mitigation Actions developed for some of the more difficult to mitigate natural hazards. Many possible reasons are considered such as feasibility, prohibitive cost, jurisdiction, staff availability to develop and administer the project, lack of local support, unrealistic favorable outcome for the effort and more, all resulting in the point that for some natural hazards, potential Actions would not have worked for the Town. Those hazards for which no specific or feasible Action was identified are displayed in Table 45.

Table 45

Committee Assessment of Natural Hazards with No Mitigation Actions

Natural Hazard	Committee Assessment
Tornadoes	**The Committee felt Tornadoes would be an unlikely hazard event. Although if a Tornado were to occur, existing activities of the State Building Code, current Public Works Department's notification of Eversource (for tree removal) are in place. Several of the Severe Wind-related Actions could also apply to Tornadoes. They felt no specific Actions were within the scope of their jurisdiction.**
Downbursts	**The Committee's assessment of Downbursts is the same as Tornadoes and Hurricanes and Tropical Storms. They did not feel specific mitigation Actions for Downbursts could be pursued.**
Hurricanes and Tropical Storms	**Hurricanes and Tropical Storms often carry heavy rains, debris, and flooding along with high winds. The Committee's assessment looks to the other wind and flood hazards for modeling. They felt the Town could not further mitigate these hazards beyond what was being proposed for Severe Wind-related hazards.**
Drought	**The Committee felt Drought is a wide-spread, long-term hazard for which no specific mitigations Actions could be proposed for the Town. The Contoocook Village Water Precinct can call for a voluntary water usage restriction for an indefinite time period to help the Town conserve water.**
Excessive Heat	**The Committee believes Excessive Heat issues may be better addressed at the public education level than by mitigation projects. The Fire Department is considering opening a "cooling shelter" and/or checking on vulnerable residents. The Committee did not feel additional mitigation Actions could be proposed for Excessive Heat beyond those which generally cover public education.**

Source: Hopkinton Hazard Mitigation Committee

8 MITIGATION ACTION PLAN

The **Mitigation Action Plan** is the culmination of the work of the previous Assessments, inventories, and evaluations from the previous Chapters. Actions to help Hopkinton mitigate the damages causes by disasters have been developed and prioritized by Hazard Mitigation consensus in consideration of both existing and new development.

As noted in **7 POTENTIAL ACTION EVALUATION**, each Action falls into (at least) one of these 4 mitigation Action categories:

Local Planning and Regulation
Structure and Infrastructure Projects
Natural Systems Protection
Education and Awareness

Each Action, including the **Deferred** 2011 Actions and the **New** 2017 Actions, is evaluated by the relative ease of completion using a numeric ***Ranking Score*** generated by the STAPLEE prioritization, by the ***Action Timeframe*** by which the Hazard Mitigation Committee would like to see the Action implemented, and by a basic **Cost to Benefit Analysis** as contained within the STAPLEE.

The Actions are numbered for easier tracking. The 2011 Actions received the designation of **#01- 2011** through **#25- 2011**. The 2017 Actions picked up where the prior Actions left off, beginning with **#26-2017** through to **#41- 2017**. Over time, the Actions can be tracked to see which have been **Deferred** and to notice, with the missing numbers, how many have been **Completed** or **Deleted**.

The **Responsible Department** is indicated for each Action as the party who will ensure the Action gets completed. An **Approximate Cost** is provided, although no definitive cost estimates or quotes have been obtained now. Ways the Action can be **Funded** is identified and offered as an avenue to explore during implementation. The purpose is to offer an idea of how much funding is provided for each Action and how it may be paid for.

Hopkinton's Mitigation Action Plan 2017

At the meetings, the Hazard Mitigation Committee identified by consensus these mitigation Actions from the various **Assessments** and evaluations conducted. The process for Action development has been described in previous Chapters and sections. Combined with the visual Maps of the **Hazard Mitigation Plan 2017**, the **Mitigation Action Plan** shown in **Table 46**, **Table 47**, **Table 48** and **Table 49** should be able to guide future hazard mitigation efforts in the Town through an annual implementation process.

Three (**3**) **Deferred** Actions from 2011 and **16** **New** Actions from 2017 combine to develop the **19** Actions of the 2017 **Mitigation Action Plan**. The **Deferred** Actions' cells are highlighted in tan.

Table 46

Local Planning and Regulation Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approximate Cost to Town	What Cost Will Pay For	How Funded
#01- 2011	**Update the Floodplain Zoning Ordinance to Comply with NFIP Requirements to Reduce Flooding Risk**	Ongoing	36	Planning Department	$0	Staff and volunteer labor is in-kind ($0)	N/A
#23- 2011	**Protect Infrastructure Against Earthquakes and Storms by Developing Site Plan and Subdivision Regulation Changes for Underground Utilities**	Short Term 1-2 Years	35	Planning Board	$500	Cost is for printing the updated regulations. Staff and volunteer labor are in-kind.	4191 Planning Board Budget
#26- 2017	**Reduce the Risk of Injury from Natural Hazards by Requiring New Road Elevation and/or More than 1 Egress for New Developments**	Short Term 1-2 Years	35	Planning Board	$500	Cost is for printing the updated regulations. Staff and volunteer labor are in-kind.	4191 Planning Board Budget
#27- 2017	**Revise the Current Drainage, Slope and Elevation Standards in the Town's Road Construction Standards and Class VI Roads Policy to Reduce the Risk of Flooding and Erosion**	Short Term 1-2 Years then Ongoing	36	Select Board	$0	Cost is for in-kind staff and volunteer labor.	N/A
#28- 2017	**Reduce the Risk to Travelers During Snowstorms by Amending the Winter Road Maintenance Policy to Accommodate Emergency Parking and Sidewalk Maintenance**	Short Term 1-2 Years	36	Public Works Department with Town Administration	$500	Cost is for publication of amended policy	Funded by either PW budget or BOS budget

Source: Hopkinton Hazard Mitigation Committee

Table 47

Structure and Infrastructure Projects

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approximate Cost to Town	What Cost Will Pay For	How Funded
#07- 2011	**Reduce Flooding, Erosion and Overflow Damage by Upgrading 12' Diameter Steel Culvert Along East Penacook Road with Box Culvert**	**Medium Term 3-4 Years**	**35**	Public Works Department	$300,000	Cost is for engineering, permitting and installation by contractor. (Grants preferred)	NH State Bridge Aid 80/20, PWD Budget Shimming and Paving, Possible Bond
#29- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #1 at Dolf Brook**	**Medium Term 3-4 Years**	**36**	Public Works Department	$150,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#30- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #2 at Dolf Brook**	**Long Term 4-5 Years**	**36**	Public Works Department	$50,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#31- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #3 at Dolf Brook**	**Medium Term 3-4 Years**	**36**	Public Works Department	$150,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#32- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #4 at Dolf Brook**	**Medium Term 3-4 Years**	**36**	Public Works Department	$150,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#33- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Rollins Road Culvert at Dolf Brook**	**Short Term 1-2 Years**	**36**	Public Works Department	$60,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#34- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Broadcove Road Bridge at Dolf Brook**	**Long Term 4-5 Years**	**36**	Public Works Department	$300,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approximate Cost to Town	What Cost Will Pay For	How Funded
#35- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Stickney Hill Road Bridge at Boutwell Mill Brook**	**Short Term 1-2 Years**	**36**	Public Works Department	$300,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#36- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Kearsarge Avenue Culvert at Browns Brook**	**Long Term 4-5 Years**	**36**	Public Works Department	$200,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article
#37- 2017	**Reduce Flooding, Erosion and Overflow Damage by Upgrading Bound Tree Road Culvert at Hardy Spring Brook**	**Medium Term 3-4 Years**	**36**	Public Works Department	$150,000	Cost is for permitting, engineering, construction	Options include Town Budget Public Works Line Items, General Fund, Bond, or Warrant Article

Source: Hopkinton Hazard Mitigation Committee

Table 48

Natural Systems Protection Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approximate Cost to Town	What Cost Will Pay For	How Funded
#38- 2017	**Place Key Wetlands and Slope Parcels Near the Highway into Permanent Conservation to Enhance the Flood Storage Capacity**	**Long Term 4-5 Years**	**36**	Conservation Commission	$70,000	Current balance of LUTC Conservation Fund to purchase easements or parcels	Land Use Change Tax, Moose Plate Conservation, LCHIP
#39- 2017	**Upgrade Kimball Lake Dam to Protect Properties from Flooding**	**Long Term 4-5 Years**	**35**	Town Administration	$600,000	300,000 to upgrade Kimball Pond dam 8 years ago, same approx. size. Engineering, permitting, contracting cost	Warrant Article
#40- 2017	**Identify Additional Locations for and Install Dry Hydrants for Wildfire Suppression**	**Medium Term 3-4 Years**	**35**	Fire Department	$5,000 per dry hydrant	Cost is for permitting, contractor for installation, pipes and connectors	Building Permit fees, part of private development costs

Source: Hopkinton Hazard Mitigation Committee

Table 49

Education and Awareness Actions

Action Number	Action	Action Timeframe	Ranking Score	Who is Responsible	Approximate Cost to Town	What Cost Will Pay For	How Funded
#41- 2017	**Conduct Outreach with Volunteer Groups to Hold and Promote Natural Disaster Awareness and Mitigation Events**	**Short Term 1-2 Years then Ongoing**	**36**	Emergency Management	$0	Cost is for in-kind staff and volunteer labor.	N/A

Source: Hopkinton Hazard Mitigation Committee

Great Projects…. And the Realities of Project Implementation in New Hampshire

These important but costly and/or time consuming mitigation projects identified in the **Mitigation Action Plan** represent the best case scenarios (or to some, "wish-list" items) for completion. There are many barriers to successful implementation of any project which is outside the typical duties of a Town staff member. The annual struggle to obtain municipal funding at Town Meetings and the uncertainty of political & local support needed for hazard mitigation projects, the limited staff time available to administer and complete the projects, and dwindling volunteer support to help locate grants and work on the Action Plan items all reduce the Town's ability to complete successful hazard mitigation projects within the Plan's 5-year lifespan. Town staff and volunteers are usually forced to be reactive to their numerous daily duties or annual processes and have little availability to be proactive. This is especially true for the Central NH region's smaller communities that rely on voter support for staff hiring and/or hazard mitigation project budget funding, which is 19 out of 20 municipalities.

Therefore, mitigation and other projects are generally completed on an "as-needed basis" or on an "as-available basis" despite the different ways of evaluation and prioritization shown within the **Hazard Mitigation Plan 2017**. Small New Hampshire communities do the best they can with the resources available to them to make ends meet, particularly in times of economic duress or hardship and our aging population. Town Meeting voters decide whether to approve new zoning ordinances which can help mitigate hazards, vote to approve Department Budgets which usually are sustainable and do not allow enough flexibility to plan ahead, and vote to approve Warrant Articles for a hazard mitigation project. Town Volunteers are relied upon to do much of the hazard mitigation work as Town staff are already engaged in real-time, constant public engagement issues and have little additional time available for planning. Few younger people are stepping up to the plate of community volunteering when our existing volunteers are retiring. Indeed, many staff or volunteers have dual or triple roles in the community to fill vacancies, such as a Town Administrator serving as Health Officer and Human Services Officer and a volunteer Fire Chief serving as Emergency Management Director also in a volunteer capacity.

NH communities are used to "toughing it out" and will try to accomplish all they can with the time, funding and resources available to them. However, many of these **2016** Actions may end up **Deferred** to **2021** simply because of the unique nature of our proud, independent State and community culture.

Action Evaluation and Prioritization Methods

A variety of methods were utilized to evaluate and prioritize the Actions. These methods include the enhanced STAPLEE (Social Technical Administrative Political Legal Environmental and Economics) criteria, designating the Action to be completed within a certain timeframe, and completing a basic **Cost to Benefits Analysis**, a later section. These prioritization methods are meant to enable the community to better identify which Actions are more important and are more feasible than others.

STAPLEE METHOD

The Hazard Mitigation Committee ranked each of the mitigation Actions derived from the evaluation process. The total ***Ranking Score*** serves as a guide to the **relative** ease of Action completion by scoring numerous societal and ethical impact questions and does not represent the Town's Action *importance* priority. Instead, the STAPLEE process evaluates each Action and attempts to identify some potential barriers to its success. A score of **36** would indicate that the mitigation strategy, or Action, would be relatively among the easiest Actions to complete from a social and ethical standpoint.

All STAPLEE answers are subjective and depend on the opinions of the Committee members discussing them. The Committee answered these 12 questions with a numeric score of "**1**" (indicating a **NO** response), "**2**" (indicating a **MAYBE/PARTIALLY** response), or "**3**" (indicating a **YES** response).

- Does the action reduce damage and human losses?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?
- Is the action socially acceptable?
- Is the action technically feasible?
- Is the action administratively possible?
- Is the action politically acceptable?
- Is the action legal?
- Does the action offer reasonable benefits compared to its cost in implementing?
- Is the action environmentally sound?

STAPLEE Method	
Range of Ranking Scores	Action Ranking Relative Ease of Completion
36 - 30	Easiest to Complete
29 - 13	Harder to Complete
12 - 1	Most Difficult to Complete

The STAPLEE scores ranged from a high of **36** to a low of **35** as shown in **Figure 21**, all of which fell into the **Easiest to Complete** Action ranking category.

Figure 21

STAPLEE Ranking of Mitigation Actions

Action Number	Does/Is the Action…… Action	Reduce Damage?	Contribute to Town Objectives ?	Meet Regulatio-ns?	Protect Sensitive Structures ?	Implemen-ted Quickly?	Socially Acceptable ?	Technically Feasible?	Admini-stratively Realistic?	Politically Acceptable ?	Legal?	Have a Reasonable Cost to Benefits?	Environ-mentally Sound?	Ranking Score
#01- 2011	Update the Floodplain Zoning Ordinance to Comply with NFIP Requirements to Reduce Flooding Risk	3	3	3	3	3	3	3	3	3	3	3	3	36
#07- 2011	Reduce Flooding, Erosion and Overflow Damage by Upgrading 12' Diameter Steel Culvert Along East Penacook Road with Box Culvert	3	3	3	3	2	3	3	3	3	3	3	3	35
#23- 2011	Develop Site Plan and Subdivision Regulation Changes for Underground Utilities to Protect Infrastructure Against Earthquakes and Storms	3	3	3	3	2	3	3	3	3	3	3	3	35
#26- 2016	Revise the Subdivision and Site Plan Review Regulations to Require Road Elevation and/or More than 1 Egress for New Developments	3	3	3	3	2	3	3	3	3	3	3	3	35
#27- 2016	Review the Town's Road Construction Standards and Class VI Roads Policy and Revise to Require Current Drainage, Slope and Elevation Standards	3	3	3	3	3	3	3	3	3	3	3	3	36
#28- 2016	Amend the Winter Road Maintenance Policy to Accommodate Emergency Parking and Sidewalk Maintenance	3	3	3	3	3	3	3	3	3	3	3	3	36
#29- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #1 at Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#30- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #2 at Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#31- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #3 at Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#32- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Briar Hill Road Culvert #4 at Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#33- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Rollins Road Culvert at Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#34- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Broadcove Road Bridge At Dolf Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#35- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Stickney Hill Road Bridge at Boutwell Mill Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#36- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Kearsarge Avenue Culvert at Browns Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#37- 2016	Reduce Flooding, Erosion and Overflow Damage by Upgrading Bound Tree Road Culvert at Hardy Spring Brook	3	3	3	3	3	3	3	3	3	3	3	3	36
#38- 2016	Place Key Wetlands and Slope Parcels Near the Highway into Permanent Conservation to Enhance the Flood Storage Capacity	3	3	3	3	3	3	3	3	3	3	3	3	36
#39- 2016	Upgrade Kimball Lake Dam to Protect Properties from Flooding	3	3	3	3	3	3	3	3	3	3	2	3	35
#40- 2016	Identify Additional Locations for and Install Dry Hydrants for Wildfire Suppression	3	3	3	3	2	3	3	3	3	3	3	3	35
#41- 2016	Conduct Outreach with Volunteer Groups to Hold and Promote Natural Disaster Awareness and Mitigation Events	3	3	3	3	3	3	3	3	3	3	3	3	36

Source: Hopkinton Hazard Mitigation Committee

ACTION TIMEFRAMES

The Actions are also prioritized by an estimated ***Action Timeframe*** for completion based upon the other Town activities (hazard mitigation-related or not), funding potential for the Action, the need for the Action project, and possible staff time and volunteers available to complete the Action. This **relative** Action importance priority is measured by the time indicated for project completion. All Action projects within the **Mitigation Action Plan** have been assigned an ***Action Timeframe***.

Action Timeframe	Description of Timeframe
Ongoing	Action undertaken throughout the life of the 5-year Plan
Short Term	Action should be undertaken during Years 1-2 of the Plan
Medium Term	Action should be undertaken during Years 3-4 of the Plan
Long Term	Action should be undertaken during Years 4-5 of the Plan

Those projects which are designated as **Ongoing** mean the Action should be undertaken on a regular basis throughout the five-year lifespan of the Plan. Actions that could qualify as **Ongoing** include public education, zoning ordinance or regulation revisions, essential mitigation maintenance and more.

Short Term projects are those which are the more important Actions and should be undertaken during **Years 1-2** of the Plan's lifespan if possible. **Medium Term** Actions are recommended by the Hazard Mitigation Committee to be undertaken during **Years 3-4** of the Plan's lifespan, while **Long Term** Actions are those which should wait until last, with suggested implementation undertaken during Plan **Years 4-5**. It is important to remember the ***Action Timeframes*** are relative to each other and are another an indication of Action importance. If an Action cannot be completed within the ***Action Timeframe***, it may still be a higher priority than other Actions but was unable to be implemented for some reason.

Both the ***Action Timeframe*** and the ***Ranking Score*** are incorporated into the **Mitigation Action Plan** to assist the Town with implementing the hazard mitigation Actions. The Actions can be sorted within their Action Category by either priority for easy display of the desired characteristic; Actions can also be sorted by **Responsible Department** to keep them all together for ease of completion.

COST TO BENEFIT ANALYSIS

A simple **Cost to Benefit Analysis** ranking is contained within the STAPLEE criteria.

9 ANNUAL IMPLEMENTATION AND EVALUATION

The Town received FEMA approval for the prior **Hazard Mitigation Plan** in **April 2011.** The completion of a planning document is merely the first step in its life as an evolving tool. The **Hazard Mitigation Plan Update** is a dynamic document that should be considered by all Town Departments, Boards, and Committees within their normal working environments. While evaluating the effectiveness of Actions in its everyday implementation, everyone should be able to contribute to the relevancy and usefulness of the Plan and to communicate with the Hazard Mitigation Committee where changes should be made. An annual effort will be undertaken to complete Actions and add new Actions as old tasks are completed and new situations arise. This Chapter will discuss the methods by which the Town of Hopkinton will review, monitor, and update its new **Hopkinton Hazard Mitigation Plan Update 2017**.

Annual Monitoring and Update of the Mitigation Action Plan

The Select Board voted to establish a permanent Hazard Mitigation Committee in **Summer 2016**. The purpose is to meet on a regular basis to ensure the **Hazard Mitigation Plan's** Actions are being actively worked on.

The Emergency Management Director or designee should continue to serve as Chair of the Committee for Hazard Mitigation meetings, and should be appointed in such a capacity by the Select Board. Current Hazard Mitigation Committee members can be appointed to continue to participate as members of the permanent Committee.

Committee membership should include the Emergency Management Director, Town Administrator, Fire Chief, Police Chief, Public Works Director, Building Inspector/Code Enforcement Officer, Town Planner, Health Officer, 1 Selectman, 1 Planning Board member, 1 School District Representative and Members at large. Stakeholders who should be solicited to attend meetings and to participate equitably in the Plan development process include Business Community members, Non-profits, and local, State or Federal agency representatives. This provides a wide spectrum of potential interests and opportunities for partnership to develop and accomplish Actions.

This Committee will **aim to meet up to 4 times per year** with the following potential future meeting activities to update the **Mitigation Action Plan** and complete the Plan's annual evaluation as displayed in **Table 50**.

Table 50

Hazard Mitigation Committee Preliminary Annual Future Meeting Activities

Month	Preliminary Interim Activities and/or Meeting Agenda Items
In between meetings	Committee continues update to the **Mitigation Action Plan** using **Department Mitigation Action Progress Reports** and an updated **Action Status Tracking sheet.** Committee provides revised copies to Department Heads, keeps original Word and Excel files accessible on Town computer system.
March Meeting	Committee completes annual update of the **Mitigation Action Plan and the associated Plan Chapter and sections. Annual funding is received from Town Meeting.** Committee determines Action Plan items to pursue for next year, including $0 cost items. Committee informs Department Heads of Action priorities to begin working on and with getting next year's high-cost Action Plan items into the CIP.
June Meeting	**Begin planning for next year's budget**. With HMC help, Department Heads and Board Chairs should have been working on Actions since April. Committee provides a **Progress Report #1** for all Actions to responsible parties for response by beginning of May. Committee prepares **Annual Evaluation of the Plan**.
In between meetings	Committee to assist Department Heads with their budget requests to include Action Plan items, and to determine which Action Plan items should have warrant articles. HMC continues assistance to Departments for Action Plan items. Committee begins to update the **Action Status Tracking Sheet.** Committee ensures Haz Mit Actions are added into the CIP. Committee sends **Progress Reports #2** to Departments for completion by beginning of September.
September Meeting	**Budget funding amounts are in to Select Board.** Committee continues to update the **Action Status Tracking Sheet** from Department/Board progress. HMC attends Selectmen budget meetings and suggests warrant articles for Action Plan items. Committee attends Budget Committee meetings scheduled through January to champion Action item funding. Committee sends **Progress Reports #3** to Departments for completion by beginning of November.
December Meeting	HMC assists Select Board and Budget Committee with getting their mitigation projects funded and written into budgets. Action implementation continues. Committee continues update to the **Action Status Tracking Sheet** using the **Department Mitigation Action Progress Reports from November.**

Sources: Hopkinton Hazard Mitigation Committee 2017

Annually and independent of the Town's budget cycle, a simpler listing of the Hazard Mitigation Committee's tasks should include:

- **Document New Hazard Events that Occurred in Town**
  - Hazard Risk Assessment
  - Local and Area History of Disaster and Hazard Events
- **Coordinate Completion of Annual Mitigation Actions by Assigning to Departments**
  - Appendix B Mitigation Action **Progress Report**
- **Seek and Help Departments Acquire Funding for Actions & Fill in Tracking File**
  - Appendix B Mitigation **Action/Project Status Tracking**
- **Evaluate Effectiveness of the Plan and Its Actions Yearly**
  - Appendix B Plan **Evaluation Worksheet**
- **Obtain Semi-Annual Progress Reports from Departments & Update Tracking File**
  - Appendix B Mitigation **Action/Project Status Tracking**
- **Update & Reprioritize Mitigation Action Plan and Update Supporting Plan Document Sections**
  - Mitigation Action Plan
  - Enhanced STAPLEE Prioritization
  - Hazard Mitigation Plan Update 2017 sections as needed (make a note of the new information added/changed)
- **Repeat**

For meetings, the Emergency Management Director (or Staff Coordinator) will invite other Department members, Board and Committee members, Town Staff, Hopkinton School District Staff, and other participants of the **2017 Plan** Committee meetings. Identified and general members of the public will also be invited. Their purpose is to attend and participate in the meetings as full participants, providing input and assisting with decision making. Public notice will be given as press releases in local papers, will be posted in the public places in Hopkinton, and will be posted on the Town of Hopkinton website at www.hopkinton-nh.gov.

The **Hazard Mitigation Plan's Mitigation Action Plan** will be updated and evaluated annually generally following the suggestions outlined within the Chapter. All publicity information, Agendas, and Attendance Sheets, should be retained and compiled for inclusion into **APPENDIX C**.

The Emergency Management Director and Department heads will work with the Select Board to discuss the funding of Action projects as part of the budget process cycle in the fall of each year. The projects

identified will be placed into the following fiscal year's budget request if needed, including the Capital Improvements Program (CIP), Town Operating Budgets, and other funding methods.

The Federal Emergency Management Agency (FEMA) encourages communities to upload their Hazard Mitigation Plan Actions into an online database. The **Mitigation Action Tracker** follows municipal Actions through their completion. This added attention to the Town's Actions could enable additional support for grant opportunities when it is shown the Town can complete its mitigation projects. The Town would need to set up an account to enter their Actions into the **FEMA Mitigation Action Tracker** at https://mat.msc.fema.gov.

Tasks of the Plan Update

A number of tasks will be accomplished for the complete (five-year, FEMA approved) update to the Hazard Mitigation Plan. Note that information from many Chapters will be used or referenced by other Chapters. The annual **Mitigation Action Plan** update tasks for the Hazard Mitigation Committee are indicated in bulleted list above and are noted below under the brief instructions for chapter updates.

1 PLANNING PROCESS

Add the new Hazard Mitigation Committee members, contributors, and the public who participated in meetings. Add any new Agendas to the Table. Retain all meeting, attendance, publicity and invitation documents in updated **APPENDIX C Meeting Information**.

2 COMMUNITY PROFILE

Revise the Tables with new demographic and housing information as it becomes available. Update the building permit figures. Revise land use data from the Avitar Appraisal System and compare to previous years' data. Update any zoning changes. The text analysis will need to be revised to reflect all changes.

3 GOALS AND OBJECTIVES

Review and update the general and hazard-specific objectives (Flood, Wind, Fire, Extreme Temperature, Earth, Technological, Human) to ensure their continued relevance.

4 HAZARD RISK ASSESSMENT

Review and update the **Hazard Risk Assessment**. Add new disasters, new Public Assistance funding received, and significant new hazard events since the last Plan into the Tables and Appendices**.** Determine the magnitude of new declared disasters. Add any specific narrative dialogue about new hazard events occurring in Hopkinton. Update **Local and Area Hazard Event History** with new disasters or hazard events and review the **Hazard Risk Assessment** for necessary changes. Update **Potential Future Hazards** to document the possible new hazards that could occur in Town based on historic or current evidence.

5 COMMUNITY VULNERABILITY AND LOSS ESTIMATION

Review and update the **APPENDIX A Critical and Community Facility Vulnerability Assessment** Tables to ensure accuracy. Update the Structure Valuation cost when new Avitar assessing data becomes available. Generate additional **Problem Statements** that arise because of issues with facilities. Update the Culvert Upgrade Table. Revise the number and type of buildings in the Special Flood Hazard Areas (floodplains) including new structure valuation and recalculate the discussion values. Once the new structure assessments are available, recalculate the building dollar losses by the other natural hazards. Update the NFIP Tables and changes to the Floodplain Ordinance.

6 CAPABILITY ASSESSMENT

Review and update the **Capability Assessment** for adoption date revisions, changes since the last plan, or future improvements. List additional example capabilities in the Chapter. Add additional mitigation support resource documents to the Table.

7 POTENTIAL ACTION EVALUATION

Review the Actions for validity and revise as needed to place them in different categories: Completed, Deferred or Deleted. Explain why each Action was Deleted or Deferred and indicate when each Action was Completed. Determine any new Actions can be developed from new Problem or new Capability Assessment Future Improvements. List some examples of each type of the 5 actions in the Plan. Revise the **Potential Action Evaluation** to accommodate the Action changes.

8 MITIGATION ACTION PLAN - ANNUAL UPDATE

Remove Completed and Deleted Actions and move to **7 POTENTIAL ACTION EVALUATION.** Add New Actions to the **Mitigation Action Plan 2017** and ensure they are reviewed in the previous Chapter, listed above. Reevaluate Actions not yet completed, remove the Deleted, and evaluate any New Actions utilizing the enhanced **STAPLEE Mitigation Action Prioritization** matrix. Modify the approximate cost, date for completion, and funding changes as needed.

9 ANNUAL PLAN IMPLEMENTATION AND EVALUATING - ANNUAL ACTIVITY

The Hazard Mitigation Committee (HMC) should be permanently appointed by the Select Board to hold up to **4** meetings yearly to review, implement, and evaluate the Plan. Updates any procedures or processes in the Chapter. Use the **APPENDIX B Annual Plan Evaluation and Implementation Worksheets** to guide the annual update of **8 MITIGATION ACTION PLAN**. Keep track of publicity, Department Reports, and all progress made towards the identified Actions. Add progress since the last Plan for implementation programs. Review continued public involvement for accuracy. Add other new information to the Chapter or revise as needed if new information becomes available.

10 APPENDICES

Revise the **APPENDICES A-D** as needed to update the data and documentation for Hopkinton. Ensure all the publicity documents, Agendas, Attendance Sheets, revised files and more are available for transfer

to CNHRPC when the 5-year Plan update is due. These interim files will be placed into an updated **APPENDIX C Meeting Information.**

11 MAPS

Update *Map 1*, *Map 2*, *Map 3*, and *Map 4* of the Plan as needed to reflect the changes of the hazard event locations and site locations. Mapping assistance may be sought elsewhere, such as with the Central NH Regional Planning Commission (CNHRPC). The additional maps of the Soucook and Suncook Rivers fluvial geomorphic assessment were a one-time project with the NH Geological Survey and no further revisions are anticipated to these detailed Maps.

Implementing the Plan through Existing Programs

In addition to work by the Hazard Mitigation Committee and Town Departments, several other mechanisms exist which will ensure that the **Hopkinton Hazard Mitigation Plan Update 2017** receives the attention it requires for optimum benefit. Incorporating Actions from the Plan is often the most common way the Hazard Mitigation Plan can be integrated into other existing municipal programs, as described below.

MASTER PLAN

The **Hopkinton Master Plan** was adopted in **2010**, developed by the Planning Board with assistance from the CNHRPC. The Planning Board reviews **1-2** Chapters per year of the Master Plan and is now attempting a full update to be completed in **2017**.

The Planning Board should consider adopting the Hazard Mitigation Plan Update as a separate Chapter to its Master Plan in accordance with **RSA 674:2.II(e)**. The **Hazard Mitigation Plan** should be presented to the Planning Board after FEMA's approval. The Plan can be considered for adoption after a duly noticed public hearing, just as any typical Chapter of a Master Plan.

Process to Incorporate Actions

The Hazard Mitigation Committee will present the approved **Hazard Mitigation Plan** to the Planning Board within **3** months after FEMA's **Letter of Formal Approval is received** for consideration and adoption into the Master Plan after a duly noticed public hearing. This is the same process used to adopt other components of the Master Plan. The NH State law supporting the development of a natural hazard mitigation plan as a component of a community Master Plan is **RSA 674:2-III(e).** The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to ensure that the relevant **Hazard Mitigation Plan** Actions are incorporated into the Master Plan.

Implementation Progress through the Master Plan Since the 2011 Plan

The existing **2010** Master Plan developed by the Planning Board does not contain the **Hazard Mitigation Plan 2011** (or **2017**) as an Appendix.

How Was This or Will This Be Accomplished?

The **2010** Master Plan will be updated in 2017. This will be an opportune time to integrate the **Hazard Mitigation Plan**. The Planning Board will be given a copy of the **2017 Plan** and can choose to incorporate several Action items that pertain to the Planning Board or incorporate the entire Plan by reference. Several Actions include revisions to Board regulations and to Capital Improvements, Zoning Amendments, or Subdivision and Site Plan Review regulations. The Floodplain Ordinance under the purview of the Planning Board was updated since the last Plan, in **2010**. The Emergency Management Director will recommend that the Board incorporate the identified Planning Board-responsibility Actions as appropriate into the Future Land Use, Implementation, and Community Facilities Chapters and include the **Hazard Mitigation Plan** into the Master Plan Appendix whenever the Planning Board updates the Master Plan.

CAPITAL IMPROVEMENTS PROGRAM

Hopkinton developed its newest **Capital Improvements Program (CIP)** for **2016-2022**, with the intention of an annual update. The HMC would like to ensure Actions requiring capital improvements funding from the **Hazard Mitigation Plan Update** will be inserted into the Capital Improvements Program for funding. Depending on the Town's funding needs, a Capital Reserve Fund for Hazard Mitigation Program Projects may be established to set aside funding for the many projects identified in the Hazard Mitigation Plan Update.

Process to Incorporate Actions

The Hazard Mitigation Committee will oversee the process to begin working with the Planning Board's CIP Committee to incorporate the various Hazard Mitigation Plan projects into the yearly CIP. As the CIP is updated on a yearly basis, a representative from the Hazard Mitigation Committee could request to sit on the CIP Committee to ensure the projects are added.

Implementation Progress through the CIP Since the 2011 Plan

Many of the Completed Actions could be completed because of their placement into and purchase out of the Capital Improvements Program.

How Was This or Will This Be Accomplished?

The Town Departments and Town Administrator will work together with Planning Board to identify the items needed for the **Hazard Mitigation Plan** Action implementation. The Actions identified were then (or will be in the future) added to the next updated CIP.

ZONING ORDINANCE AND REGULATIONS

Several of the implementation strategies proposed involve revisions to the Zoning Ordinance, Subdivision Regulations, and/or the Site Plan Review Regulations. The Town staff and Planning Board annually draft Zoning Ordinance amendments for Town Meeting approval, and will be requested to do so in order to accommodate Actions. The Regulations are updated by the Board as needed.

Process to Incorporate Actions

A Hazard Mitigation Committee member, perhaps the Town Planner, will work with Planning Board to develop appropriate language for modifications to the Zoning Ordinance and the Subdivision and Site Plan Regulations as they deem appropriate as appropriate to accommodate Actions in the **Hazard Mitigation Plan**. Other Committee members, if requested, could help Town staff draft language for respective changes to the Regulations or the Zoning Ordinance, and assist Town staff with presenting the language to the Planning Board for consideration.

The Hazard Mitigation Committee representative will request from the Planning Board a copy of future required language for any FEMA Zoning Ordinance Updates for incorporation into the Plan.

Implementation Progress through Zoning Since the 2011 Plan

The Town adopted the April 19, 2010 NFIP DFIRM Maps and respective updates to the Zoning Ordinance. Other Zoning Ordinance changes did not pertain to mitigation.

How Was This or Will This Be Accomplished?

The Planning Board directly obtains the required NFIP floodplain ordinance revision information from the NH Office of Energy and Planning and provides it to the Select Board for approval, a legislative power granted to them. For any future updates to the Floodplain Development Ordinance not required by FEMA, the changes will have to be approved at Town Meeting.

TOWN MEETING

In Hopkinton, the annual Town Meeting is held in March where the voters of the Town vote to raise money for capital projects and approve the annual operating budget of the Town. This is an opportunity to get some of the Actions of the Hazard Mitigation Plan Update funded.

Process to Incorporate Actions

The Hazard Mitigation Committee members will work with the Budget Committee and Select Board to develop warrant article language for appropriate Actions. A representative from the Hazard Mitigation Committee will provide a copy of the **Mitigation Action Plan** to both the Budget Committee and Select Board and validate the need for funding at the annual Town Meeting to accomplish the projects. The representative will work with the Town Administrator to write warrant article language for approval Action items if needed or to get the items placed into Department Operating Budgets.

Implementation Progress through Town Meeting Since the 2011 Plan

Town Meetings are used to accomplish many of the Action purchases**. Mitigation Actions Completed Since 2011** through separate warrant articles, warrant articles to remove funds from the Capital Improvements Program, or through adoption of Department Operating Budgets and the General Fund.

How Was This or Will This Be Accomplished?

The Emergency Management Director, a member of the Hazard Mitigation Committee, brings Action items to be purchased to the Select Board and Budget Committee for consideration. The CIP contains many of the Actions, as discussed previously. The Select Board and Budget Committee bring Actions to the Town Meeting via warrant articles, as well as the Operating Budgets, additional warrant articles which may include Action items in the CIP, and warrant articles to add funding into the capital reserve funds. Many of the Action items are funded in this manner.

OPERATING BUDGETS

Many of the Actions will not require specific funding but are identified as requiring in-kind Staff labor to perform the work required to undertake the Actions. Town Departments and Staff have rigorous job functions that demand their undivided attention to the tasks required to run their respective Departments. Additions to the work load to accommodate the Actions can put a strain on their ability to serve the public during performance of their normal job duties. When possible, Hopkinton Departments and Staff will be able to prioritize their tasks to work on **Hazard Mitigation Plan Update 2017** Actions. The in-kind work performed comes out of the Operating Budget for that particular Department.

Process to Incorporate Actions

With getting started help from the HMC, the Department or Board given the responsibility to ensure the Action gets completed will work on the Actions allocated to him/her or delegate the Action to another person, when their normal job duties permit. The funding for the Actions comes out of the Department's operating budget as work is undertaken by the Staff person on an as-time-permits basis unless the Action is a component of the Town staff members' normal work duties.

Staff or volunteers will attempt to follow the **Action Timeframe** as a guideline for completion. A yearly review of the **Mitigation Action Plan** by the Hazard Mitigation Committee will reprioritize the Actions, and the members can report on their progress, asking for assistance or more time as needed.

Implementation Progress through Operating Since the 2011 Plan

The Operating Budgets of the Town Departments typically served to implement many of the Actions displayed in **Mitigation Action Plan.**

How Was This or Will This Be Accomplished?

Department heads who participated in the Hazard Mitigation Committee submitted their Action items to Select Board and Budget Committee for consideration. Individual Department needs are recognized as part of their respective Operating Budgets and are proposed to the Select Board and Budget Committee. All Operating Budgets go to Town Meeting for voter approval.

Continued Public Involvement

On behalf of the Hazard Mitigation Committee, the Emergency Management Director and the Staff Coordinator, under direction of the Town Administrator, will be responsible for ensuring that Town Departments and the public have adequate opportunity to participate in the planning process. Administrative staff may be utilized to assist with the public involvement process.

For each interim meeting in the annual update process, and for the five-year update process procedures that will be utilized for public involvement include:

- Provide personal invitations to Town volunteer Board and Committee Chairs, and Budget Committee members;
- Provide personal invitations to Town Department heads;
- Provide personal invitations to the following entities listed below;
- Post public meeting notice flyers on the Town's website at http://www.hopkinton-nh.gov/ and in the Town Offices, Town Library, and Slusser Senior Center;
- Submit media releases to the Concord Monitor (a regional newspaper serving 39 communities around the Concord area) and the Concord Patch (a popular online local news source).

Agencies and businesses to invite to future **Hazard Mitigation Plan Update** meetings include the Hopkinton School District, US Army Corps of Engineers and representatives from business and non-profit community (see **APPENDIX A Critical and Community Facilities Vulnerability Assessment** Tables: Vulnerable Populations, Economic Assets and Recreational and Gathering Sites). The Emergency

Management Directors of the neighboring communities will again be invited as will the NH Homeland Security and Emergency Management Field Representative for Merrimack County.

The Hazard Mitigation Committee will ensure that the Town website's Emergency Management webpage at http://www.hopkinton-nh.gov/ is updated with the Hazard Mitigation meeting notices that first appear on the welcoming Home page. A number of Action Plan items which will be undertaken relate to public education and involvement. The website could be a good way to get the word out.

Implementation and Evaluation of the Plan

During the Committee's annual review of the **Mitigation Action Plan,** the Actions are evaluated as to whether they have been **Completed, Deleted**, or **Deferred.** Those Action types are placed into their respective Tables. Any **New** Actions will be added as necessary. Each of the Actions within the updated **Mitigation Action Plan** will undergo the enhanced STAPLEE ranking as discussed in **8 MITIGATION ACTION PLAN.**

A set of comprehensive **Annual Interim Plan Evaluation and Implementation Worksheets** is available to assist the community with Plan implementation in **APPENDIX B**. These worksheets are to be used during the Hazard Mitigation Committee basic meeting schedule outlined previously in **Table 50**.

The worksheets include administrative and organizational documents, those that are used with the Appendices spreadsheets developed, and two Agendas to get started with HMC Interim Update meetings:

- **Purpose of the Permanent Hazard Mitigation Committee for the Selectmen's Establishment and Committee Appointments**
- **Select Board Appointed Permanent HMC 2017**
- **Interim HMC Meeting Publicity Tracking 2017**
- **Annual Interim Plan Update Evaluation Worksheet 2017**
- **Hazard Mitigation Actions Status Tracking 2017**
- **Department Mitigation Action Progress Report 2017**
- **Attendance Sheet Example 2017**
- **Agenda IM1 Example 2017**
- **Agenda IM2 Example 2017**

The five-year full Plan update will evaluate the Actions in the same manner in addition to fulfilling all of the **TASKS OF THE PLAN UPDATE** earlier in this Chapter.

10 APPENDICES

The following **APPENDICES A-D** are included under a separate electronic or paper document to maintain the relative brevity of this **Hazard Mitigation Plan Update**.

Listing of Hopkinton Hazard Mitigation Plan Update 2017 Appendices

Some of these documents should be updated annually as part of the interim Action implementation and Plan evaluation process*. The remaining **APPENDICES** could be amended as a result of the new or revised annual information, but they are optional. It is necessary to establish a location for placing any new or updated hazard, Action, meeting or Plan data over the 5-year interim until the Plan is fully updated again.

- **A Critical and Community Facility Vulnerability Assessment**
- **B Annual Plan Evaluation and Implementation Worksheets ***
- **C Meeting Information ***
- **D Plan Approval Documentation**

11 MAPS

Four detailed Maps were created during the development of the **Hazard Mitigation Plan 2017**. Data from the previous Plan maps were used, new standardized data layers were available, and Hazard Mitigation Committee members added their own knowledge of sites and hazard events.

Plan Update 2017 Maps

Map 1 - Potential Hazards illustrates potential hazard event locations in Hopkinton that have the possibility of damaging the community in the future. The ***Map 1*** legend includes (technology) infrastructure hazards such as dams, bridges, water lines, gas lines, sewer lines, electric transmission lines, and evacuation routes. Natural hazards are displayed such as Special Flood Hazard Areas (SFHAs), locations of potential road washout, fire/wildfire, and more.

Map 2 - Past Hazards illustrates the locations of where hazard events have occurred in Hopkinton in the past, including areas of flooding, washouts, transportation accidents, fire, lightning, and more.

Map 3 - Critical and Community Facilities includes all of the infrastructure included in ***Map 1 Potential Hazards*** on a background of aerial photography to give readers a better, real world perspective. The locations of all critical facilities and community facilities as recorded in the Community Vulnerability Assessment are displayed on the Map. Each of these sites is numbered on a key listing the names of each facility.

Map 4 - Potential Hazards and Losses utilizes all the features of ***Map 3*** on an aerial photography background and includes the ***Map 1 Potential Hazards*** and any realistic ***Map 2 Past Hazards*** locations where hazard events can occur again.

- **Map 1 - Potential Hazards**
- **Map 2 - Past Hazards**
- **Map 3 - Critical and Community Facilities**
- **Map 4 - Potential Hazards and Losses**