

Town of Brookline, NH Hazard Mitigation Plan Update 2012

Adopted by the:
Brookline Board of Selectmen

Date Approved Pending Adoption: July 17, 2012

Date Adopted: July 30, 2012

Date Approved: August 21, 2012



Prepared with the assistance of the:



NASHUA REGIONAL PLANNING COMMISSION

This project was partially funded by:



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CERTIFICATE OF ADOPTION

**Town of Brookline, New Hampshire
BOARD OF SELECTMEN**

A RESOLUTION ADOPTING THE TOWN OF BROOKLINE HAZARD MITIGATION PLAN UPDATE 2012

WHEREAS, the Town of Brookline received funding, administered by the Nashua Regional Planning Commission, from the New Hampshire Bureau of Emergency Management to prepare the Town of Brookline, NH Hazard Mitigation Plan Update 2012; and

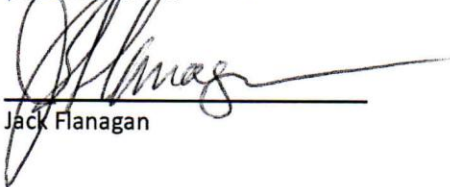
WHEREAS, several public planning meetings were held between April and July of 2011, regarding the development and review of the Town of Brookline, NH Hazard Mitigation Plan Update 2012; and

WHEREAS, the Town of Brookline, NH Hazard Mitigation Plan Update 2012 contains several potential future projects to mitigate hazard damage in the Town of Brookline; and

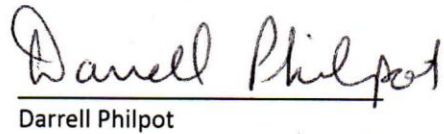
NOW, THEREFORE BE IT RESOLVED that the Brookline Board of Selectmen adopts the Town of Brookline, NH Hazard Mitigation Plan Update 2012.

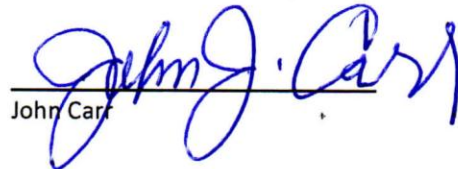
ADOPTED AND SIGNED this 30th day of July 2012


Clarence Farwell


Jack Flanagan

Karl D. Dowling


Darrell Philpot


John Carr

ATTEST



Tad Putney

FEMA APPROVAL LETTER

U.S. Department of Homeland Security
FEMA Region I
99 High Street
Boston, MA 02110



FEMA

August 27, 2012

Clarence Farwell, Chair
Brookline Board of Selectmen
Brookline Town Hall
1 Main Street, P.O. Box 360
Brookline, NH 03033-0360

Dear Mr. Farwell:

Thank you for the opportunity to review the Town of Brookline, NH Hazard Mitigation Plan. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I has evaluated the plan for compliance with 44 CFR Part 201. The plan satisfactorily meets all of the mandatory requirements set forth by the regulations. Congratulations on this achievement!

With this plan approval, the Town is eligible to apply for Mitigation grants administered by FEMA. Requests for mitigation funding will be evaluated individually according to the specific eligibility and requirements of each of these programs. Furthermore, a specific mitigation activity or project identified in your community's plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under the programs referenced above.

The Town's Hazard Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of August 21, 2012** in order to maintain eligibility as an applicant for mitigation grants. Over the next five years, we encourage the town to continue updating the plan's assessment of vulnerability, adhere to its maintenance schedule, and begin implementing, when possible, the mitigation actions proposed in the plan.

Once again, thank you for your continued dedication to public service demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please do not hesitate to contact Marilyn Hilliard at (617) 956-7536.

Sincerely,

A handwritten signature in black ink, appearing to read "Don R. Boyce".

Don R. Boyce
Regional Administrator

DRB:mh

cc: Lance Harbour, Acting State Hazard Mitigation Officer
Beth Peck, NH Homeland Security and Emergency Management Planner
Jill Longval, Nashua Regional Planning Commission
Jennifer Gilbert, NFIP Coordinator

Enclosure

ACKNOWLEDGEMENTS

The Brookline Board of Selectmen extends special thanks to those that assisted in the development of the Plan:

Hazard Mitigation Team

- Wes Whittier, Emergency Management Director, Town of Brookline, NH
- Charles Corey, Fire Chief, Town of Brookline, NH
- Scott Knowles, Assistant Fire Chief/Fire Inspector, Town of Brookline, NH
- Bill Quigley, Police Chief, Town of Brookline, NH
- Valerie Maurer, Town Planner, Town of Brookline, NH
- Jerry Farwell, Road Agent, Town of Brookline, NH

Additional Staff

- Jack Moorhouse, Field Representative, New Hampshire Department of Safety, Division of Homeland Security and Emergency Management
- Patrick Blaisdell, Planning Assistant, Nashua Regional Planning Commission
- Jill Longval, Environmental Planner, Nashua Regional Planning Commission
- Camille Pattison, Principal Planner, Nashua Regional Planning Commission

The Brookline Board of Selectmen offers thanks to the New Hampshire Department of Safety, Division of Homeland Security and Emergency Management (HSEM) and the Federal Emergency Management Administration (FEMA) for their assistance in developing the Plan. In addition, special thanks are extended to the staff of the Nashua Regional Planning Commission (NRPC) for professional services, process facilitation, and preparation of this document.

EXECUTIVE SUMMARY

The Town of Brookline, NH Hazard Mitigation Plan Update 2012 (herein after, the Plan) serves as a tool for town and emergency personnel by identifying hazards to citizens, public and private property, assessing the frequency, intensity, and potential damage anticipated from these local and regional hazards, and identifying actions and strategies that are intended to protect citizens and reduce or prevent damages to property. The Plan was developed by the Brookline Hazard Mitigation Team (herein after, the Team) with the assistance of NRPC and contains statements of policy adopted by the Board of Selectmen. The Plan does not constitute any sections of Brookline's Master Plan, Town Ordinances, or Regulations.

The following natural hazards are addressed:

- Flooding
- Dam Failure
- Hurricanes
- Tornados
- Downbursts
- Lightning
- Wildfires
- Severe Winter Weather
- Earthquakes
- Landslides
- Radon
- Drought

The following man-made hazards are addressed:

- Explosions/Fires
- Traffic Congestion/Accidents
- Hazardous Materials Incidents
- Vandalism
- Terrorism

The list of critical facilities includes:

- Electric Power Lines, Sub-Stations;
- Water Facilities;
- Gas Facilities;
- Fire Stations and Law Enforcement Facilities;
- Schools;
- Childcare Facilities;
- Commercial Centers;
- Bridges;
- Transportation Routes; and
- Facilities Storing Chemicals and/or Hazardous Materials.

The list of areas of concern includes:

- Large Open Spaces Susceptible to Wildfire/Lightning Strikes;
- Known Flooding Locations;
- Cellular Towers;
- Bridges;
- Motels/Hotels;
- Areas of Traffic Congestion and Accidents;
- Recreational Facilities;
- Churches; and

- Multi-Family Housing.

The Brookline Hazard Mitigation Plan Update 2012 is considered a work in progress and should be revised on a regular basis to assess whether the existing and suggested mitigation strategies are successful. Copies have been distributed to all municipal departments and a copy will remain on file at NRPC.

This is an update to the original Plan adopted in 2006. As part of the update process, NRPC staff developed a list of new sections and text that are now required and must be incorporated into subsequent updates and plans. Each section of the entire Plan has been reviewed in great detail and relevant updates have been made as needed throughout the Plan. Updates were completed with a combination of input from Town staff as well as demographic and land use data from NRPC. These updates included the following changes:

- Chapter I, Section B – Methodology (Updated plans to consider in the Plan update process)
- Chapter I, Section C - Hazard Mitigation Goals and Objectives of the State of New Hampshire (Updated hazard mitigation goals)
- Chapter II, Section A – Town Overview (Updated population figures)
- Chapter II, Section B – Development Trends (Updated population and housing trends)
- Map 2: Watershed Boundaries in Brookline and Table 1: Watersheds in Brookline (Based on more recent watershed classifications)
- Figure 1: Population Trends of Brookline (New graphic displaying population trends in Brookline 1860-2030)
- Table 3: General Land Use Types in Brookline and Map 3 - Land Use Classes in Brookline, 2011 (New graphics illustrating most recent land use types in Brookline)
- Map 4: Location of Past Hazards in Brookline and Table 3: Past Hazard Events in Brookline, Hillsborough County, and State of NH (Additional past hazard events added)
- Chapter III, Section C – Potential Hazards to Critical Facilities and Areas of Concern (Additional dams and areas of high traffic congestion/accidents added)
- Map 5: Location of Critical Facilities and Areas of Concern in Brookline and Table 5: Hazards to Critical Facilities and Areas of Concern in Brookline (Updated businesses, locations, and critical facilities and areas of concern)
- Table 6: Structures in the Floodplain (Newly added table displaying all structures in the 100 year floodplain)
- Map 6: Structures Partially or Completely Located in the 100 Year Floodplain (Based on more recent floodplain classifications)
- Chapter IV, Section A – Prioritization of Critical Facilities and Areas of Concern (Updated emergency response, facilities and areas to protect in a hazard event, and potential resources)
- Chapter IV, Section B – National Flood Insurance Participation (New section on National Flood Insurance Participation)
- Table 7: Critical Facilities Matrix (Reviewed and updated for relevancy)
- Chapter IV, Section D – Calculating the Potential Loss (Updated traffic congestion and vehicular accidents, dam failure, and flooding (riverine) based on up-to-date structures and assessed building value)
- Table 8: Risk Probability Matrix (Newly added table indicating the probability that a particular hazard will occur in Brookline)
- Chapter IV, Section E – Assessment of Future Development Losses (Updated assessment of future development losses)
- Map 7: Facilities in Brookline Identified in Potential Loss Analysis (Updated with additional past hazards and critical facilities/areas of concern)
- Table 9: Existing Mitigation Strategies (Added items from Table 9 that have been accomplished since the last update. Removed items no longer deemed relevant)
- Chapter V, Section B – Completed or Implemented Mitigation Measures (New section detailing mitigation actions that have been added, moved, or removed from Table 9 and 10)
- Table 10: Proposed Mitigation Strategies (Added newly proposed mitigation strategies. Removed items no longer deemed relevant)

- Table 11: STAPLEE Analyses of Proposed Mitigation Strategies (Updated with new mitigation strategies)
- Table 12: Prioritized Mitigation Projects and Action Plan (Updated to show new prioritization and strategies)

CHAPTER I. INTRODUCTION

A. Background

The New Hampshire Department of Safety, Division of Homeland Security and Emergency Management (HSEM) has a goal for all communities within the State of New Hampshire to establish Local Hazard Mitigation Plans as a means to reduce and mitigate future losses from natural or man-made hazard events. HSEM outlined a process whereby communities throughout the State may be eligible for grants and other assistance upon completion of a local Hazard Mitigation Plan. A handbook entitled Hazard Mitigation Planning for New Hampshire Communities was created by HSEM to assist communities in developing local plans. The State's Regional Planning Commissions are charged with providing assistance to selected communities to develop local plans.

The Plan was prepared by Town of Brookline staff with the assistance and professional services of NRPC under contract with the HSEM operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition). The Plan serves as a strategic planning tool for use by the Town of Brookline in its efforts to identify and mitigate the future impacts of natural and/or man-made hazard events. This Plan does not constitute any section of the Brookline Master Plan, Zoning Ordinance, or Emergency Management Plan.

B. Methodology

In April of 2011, NRPC organized the first public meeting with representatives from the Town of Brookline to begin the initial planning stages of the Plan. NRPC and the Team developed the content of the Plan using the nine-step process set forth in Hazard Mitigation Planning for New Hampshire Communities. The Team also used the Hudson and Pelham Hazard Mitigation Plans as templates for a general outline and format. Meetings were held on April 6th, 2011, May 4th, 2011, June 1st, 2011, and July 6th, 2011. These meetings involved representatives from the following departments: Fire, Police, Emergency Management, Planning, and Highway. The Team sought participation from neighboring communities, leaders in industry and education, and the general public via direct mail to key contacts in the region as well as notifications in the following locations (see Appendix H for additional details):

Dartmouth Hitchcock Family Practice	Nashua Airport Authority
Homeland Security and EMS	Town of Mason
American Red Cross	Town of Milford
Southern NH Medical Center	Town of Brookline
St. Joseph's Medical Center	Town of Townsend, MA
Public Service of NH	Franklin Pierce College
Manchester Boston Regional Airport	Southern NH University
Daniel Webster College	Hesser College
Nashua Community College	

There was no response or participation from any of the neighboring communities, industry and education leaders, or the general public contacted as part of this process.

In addition, information and recommendations from the following documents were considered and included if applicable into the update of this Plan: Brookline Master Plan, Brookline Zoning and Subdivision Regulations, Emergency Action Plan for the Pierce Pond Dam, Local Emergency Operations Plan, Greater Nashua Regional Pandemic Plan, Souhegan Mutual Aid Association, Mutual Aid Agreement with Townsend, MA, Mutual Aid for Fire, Police, and Ambulance, and Mutual Agreements with Surrounding Communities. Ultimately, the Brookline Master Plan, Brookline Zoning and Subdivision Regulations, and Brookline Emergency Operations Plan were incorporated to form the content of this Hazard Mitigation Plan update. Their use is referenced throughout this plan.

The following is a summary of the nine-step process conducted to compile the Plan.

Step 1 – Establish and Orient Hazard Mitigation Team

The Team was established in the Spring of 2011 and was comprised of representatives from the following departments: Fire, Police, Emergency Management, Planning, and Highway. Meeting notifications were posted in the Town Hall, the Library, the Town website, and the Hollis/Brookline Journal.

Step 2 – Map the Hazards and Identify Critical Facilities

Participants updated data about damage from historic natural disasters that have occurred and areas where critical man-made facilities and other features may be at risk in the future for loss of life, property damage, environmental pollution, and other risk factors. NRPC generated a set of base maps that were used in the process of identifying past and future hazards.

Participants updated facilities and areas that were considered to be important to the Town for emergency management purposes, for provision of utilities and community services, evacuation routes, and for recreational and social value. Using existing databases, local orthophotos, community maps, local assessing data, and floodplain maps, NRPC plotted the location of these sites on a map. The locations marked on the map represent the entrance to a building or the approximate center of open area sites.

Step 3 – Assessing Vulnerability

Once the critical facilities and areas of concern were identified, NRPC discussed the potential loss of critical facilities based on the frequency and potential severity of the following hazards:

- 1) Flooding
- 2) Dam Failure
- 3) Hurricanes
- 4) Tornados
- 5) Downbursts
- 6) Lightning
- 7) Wildfires
- 8) Severe Winter Weather
- 9) Earthquakes
- 10) Landslides
- 11) Radon
- 12) Drought
- 13) Explosions/Fire
- 14) Traffic Congestion/Accidents
- 15) Hazardous Materials Incidents
- 16) Vandalism
- 17) Terrorism

A Critical Facilities Matrix that ranks each critical facility and area of concern, by the potential risk of being affected by a natural or manmade hazard was also constructed. Each hazard is ranked as having a low, medium, or high risk of potentially severely affecting the facility.

Step 4 - Analyzing Development Trends

Current development trends are identified at the end of Chapter II, in Section B, Development Trends. Future development trends are identified at the end of Chapter IV, in Section E, Assessment of Future Development Losses.

Step 5 - Identify Currently Established Strategies and Gaps in Current Protection

After collecting detailed information on each critical facility in Brookline, the Team and NRPC staff identified existing Town mitigation strategies relative to flooding, wind, fire, ice and snow events, earthquakes, hazardous material leaks, traffic congestion and vehicular accidents, and terrorism. The existing strategies were then reviewed for coverage and effectiveness as well as the need for improvement.

Step 6 – Brainstorm and Evaluate Disaster Minimization Alternatives

After developing a list of existing hazard mitigation strategies, the Team was able to identify gaps in the existing mitigation measures. These gaps were taken into consideration during the development of mitigation goals and proposed mitigation measures. The Team also determined which proposed mitigation activities had been completed and they were moved to Table 9: Existing Mitigation Strategies.

Step 7 – Select Actions

The proposed hazard mitigation actions and strategies were reviewed and each strategy was rated (good, average, or poor) for its effectiveness according to seven factors (e.g., technical and administrative applicability, political and social acceptability, legal authority, environmental impact, financial feasibility). Each factor was then scored and all scores were totaled for each strategy. Strategies were ranked by overall score for preliminary prioritization then reviewed again under Step 9.

The preliminary prioritization list was reviewed in order to make changes and determine a final prioritization for new hazard mitigation actions and existing protection strategy improvements identified in previous steps.

Step 8 – Develop a Strategy

The implementation strategy was updated and included person(s) responsible for implementation (who), a timeline for completion (when), and a funding source and/or technical assistance source (how) for each identified hazard mitigation action.

Step 9 – Adopt and Monitor the Plan and Continued Public Input

The Emergency Management Director will be responsible for ensuring that the Town Departments and the public have adequate opportunity to participate in the maintenance and update of the Plan. The Team may solicit direct involvement from the Board of Selectmen and Town Departments. The Team will advertise the process in the local paper, in Town offices, and via the internet.

C. Hazard Mitigation Goals and Objectives of the State of New Hampshire

HSEM identified twelve overall goals of the State which are listed in the NH State Natural Hazards Mitigation Plan, October 2010 Edition and are listed in the following order:

1. To improve upon the protection of the general population, the citizens of the State, and guests from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the State's Critical Support Services.
3. To reduce the potential impact of natural and man-made disasters on Critical Facilities in the State.
4. To reduce the potential impact of natural and man-made disasters on the State's infrastructure.
5. To improve Emergency Preparedness.
6. To improve the State's Disaster Response and Recovery Capability.

7. To reduce the potential impact of natural and man-made disasters on private property.
8. To reduce the potential impact of natural and man-made disasters on the State's economy.
9. To reduce the potential impact of natural and man-made disasters on the State's natural environment.
10. To reduce the State's liability with respect to natural and man-made hazards generally.
11. To reduce the potential impact of natural and man-made disasters on the State's specific historic treasures and interests as well as other tangible and intangible characteristics which add to the quality of life of the citizens and guests of the State.
12. To identify, introduce, and implement cost effective Hazard Mitigation measures so as to accomplish the State's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation generally.

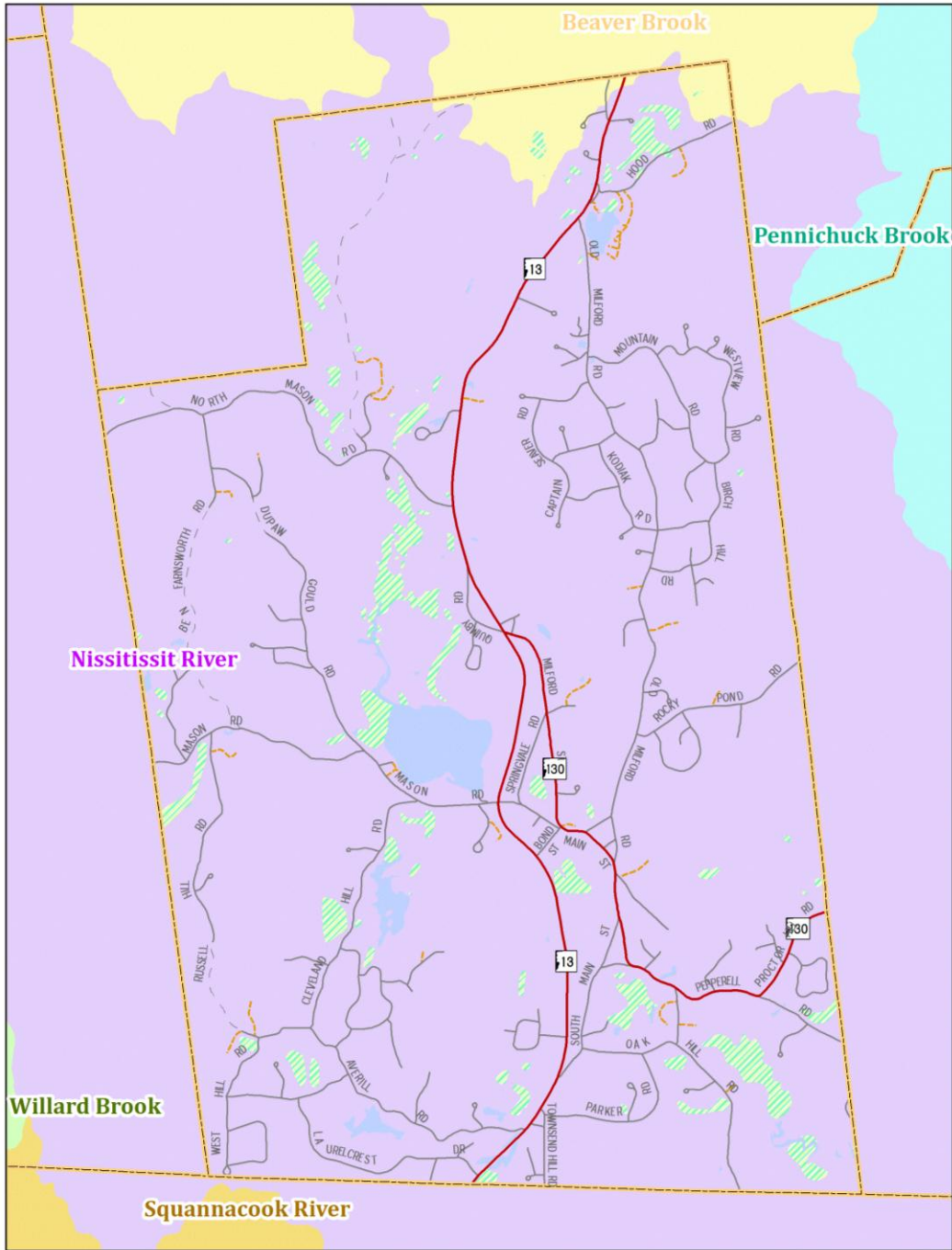
The Team declared a set of overall goals to help guide the development of the Plan. These goals support Brookline's Master Plan and are derived from recommendations of the Team and the New Hampshire Multi-Hazard Mitigation Plan Goals and Objectives.

The primary goal of the Team is to comply with the FEMA requirement to update the Hazard Mitigation Plan not more than every five (5) years and to update or make the necessary changes so that the Plan will continue to be a useful tool in helping mitigate or avoid future injury, loss of life, damage, or destruction of property caused by natural and man-made hazards.

The following additional goals are useful for successful maintenance and implementation of the Plan:

- Monitor the natural hazards that may impact Brookline.
Examples include landslides, earthquakes, snowstorms, and wildfires.
- Monitor possible risks from the natural hazards.
Examples include identifying where these hazards have occurred in the past and what areas might be impacted if to occur in the future.
- Identify resources, strategies, actions or plans available to Brookline to help mitigate the impact of the natural hazard events.
Examples include updating Emergency Operations Plans, culvert improvements for evacuation roads, etc.
- To increase public awareness of natural and man-made hazards and how to prepare for and react to them through continued public outreach and education.

MAP 2: WATERSHED BOUNDARIES IN BROOKLINE



Source: NRPC GIS, 2011

TABLE 1: WATERSHEDS IN BROOKLINE

Watershed	Acres in Brookline	Percentage of Brookline
Beaver Brook	251.5	1.9%
Nissitissit River	12,672.9	98.1%
Total Area:	12,924.4	100%

Source: NRPC GIS, 2011

B. Development Trends

The Brookline Master Plan, 2011 Update, was used to form the content of this section, including the discussion, Tables 2 and 3, Figure 1, and Map 3.

Brookline’s population grew rapidly over the last fifty years; there were just under 800 people counted in Brookline during the 1960 Census and just under 5,000 in the 2010 Census. The largest population increase during that time was between 1990 and 2000, when Brookline grew over 73%. This represents one of the largest percent increases of any community in New Hampshire during that decade and the largest increase of any community over 500 people. However, that rate of growth slowed according to the 2010 Census, which showed a 19% increase in Brookline’s population. This trend is similar to the trend across the NRPC region, Hillsborough County, the state, and the country, which all experienced lower population growth rates between 2000 and 2010 than between 1990 and 2000. The annual percent growth rate between 2000 and 2010 is 1.8% per year; this is down from 5.7% per year between 1990 and 2010. Over the last fifty years, the annual percent growth rate in Brookline is 3.7%, which is significantly higher than the annual percent growth rate for the region (2.35%), the County (1.63%), and the State (1.56%). According to the US Census Bureau, Brookline has about twenty square miles of land. With the 2010 population of 4,991, the current population density is 252 people per square mile.

Among municipalities in the Nashua Region, Brookline has experienced the third highest percent change in housing units from 2000-2010. The most prevalent housing type in Brookline is 1-unit, detached housing. A total of 561 building permits were issued in Brookline from 1995-2009. 550 of these permits were for single family homes. The general trend has been a decline in the number of building permits issued on an annual basis since 1995. There were only a select number of manufactured housing units in the Town as of the 2005-2009 American Community Survey. New residential developments such as the recently subdivided Hutchinson Hill Estates are generally found on lots of about one acre in size and are spread throughout Town. There are no centralized clusters of housing. Due to Brookline's hilly terrain, much of the development has consumed farmland or encroached on the Town's sensitive wetland and hillside areas.

In addition to residential development, automobile dependent commercial uses have developed primarily along Route 13 and 130, two of the Town's most important thoroughfares. A majority of Brookline’s main economic contributors are present along the Town's two industrial/commercial districts in the north-central and south-central portions of Town. Much of the southern industrial/commercial district encompasses sensitive wetlands and is closely situated to Lake Potanipo. The northern industrial/commercial district includes fewer wetlands but contains large areas of steep slopes. Generalized existing land-use classes are depicted in Table 3 and illustrated on Map 3.

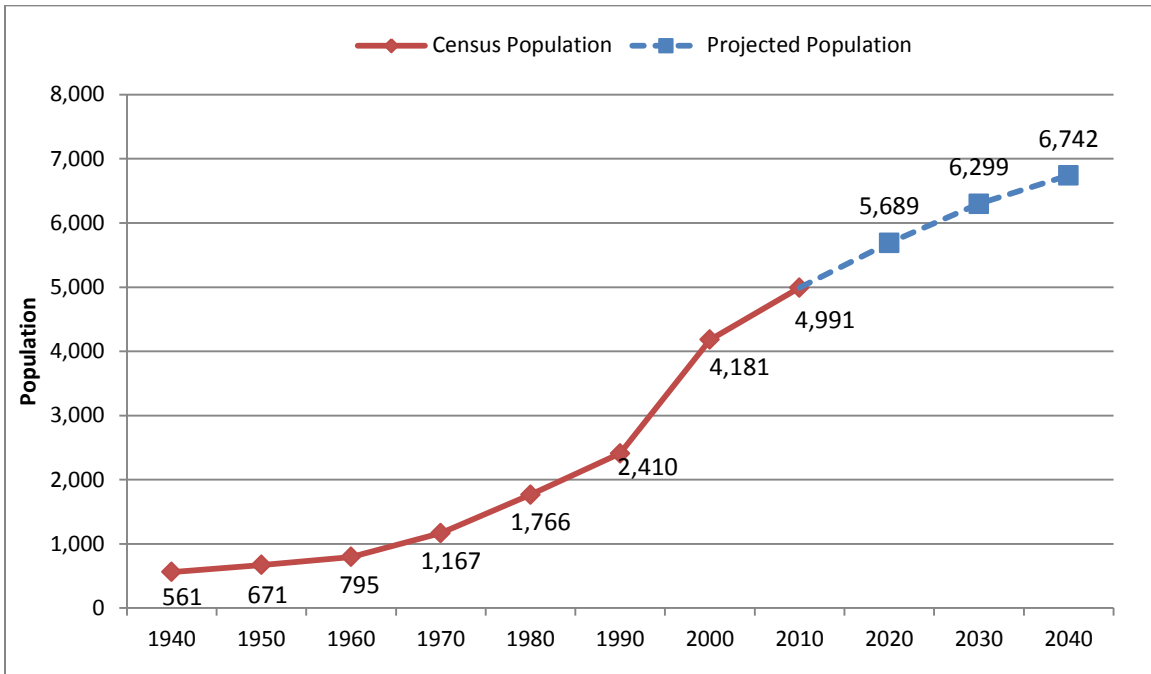
Though slower than previous decades, strong growth is still expected to continue in Brookline through the next decade, as shown in Table 2 below. However, as the base population grows, the Town’s growth rate will decline.

TABLE 2: BROOKLINE POPULATION PROJECTIONS (2015 – 2040)

Year	Projection	
	Population	% Change
2015	5,344	7.1%
2020	5,689	6.5%
2025	6,010	5.6%
2030	6,299	4.8%
2035	6,542	3.9%
2040	6,742	3.1%

Source: NRPC, NH DHHS Health Statistics and Data Management Section

FIGURE 1: BROOKLINE ACTUAL (1940 – 2010) AND PROJECTED (2020 – 2040) POPULATION



Source: NRPC, NH DHHS Health Statistics and Data Management Section

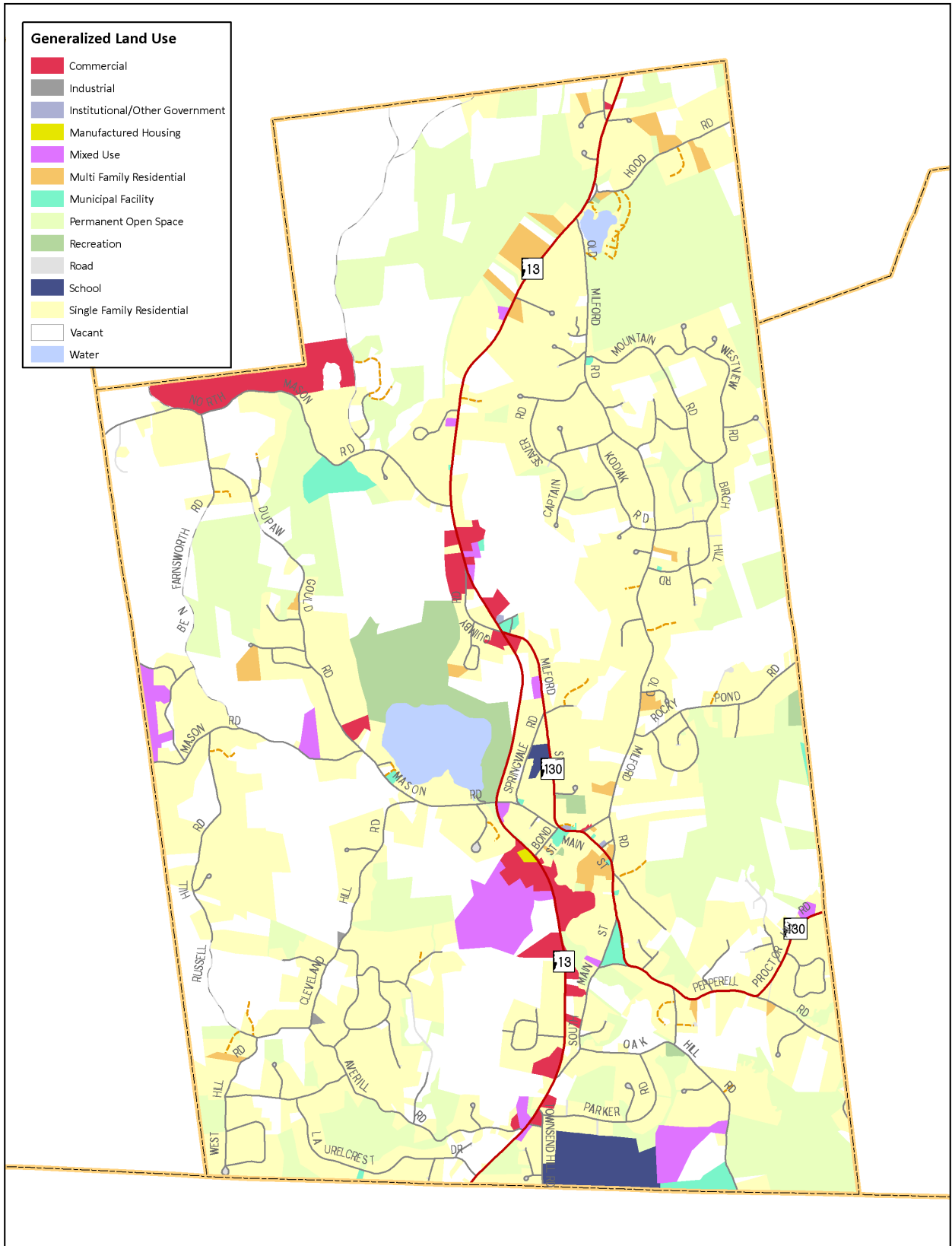
Note: To show consistent year intervals in the graph, projections for 2015, 2025 and 2035 are not displayed.

TABLE 3: GENERAL LAND USE TYPES IN BROOKLINE

Land Use	Total Acres	Percent Total Land Area
Commercial	267	2%
Industrial	3	0.2%
Institutional/Other Government	3	0.2%
Mixed Use	212	1.6%
Municipal/School	205	1.5%
Permanent Open Space/Recreation	2,603	20.1%
Residential	5,030	38.9%
Road	332	2.5%
Vacant	4,117	31.8%
Water	159	1.2%
Total	12,931	100.0

Source: NRPC GIS, 2011

MAP 3: LAND USE CLASSES IN BROOKLINE, 2011



Source: NRPC GIS, 2011

CHAPTER III. COMMUNITY HAZARDS

A. Hazard Descriptions

The first step in planning for natural hazards is to identify hazards that may affect the Town. Some communities are more susceptible to certain hazards (i.e., flooding near rivers, hurricanes on the seacoast, etc.). The following hazards that are most likely to target the State of New Hampshire and Brookline include:

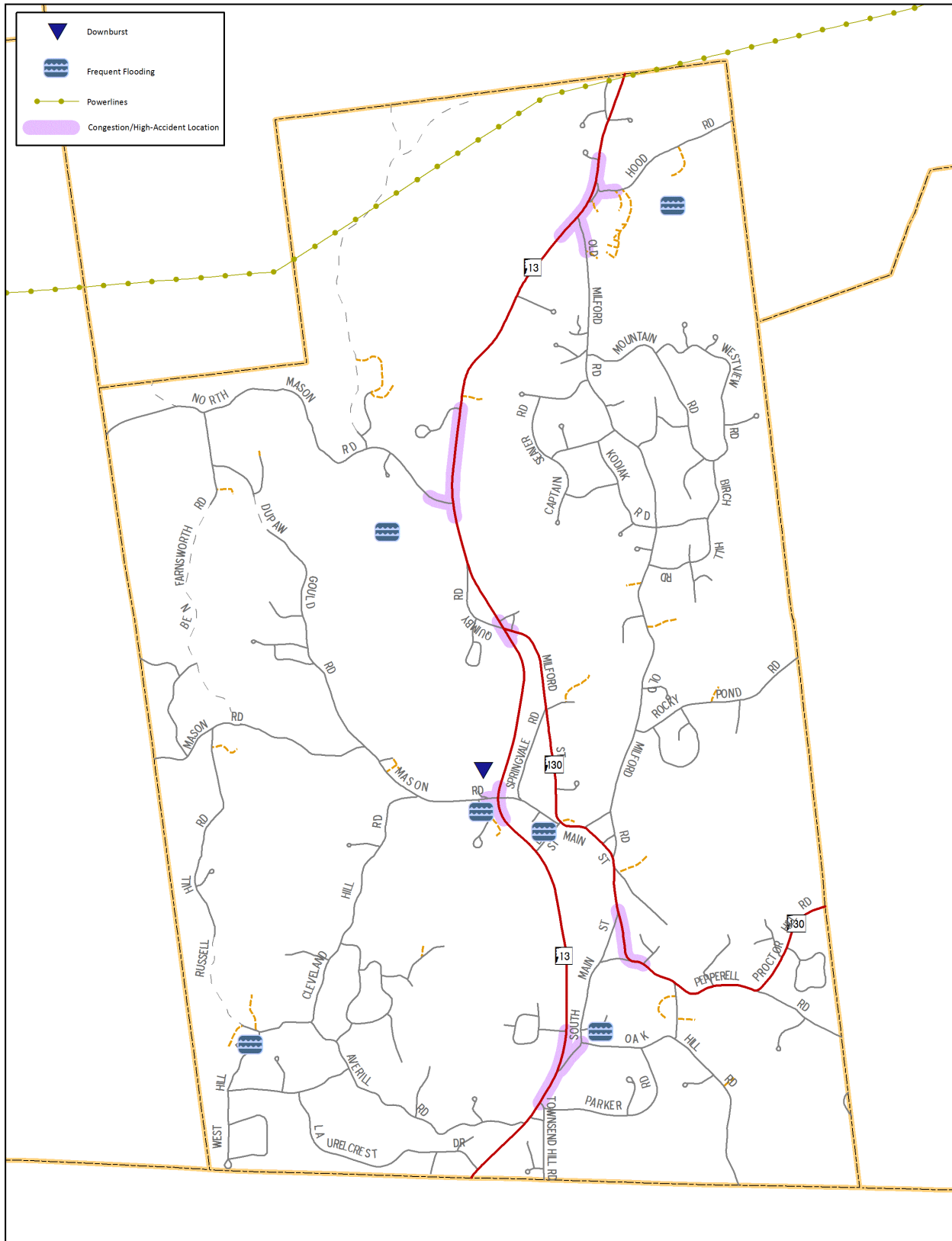
- **Flooding** - debris-impacted infrastructure, erosion, mudslides, rapid snow pack melt, and river ice jams;
- **Dam Failure** - during severe weather such as a flood, a dam's ability to serve as a flood control mechanism may be challenged and could breach or fail;
- **Hurricanes** - a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center;
- **Tornadoes** - a violent windstorm characterized by a twisting, funnel shaped cloud;
- **Downbursts** - a severe localized wind blasting down from a thunderstorm;
- **Lightning** - giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground;
- **Wildfires** - including grass fires, forest fires, drought-related fires, and issues with isolated homes and residential areas;
- **Severe Winter Weather** - including heavy snow storms, ice storms, "Nor'-Easters," blizzards, and hailstorms;
- **Earthquakes** - geologic events related to seismic activity;
- **Landslides** - the downward or outward movement of slope forming materials reacting under the force of gravity;
- **Radon** - naturally occurring radioactive gas formed by the natural breakdown of uranium in soil, rock and water;
- **Drought** - a long period of abnormally low precipitation, especially one that adversely affects growing conditions;
- **Explosions/Fires** - a violent release of energy due to a sudden increase in volume within a given space;
- **Traffic Congestion and Vehicular Accidents** - most prominent in the Town Center and along major thoroughfares;
- **Hazardous Materials** - Any substance which has been determined to be either a health hazard or a physical hazard;
- **Vandalism** - willful wanton and malicious destruction of the property of others; and
- **Terrorism** - the calculated use or threat of violence against civilians in order to attain goals that are political, religious, or ideological in nature through intimidation, coercion, or instilling fear.

Appendix A includes more in-depth definitions of these hazards that have occurred or could occur in New Hampshire and identifies the potential for each hazard to occur in the Town of Brookline.

B. Past Hazard Events

The next step in hazard mitigation planning is to identify where hazard events have occurred in the past and if possible, what facilities or areas were adversely impacted. A base map that included all of the critical facilities and areas of concern in Brookline, the 100-year floodplain, political boundaries, waterbodies, and the road network were used to locate all of the past hazard events. This step in the planning process serves as a stepping stone for predicting where future hazards could potentially occur. NRPC and Brookline participants identified past events in the Town of Brookline, which are included in Map 4 and Table 4.

MAP 4: LOCATION OF PAST HAZARDS IN BROOKLINE



Source: NRPC GIS, 2011

**TABLE 4: PAST HAZARD EVENTS IN BROOKLINE, HILLSBOROUGH COUNTY,
AND STATE OF NEW HAMPSHIRE**

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Flood	March 11-21, 1936	Statewide	\$133,000,000 in damage throughout New England, 77,000 homeless.	Double Flood; snowmelt/heavy rain. Hooksett Main St. under 18-20 feet of water.
Flood	September 21, 1938	Statewide	Unknown	Hurricane; stream stage similar to March 1936
Flood	April 1969	Statewide	Road Network Nothing out	Record snow depth; rapid melt with sporadic rain.
Flood	August 7-11 1990	Statewide	Road Network Trees down	FEMA DR-876-NH: A series of storms with moderate to heavy rains; widespread flooding
Flood	August 19, 1991	Statewide	Road Network Trees down	FEMA DR-917-NH: Hurricane Bob; effects felt statewide; counties to east hardest hit.
Flood	October 28, 1996	Hillsborough County	Unknown - Typically structures and infrastructure in the floodplain	North and west regions; severe storms
Mother's Day Flood	May 2006	Statewide	Impacts to road network	
Hurricane	October 18, 19 1778	Portions of State	Unknown	40-75 mph winds
Hurricane	1804	Portions of State	Unknown	
Hurricane	September 8, 1869	Portions of State	Unknown	> 50 mph winds
Great Hurricane Of 1938	September 28, 1938	All of Southern New England	2 billion board feet of timber destroyed; electric and telephone disrupted, structures damaged, flooding; statewide 1,363 families received assistance	Max. wind speed of 186 mph in MA and 138 mph max. elsewhere 13 of 494 dead in NH; \$12,337,643 total storm losses (1938 dollars), timber not included
Hurricane Carol	August 31, 1954	Southern New England	Extensive tree and crop damage in State	SAFFIR/SIMPSON HURRICANE SCALE ¹ - Category 3, winds 111-130 mph
Hurricane Donna	September 12, 1960	Southern and Central NH	Unknown	Category 3 Heavy Flooding
Hurricane Belle	August 10, 1976	Southern New England	Unknown	Category 1, winds 74-95 mph. Rain and flooding in NH.
Hurricane Gloria	September 27, 1985	Southern New England	Major trees down, roads closed , power out for a number of days	Category 2, winds 96-110 mph >70 mph winds; minor wind damage and flooding.
Tropical Storm Floyd	September 16-18 1999	Statewide	Unknown	FEMA-DR-1305-NH: Heavy rains.
Tropical Storm Irene	August 26, 2011	Statewide	Damage to roads and bridges	FEMA-DR-4026

¹ For a complete description of the Saffir/Simpson Hurricane Scale see Appendix F.

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Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Tornado	July 28, 1748	Hillsborough County	Unknown-Typically localized structure and tree damage.	
Tornado	May 21, 1814	Hillsborough County	Unknown	
Tornado	September 15, 1922	Hillsborough County	Unknown-Typically localized structure, tree and power-line damage	FUJITA TORNADO DAMAGE SCALE F2 (113-157 mph) ²
Tornado	June 27, 1956	Hillsborough County	Unknown	F1 (73-112 mph)
Tornado	July 2, 1961	Hillsborough County	Unknown	F2
Tornado	July 21, 1961	Hillsborough County	Unknown	F1
Tornado	May 9, 1963	Hillsborough County	Unknown	F1
Tornado (2)	May 20, 1963	Hillsborough County	Unknown	F1
Tornado	June 9, 1963	Hillsborough County	Unknown	F2
Tornado	August 28, 1965	Hillsborough County	Unknown	F1
Tornado	July 19, 1966	Hillsborough County	Unknown	F1
Tornado	July 17, 1968	Hillsborough County	Unknown	F2
Tornado (2)	August 20, 1968	Hillsborough County	Unknown	F1 F3 (158-206 mph)
Tornado	July 16, 1970	Hillsborough County	Unknown	F1
Tornado	July 19, 1972	Hillsborough County	Unknown	F1
Tornado	July 19, 1978	Hillsborough County	Minor damage	F0 (40-72 mph)
Tornado (2)	July 5, 1984	Hillsborough County	Unknown	F1
Tornado	July 16, 1986	Hillsborough County	Unknown	F1
Ice Storm	December 17-20 1929	NH	Telephone, telegraph and power disrupted	
Ice Storm	December 29-30 1942	NH	Unknown-Typically damage to overhead wires and trees	Glaze storm; severe intensity
Ice Storm	December 22 1969	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 17, 1970	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 8-25 1979	NH	Major disruption of Power and transportation	
Ice Storm	March 3-6 1991	Southern NH	Numerous power outages in Southern NH	Numerous in Southern NH
Ice Storm	December, 1997	Parts of NH	Power and Roadway Network	Loss of power for seven days.

²For a complete description of the Fujita Tornado Damage Scale see Appendix E.

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Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Ice Storm	January 7, 1998	Hillsborough County	Power and phone disrupted, communication tower collapsed	\$17,000,000 in damages to PSNH equipment.
Ice Storm	December 2008	Statewide	Impacts to road network and power lines	
Snowstorm	February 4-7 1920	New England	Disrupt transportation for weeks	Boston 37-50 cm of sleet , ice and snow
Snowstorm	February 15, 1940	New England	Paralyzed New England	30 cm of snow with high wind.
Snowstorm	February 14-17 1958	Southern NH	Unknown	20-33" of snow
Snowstorm	March 18-21 1958	South-Central NH	Unknown	22-24" of snow
Snowstorm	March 2-5 1950	Southern NH	Unknown	25" of snow
Snowstorm	January 18-20 1961	Southern NH	Unknown	Blizzard Conditions; 50 cm of snow
Snowstorm	February 8-10 1969	Southeastern NH	Paralyzing snow	27" of snow and high winds
Snowstorm	February 22-28 1969	Central NH	Unknown	34-98" of snow; very slow moving
Snowstorm "Blizzard of '78"	February 5-7 1978	Statewide	Trapped commuters on highways, businesses closed	Hurricane force winds; 25-33" of snow. People disregard warnings due to a series of missed forecasts
Snowstorm	April 5-7 1982	Southern NH	Unknown	Late season with thunderstorms and 18-22" of snow
Earthquake	November 18, 1929	Grand Banks Newfoundland	No damage	Richter Magnitude Scale: 7.2 ³
Earthquake	December 20, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 341 miles away.
Earthquake	December 24, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 550 KM away.
Earthquake	June 15, 1973	Quebec/NH border	No Damage	Richter Magnitude Scale: 4.8
Earthquake	June 19, 1982	West of Laconia	No Damage	Richter Magnitude Scale: 4.5
Drought	1929-36	Statewide	Unknown	Regional
Drought	1939-44	Statewide	Unknown	Severe in southeast
Drought	1947-50	Statewide	Unknown	Moderate
Drought	1960-69	Statewide	Unknown	Longest recorded continuous period of below normal precipitation
Drought Warning	June 6, 1999	Most of State	Unknown	Governor's office declaration; Palmer Drought Survey Index indicate "moderate drought" for most of State.
Past Hazards Specific to Brookline				
Flood	1927	Brookline	Roadways flooded Mason	

⁵ For a complete description of the Richter Magnitude Scale see Appendix G.

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
			Road. Bridge out.	
Flood	July 30, 1986	Brookline	Dupaw Gould Bridge out North Mason Road bridge out. Many roads impassable.	100's of tires floated down Nissitissit river near Bahannon bridge. DOT worked with Brookline to rebuild bridge-improved Dupaw Gould bridge.
Flood	August 7-11, 1990	Brookline	North Mason Road closed-bridge out	
Flood	March 11-21, 1996	Brookline	Dupaw Gould bridge out	
Hurricane Gloria	Sept 27, 1985	Brookline	Roads closed, trees down, power out	
Microburst/ Tornado	June 1992	Brookline	Trees down, North Mason Road. Closed.	Many large tree down at Potanipo boat ramp, Camp Tevya
Vehicular Accidents	1982-83	Brookline	Bohannon Bridge out	Accident caused by truck
Snowstorm	Dec 8, 1996	Brookline	Trees down, power out 5 days	Heavy wet snow caused many trees to come down – power out for 5 days.
Snowstorm	Jan 24, 1998	Brookline	17 power lines down	
Frequent flooding	Recurrent	Hood and West Hill Roads	Hood and West Hill Roads	
Wind Storm	Feb 17 th – 18 th , 2006	Brookline	Trees down, power out for many residents, businesses and municipal offices.	Much of the Town without power. Emergency Operations Center remained open to provide shelter and food for any of the 649 families without power.

Sources: New Hampshire Office of Emergency Management, 2000; Town of Brookline; Northeast States Emergency Consortium (NESEC) Website: <http://www.nesec.org>; US Army Corp of Engineers Ice Jam Database, <http://www.crrel.usace.army.mil/cgi-bin/ice/ijdb>; Tornado Project, <http://www.tornadoproject.com>

C. Potential Hazards to Critical Facilities and Areas of Concern

After past events have been identified, the next step in the planning process is to determine where future hazards could potentially occur and what structures or areas could be affected. This requires determining which facilities and areas in the community are considered critical and why they are considered critical (i.e., is the facility in the floodplain? Storing hazardous materials? A primary shelter?). Each critical facility and area was mapped. Table 5 presents the critical facilities and areas of concern identified by the Team. Map 5 illustrates the locations of these facilities and areas in Brookline. Chapter IV will present an analysis of each of these facilities and areas in the community and their priority in case of an emergency.

- **Flooding**

The entire Town is vulnerable to this hazard. The areas that are most susceptible to the 100 year flood hazard zone in Brookline are depicted in Map 6. However, even people who do not live near water are susceptible to flooding. Map 4 also shows approximate locations where frequent flooding has occurred in the past.

- Dam Failure

No documented dam breaches have occurred in Brookline. According to the State of NH, Brookline is home to 6 active dams including one Class A; 3 Class AA, one Class B, and one unclassified dam. In New Hampshire the Division of Water classifies dams into the following:

Class AA – a dam that, if it were to fail, would not be a menace to public safety

Class A – a low hazard potential dam

Class B – a significant hazard potential dam

- Hurricane

The entire Town is vulnerable to this hazard. Properties, adjacent rivers, brooks, and low lying areas are most susceptible to associated flooding. Exposed and elevated structures are most susceptible to wind damage.

- Tornado

The entire Town is vulnerable to this hazard. Early warning from the media and National Oceanic and Atmospheric Administration (NOAA) weather radios are the key to survivability. While tornados are generally weak and short lived in NH, the State had a long-duration tornado in July, 2008 that was on the ground for 1.5 hours, covering over 50 miles, and produced Enhanced Fujita (EF)-0 to EF-2 damage up to ¼ mile wide, including 1 fatality.

- Downburst

The entire Town is vulnerable to this hazard. Associated with severe thunderstorms, downbursts cause straight-line wind damage ranging from about 60 – 150 mph. Typically short-lived and a narrow damage path; commonly called a “microburst.”

- Lightning

The entire Town is vulnerable to this hazard. Campgrounds, lakes, and athletic fields are most susceptible to injury due to large groups of people in one place. Open fields and hilltops put individuals at higher risk. Education, lightning detection devices, and advanced warning of approaching storms can greatly reduce risk.

- Wildfire

Usually limited to the wild or urban-wild-land interface, when coupled with high wind, low relative humidity and an abundance of fuel on the ground, wildfires can strike anywhere fuel exists and can jump breaks and fire lines affecting homes within urban and suburban neighborhoods.

- Severe Winter Weather

The entire Town is vulnerable to this hazard. Greatest impacts are to flat-roofed buildings, trees, and roadways. Related vehicular accidents or impassible roads are major concerns.

- Earthquake

The entire Town is vulnerable to this hazard.

- Landslide

There is a minimal risk of landslides in Brookline. Landslide events typically occur on steep slopes and river banks and after prolonged heavy rain and cutting into slopes during development of land. While there are some steep slopes in portions of Town, there have not been any significant landslide events in Brookline.

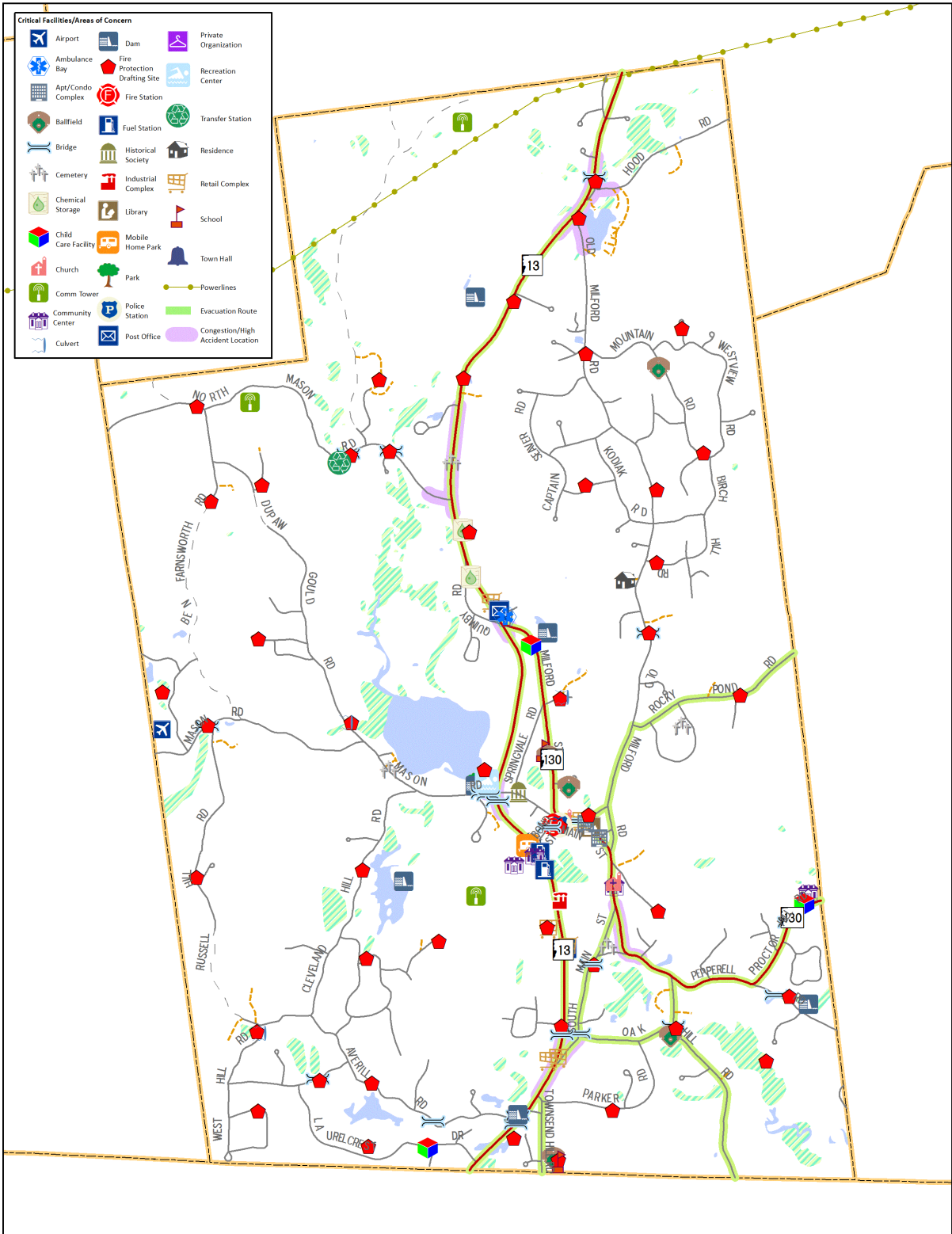
- Radon

The entire Town is vulnerable to this hazard. Education and testing are important in minimizing risk. Typically when present, radon affects basements and well water. Proper ventilation or air and water radon mitigation systems will lower or remove the exposure risk.

- Drought
The entire Town is vulnerable to this hazard.
- Explosions/Fires
Gas and fuel storage facilities and fueling stations are the most likely sites to have an increased risk of Explosions/Fires. Any structure that uses natural gas or propane is at a slightly higher risk of explosion. Professional installation and education can reduce residential risk and best management practices and corporate health and safety policies, audits, and training help to lower risk in commercial buildings.
- Traffic Congestion/Accidents
State routes 13 and 130 as well as the street network in the Town center are most susceptible to this hazard. Rain, ice, snow, and fog are the top natural causes, and speed, distraction, and experience are man-made causes of accidents.
- Hazardous Materials Incidents
These types of incidents are most prevalent along State routes 13 and 130. Gas and propane fueling stations and industrial centers also have a higher risk of incident.
- Vandalism
The entire Town is vulnerable to this hazard. Schools, private property, and some commercial buildings are typical targets of vandals.
- Terrorism
Typically designed to maximize damage or injury, large or high importance locations are at highest risk. Schools and child care facilities might be targeted for the psychological impact. Infrastructure like power lines, communications networks, and pipelines may also be targeted. Domestic terrorism can strike clinics, businesses, and mail and package centers. "Hardening" at risk facilities, surveillance, education, and vigilance are some ways to reduce risk.

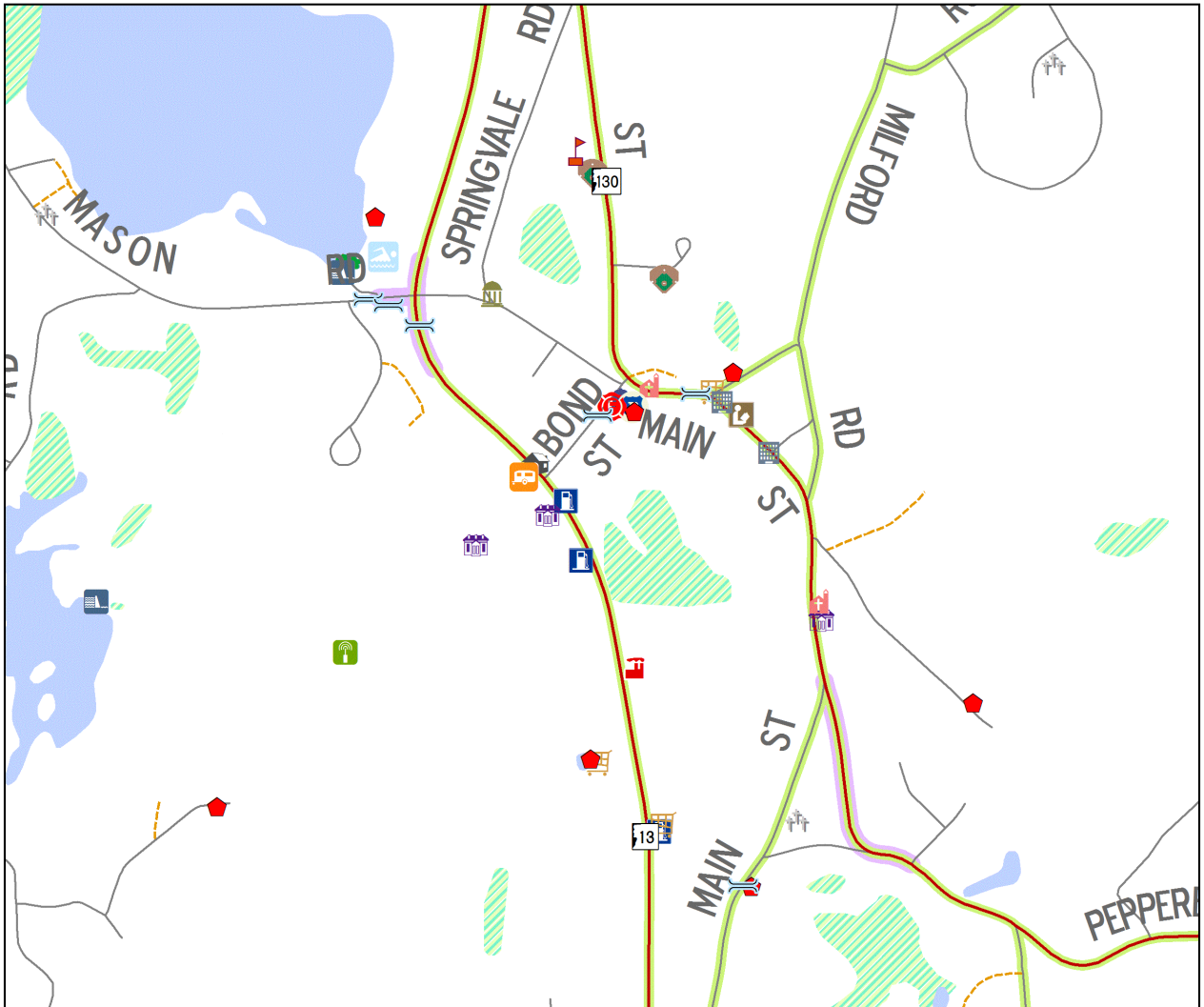
MAP 5: LOCATION OF CRITICAL FACILITIES AND AREAS OF CONCERN IN BROOKLINE

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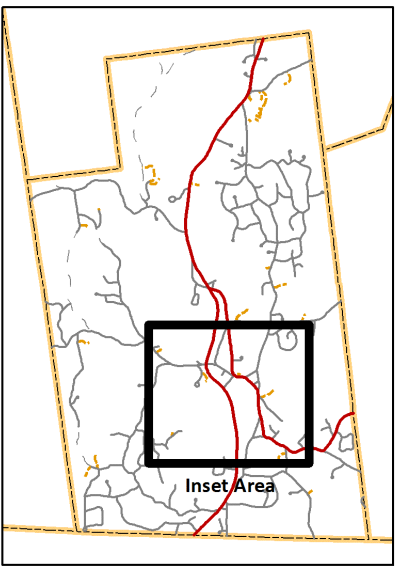


Source: NRPC GIS, 2011

MAP 5: (CONTINUED)



Critical Facilities/Areas of Concern		
Airport	Dam	Recreation Center
Ambulance Bay	Fire Protection Drafting Site	Transfer Station
Apt/Condo Complex	Fire Station	Residence
Ballfield	Fuel Station	Retail Complex
Bridge	Historical Society	School
Cemetery	Industrial Complex	Town Hall
Chemical Storage	Library	Powerlines
Child Care Facility	Mobile Home Park	Congestion/High Accident Location
Church	Park	Evacuation Route
Comm Tower	Police Station	
Community Center	Post Office	
Culvert	Private Organization	



Source: NRPC GIS, 2011

TABLE 5: HAZARDS TO CRITICAL FACILITIES AND AREAS OF CONCERN IN BROOKLINE

Facility Name	⁴ AC CF RE F/R*	Facility Type	Stories	Generator Yes (#)	100- year flood (Yes-%)	*500-year flood (Yes-%)	Size of Building (ft ²)	Type of Hazard
Critical Facilities								
Safety Complex	F/R	Emergency Facility/Town Facility/Shelter	1.5	Yes	No	Not Available	4,758	Town Facility/Shelter
Fire Department	F/R	Emergency Facility/Town Facility/Shelter	2	Yes	No	Not Available	5,952	Town Facility/Shelter
Police Station	F/R	Emergency Facility/Town Facility	3.5	Yes	No	Not Available	7,454	Town Facility
Town Hall	F/R	Town Hall	3.5	Yes	No	Not Available	7,454	Town Facility
Captain Samuel Douglass Academy	F/R	School/Shelter	2	Yes	No	Not Available	49,324	School/Shelter
Richard Maghakian Memorial School	CF	School	2	No	No	Not Available	48,380	School
Little Laurel Preschool	CF	Child Care	2	No	No	Not Available	1,783	Child Care
Day Care 57 Milford Street	CF	Child Care	-----	No	Yes	Not Available	-----	Child Care
Day Care 12 Laurel Crest Drive	CF	Child Care	-----	No	No	Not Available	-----	Child Care
Wells	CF	Wells	n/a	n/a	Yes	Not Available	n/a	Contamination/ Terrorism
Powerlines	CF	PSNH Powerlines	n/a	n/a	n/a	n/a	n/a	Fire/Explosion
Historical Society	CF	Historical Society	1.5	No	No	Not Available	1,049	Historical Society
Big Bear Lodge	CF	Community Center	3	No	No	Not Available	9,887	Gathering Place
Brookline Event Center	CF	Community Center	1	No	No	Not Available	6,000	Gathering Place
Brookline Airport	CF	Airport	1	No	No	Not Available	-----	Infrastructure – Transportation
TCP Communications Tower	CF	Communications Tower	n/a	No	No	Not Available	n/a	Infrastructure – Communication
US Cellular Tower - Ball Hill	CF	Communications Tower	n/a	No	No	Not Available	n/a	Infrastructure – Communication
US Cellular Tower - Potanipo Hill	CF	Communications Tower	n/a	No	No	Not Available	n/a	Infrastructure – Communication
Mobile Home Park	CF	Mobile Home Park	1	No	No	Not Available	-----	Dense Housing
Stony Ledge	CF	Retail Complex	1.5	No	No	Not Available	8,450	Gathering Place
Stateline Convenience Mart	F/R	Retail Complex	2	No	No	Not Available	15,218	Gathering Place
Fine Lines Auto Body	F/R	Chemical Storage	1	No	No	Not Available	3,794	Hazardous Materials

⁴ AC = Area of Concern, CF = Critical Facility, RE = Resource, F/C = Facility/Resource

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Facility Name	⁴ AC CF RE F/R*	Facility Type	Stories	Generator Yes (#)	100- year flood (Yes-%)	*500-year flood (Yes-%)	Size of Building (ft ²)	Type of Hazard
Transfer Station	CF	Transfer Station	1	No	No	Not Available	n/a	Hazardous Materials
AF Fuels	F/R	Fuel Station	1.5	No	No	Not Available	1,980	Combustible Fuel
Superior Auto Repair	F/R	Fuel Station	1	Yes - 1	No	Not Available	1,344	Combustible Fuel
Caryn's Convenience Store	F/R	Fuel Station	1	No	No	Not Available	3,600	Combustible Fuel
Bingham Lumber	F/R	Industrial Complex	1	Yes - 1	No	Not Available	32,192	Hazardous Materials
Sport Stop	CF	Retail Complex	1	No	No	Not Available	58,965	Gathering Place
Proctor Hill Road Bridge	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Main Street Bridge	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Route 13 Bridge – Near Averill Road	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Route 13 Bridge – Near S. Main Street	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Route 13 Bridge – Near Mason Road	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Route 13 Bridge – Near Hood Road	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
Culverts	CF	Bridge	n/a	n/a	No	Not Available	n/a	Flooding
West Hill Road Culvert	CF	Bridge	n/a	n/a	n/a	Not Available	n/a	Flooding
Talbot Taylor Dam	CF	Dam	n/a	n/a	No	Not Available	n/a	Breach/Flooding
Averill Road & Route 13	CF	Dam	n/a	n/a	No	Not Available	n/a	Breach/Flooding
Dave Whitcomb Dam	CF	Dam	n/a	n/a	No	Not Available	n/a	Breach/Flooding
Evacuation Routes	CF	Road Network and Bridges	n/a	n/a	Yes – In Places	Not Available	n/a	Terrorism
Areas of Concern								
Public Library	AC	Town Facility	2	No	No	Not Available	5,748	Town Facility
US Post Office	AC	Federal	1.5	No	No	Not Available	-----	Municipal
Oak Hill Park	AC	Ballfield	n/a	n/a	No	Not Available	-----	At-Risk Population
Samuel Douglass Academy Field	AC	Ballfield	n/a	n/a	No	Not Available	-----	At-Risk Population
Mountain Road Practice Field	AC	Ballfield	n/a	n/a	No	Not Available	-----	At-Risk Population
Brookline Ballpark (2 Ballfields)	AC	Ballfields	n/a	n/a	No	Not Available	-----	At-Risk Population
Cohen Memorial Grove	AC	Park	n/a	n/a	Yes	Not Available	-----	At-Risk Population
Richard Maghakian Memorial School Field	AC	Ballfield	n/a	n/a	No	Not Available	-----	At-Risk Population

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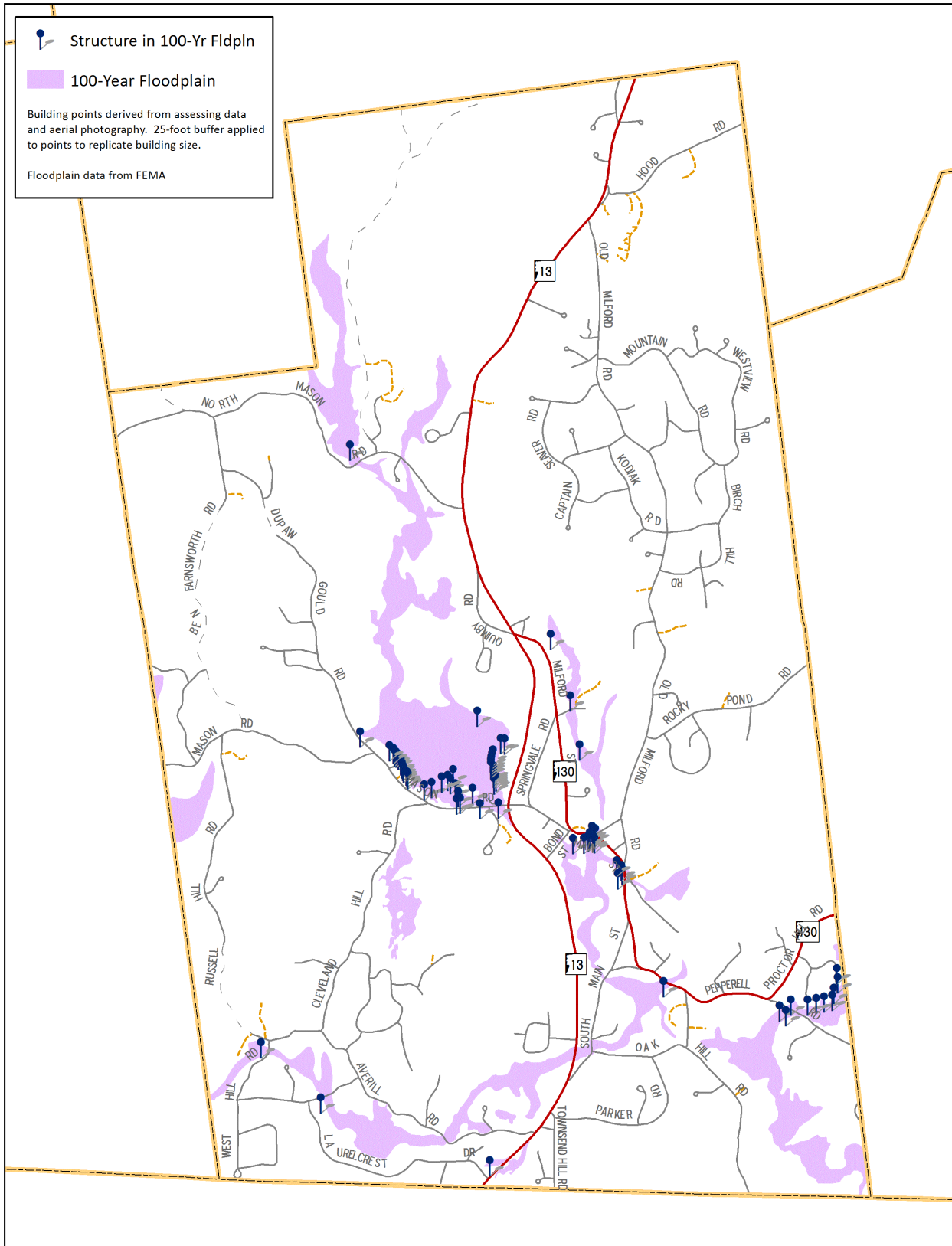
Facility Name	⁴ AC CF RE F/R*	Facility Type	Stories	Generator Yes (#)	100- year flood (Yes-%)	*500-year flood (Yes-%)	Size of Building (ft ²)	Type of Hazard
Pine Grove Cemetery	AC	Cemetery	n/a	n/a	No	Not Available	-----	Historic Structure
Lakeside Cemetery	AC	Cemetery	n/a	n/a	No	Not Available	-----	Historic Structure
Cemetery in the Woods	AC	Cemetery	n/a	n/a	No	Not Available	-----	Historic Structure
Route 13 Cemetery	AC	Cemetery	n/a	n/a	No	Not Available	-----	Historic Structure
Brookline Community Church	AC	Church	2	No	No	Not Available	8,203	Gathering Place
Brookline Chapel/Brusch Hall	AC	Church	1	No	No	Not Available	2,424	Gathering Place
Neil Stone Karate School	AC	Community Center	-----	No	No	Not Available	-----	Gathering Place and Potential Shelter
Monachelli Veterinarian Hospital	AC	Retail Complex	-----	No	No	Not Available	-----	Gathering Place and Potential Shelter
17 Main Street	AC	Apt/Condo Complex	2.5	No	No	Not Available	5,310	Dense Housing
Former Train Depot	AC	Residence	1.5	No	No	Not Available	2,325	Historic Structure
Camp Tevya	AC	Recreation Center	1	No	Yes	Not Available	27,391	At-Risk Population
American Legion	AC	Private Organization	2	No	No	Not Available	1,635	Gathering Place
Resources								
Stateline Convenience Mart	RE	Retail Complex	1	No	No	Not Available	15,218	Gathering Place
Caryn's Convenience	RE	Retail Complex	1	No	No	Not Available	3,600	Gathering Place
Brookline Village Store	RE	Retail Complex	2	Yes -1	Yes	Not Available	6,263	Gathering Place

TABLE 6: STRUCTURES IN THE 100 YEAR FLOODPLAIN

Land Use	Number of Structures	Total Building Value
Commercial	2	\$290,800
Recreation	1	\$786,600
Residential	43	\$6,949,600
TOTAL	46	\$8,027,000

Source: NRPC GIS, 2011

MAP 6: STRUCTURES PARTIALLY OR COMPLETELY LOCATED IN THE 100-YEAR FLOODPLAIN



Source: NRPC GIS, 2011

CHAPTER IV. RISK ASSESSMENT

It is important to determine which critical facilities are the most vulnerable and to estimate their potential loss. The first step is to identify the facilities most likely to be damaged in a hazard event. To do this, the location of critical facilities illustrated on Map 5, are compared to the location of various topographical elements, floodplains, roads, and waterbodies. Vulnerable facilities were identified by comparing their location to possible hazard events. For example, all of the facilities within the 100 year floodplain were identified and used in conducting the potential loss analysis. Similarly, facilities near steep slopes, vulnerable to severe winter weather, hazardous materials incidents, and high traffic congestion etc. were identified and included in the analysis. Map 7 displays the facilities that were identified during this analysis.

A. Prioritization of Critical Facilities and Areas of Concern

The next step in the Hazard Mitigation planning process is to prioritize the facilities and areas of concern that were identified. It is important for the community to determine what resources are needed to protect each facility and area of concern in the event of a hazard event. The facilities were broken into three prioritization categories. The first category contains services needed for emergency response in the event of a hazard. The second category lists facilities and areas to protect in a hazard event. The third category identifies potential resources that need to be protected in the event of a disaster.

Category 1: Emergency Response

The Town has identified the following emergency response services and facilities as the highest priority for protection from natural and man-made hazards:

1. **Brookline Safety Complex/Emergency Operations Center (EOC)**
2. **Fire & Police Stations**
3. **Emergency Fuel Stations**
 - Superior Auto Repair
4. **Emergency Shelters**
 - Captain Samuel Douglass Academy School
 - Brookline Fire Station
 - Brookline Safety Complex
5. **Evacuation Routes**
 - State Route 13
 - State Route 130
 - Oak Hill Road
 - Townsend Hill Road
 - Rocky Pond Road
 - Old Milford Road (Between Rocky Pond Road and Main Street)
 - Steam Mill Hill Road
 - Bohannon Bridge Road
 - South Main Street
6. **Bridges Located on Evacuation Routes**
 - Proctor Hill Road Bridge
 - State Route 13 – Near Averill Road
 - State Route 13 – Near South Main Street
 - State Route 13 – Near Mason Road



Brookline Safety Complex



Main Street Bridge

- State Route 13 – Near Hood Road
 - Main Street Bridge
- 7. Communications**
- Brookline Safety Complex/EOC
 - Hollis Dispatch

Category 2: Facilities and Areas to Protect in a Hazard Event

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

- 1. Dams**
 - Averill Road/Pierce Pond Dam
 - Lake Potanipo Dam (Private)
 - Rocky Pond Brook Dam
 - Taylor Pond Dam
 - Williams Pond Dam
 - Dam just off State Route 13 in northern Brookline
- 2. Water Supply Pumps/Tanks/Wells/Reservoirs**
 - CSDA Well
- 3. Commercial – Economic Impact Areas – Area’s Largest Employers**
 - Sport Stop
 - Bingham Lumber
 - Donovan Engineering
 - Fine Lines Auto Body
 - Superior Steel Fabricators Inc.
 - Skillings and Sons
 - Stateline Convenience Mart
 - Caryn’s Convenience
- 4. Events**
 - Old Home Days
 - 4th of July Parade and Fireworks
 - Tree Lighting
 - Brookline Soccer/Baseball Games
 - Fishing Derby
 - Fire Department Annual BBQ
- 5. Recreational Areas**
 - Grove Public Beach
 - Camp Tevya
 - Brookline Ballparks
 - Captain Samuel Douglass Academy and Richard Maghakian Memorial School Fields
 - Mountain Road Practice Field
 - Oak Hill Park
- 6. Areas in the Floodplain**
 - All dwelling units, businesses, and bridges etc., located in the floodplain

7. Power Lines and Substations

- No Substations in Brookline

8. Problem Culverts or Roads (Potential Flooding or Ice Jams)

- Lake Potanipo Dam (Private)

9. Historic Structures

- Historical Society Building
- Brookline Town Hall
- Brookline Community Church
- Town Annex (Old Ambulance Building)
- Old Train Station
- Brookline Library
- Legion Hall
- Brookline Chapel/Brusch Hall

Category 3: Potential Resources

1. Emergency Drinking Water Supply (Container Only)

- Brookline Village Store
- Stateline Convenience Mart
- Caryn's Convenience

2. Grocery Stores

- Brookline Village Store
- Stateline Convenience Mart
- Caryn's Convenience

B. National Flood Insurance Participation

Brookline participates in the National Flood Insurance Program (NFIP). As of 2011, Brookline contains 42 single family residences, 2 multi-family residences, 2 commercial structures, and 1 recreational structure located within the 100 year floodplain. Brookline has 1 repetitive loss property, which is a residential structure.

Brookline has every intention of complying with all future requirements to maintain their participation with the NFIP. To ensure that this occurs the following measures will be considered:

1. Participate in NFIP training offered by the State and/or FEMA (or in other training) that addresses flood hazard planning and management.
2. Revise/adopt subdivision regulations, erosion control regulations, board of health regulations, etc. to improve floodplain management in the community.
3. Prepare, distribute or make available NFIP insurance and building codes explanatory pamphlets or booklets.
4. Identify and become knowledgeable of non-compliant structures in the community.
5. Work with elected officials, the State and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training, and education.

C. Critical Facilities Matrix

The following matrix identifies critical facility types and categorizes them as having a **low (L)**, **medium (M)** or **high (H)** risk for the following ten hazards: 1) Extreme Winter Weather; 2) Hazardous Material Incidents; 3) Traffic and Vehicular Accidents; 4) Explosions/Fires; 5) Extreme Summer Weather; 6) Dam Breaches; 7) Terrorism; 8) Landslides; 9)

Wildfires; and 10) Flooding. The critical facilities risk rankings of Low, Medium, and High were determined by combining the probability that a given hazard would occur with the potential impact that hazard would have on the facility and the community. Low, Medium, and High rankings were defined as follows:

- Low probability = hazard is not likely to occur within 50 years
- Medium probability = hazard is likely to occur within 25 years
- High probability = hazard is likely to occur within 10 years
- Low impact = little impact would be caused to facility and community from hazard
- Medium impact = moderate impact would be caused to facility and community from hazard
- High impact = significant impact would be caused to facility and community from hazard

TABLE 7: CRITICAL FACILITIES MATRIX

Facility Name	Extreme Winter Weather	Hazardous Materials Incidents	Traffic and Vehicular Accidents	Explosions / Fire	Extreme Summer Weather	Dam Breach	Terrorism	Landslides	Wildfires	Flooding
Police Station	M	H	H	H	M	M	L	L	L	M
Fire Station	M	H	H	H	H	M	L	L	L	M
Town Hall	M	H	H	H	M	M	L	L	L	L
Brookline Safety Complex	M	H	H	H	H	L	L	L	L	L
Municipal Buildings	M	L	L	H	L	M	L	L	L	L
Schools	M	H	M	H	L	M	L	L	M	L
Child Care	L	M	M	M	L	M	L	L	M	L
PSNH Powerlines	H	L	L	H	H	M	L	L	H	L
Commercial Buildings	L	M	L	M	L	M	L	L	M	L
Office Buildings	L	M	L	M	L	M	L	L	M	L
Manufacturing Sites	L	H	L	M	L	M	L	L	M	L
Hazardous Materials Sites/Storage	L	H	L	H	M	M	L	L	H	L
Evacuation Routes	H	H	H	H	H	H	L	L	M	L
Bridges	H	H	H	H	H	H	L	L	L	M
Communications Towers	H	L	L	H	H	M	L	L	H	L
Playgrounds and Recreational Fields	L	M	L	L	L	M	L	L	L	L
Historic Structures	M	L	L	L	L	M	L	L	L	L
Conservation Land	L	L	L	L	L	M	L	L	H	L
Churches	M	M	L	M	M	H	L	L	M	L
High Traffic Congestion Locations	H	H	H	H	H	H	L	L	M	L

Facility Name	Extreme Winter Weather	Hazardous Materials Incidents	Traffic and Vehicular Accidents	Explosions / Fire	Extreme Summer Weather	Dam Breach	Terrorism	Landslides	Wildfires	Flooding
Vehicular Accident Sites	H	M	H	H	H	H	L	L	H	L
Multi-Family Housing	M	M	L	H	M	H	L	L	H	L
Structures in the 100-Year Floodplain	M	L	L	L	M	H	L	M	L	H

Source: Brookline Hazard Mitigation Team; NRPC, 2011

D. Calculating the Potential Loss

The next step in completing the loss estimation involves assessing the level of damage from a hazard event as a percentage of the facility's structural value. The December 31, 2011 total assessed value of all structures in Brookline is \$624,977,809 and is the basis for loss estimation calculations. The number of total parcels in Brookline is 2,214. The following discussion summarizes the potential loss estimates to structures (residential and non-residential) due to natural or man-made hazard events. Facilities considered to be at high or medium risk are displayed in Map 7.

1. Flooding

FEMA has developed a process in which replacement values for structures located in the 100-year floodplain can be calculated according to the amount of damage suffered⁵. In Brookline, the assessed values were determined for every structure identified in the floodplain. The potential loss was then calculated by multiplying the assessed value of the structure by the percent of damage expected from a hazard event (i.e., 100-year, 4-foot flood, etc.). It should be noted that although floods seldom occur on an annual basis in Brookline, that historically the North Mason and Dupaw Gould Bridges were affected and roads closed during the floods of 1927, 1986, 1990, and 1996. Although the North Mason and Dupaw Gould Roads are not evacuation routes for Brookline, many homes are situated along these roads and are of importance for the Town to try and keep open for residents.

High Risk

This considers eight-foot flooding in 100 floodplain⁶ areas and assumes that on average, all structures receive 49% damage⁷. The costs for repairing or replacing bridges, railroads, power lines, telephone lines, natural gas pipelines, contents of structures, and the loss of cropland values are not included in this estimate.

Residential Damage: 44 structures x (\$162,814 average assessed value⁹ x 0.49) = \$3,510,269.8

Non-Residential Damage: 3 structures x (\$359,133 average assessed value⁹ x 0.49) = \$527,925.5

Medium Risk

Considers a 4-foot flood in 100-year floodplain areas and assumes that on average, all structures receive 28% damage⁸.

Residential Damage:

44 structures x (\$162,814 average assessed value¹⁰ x 0.28) = \$2,005,868.4

Non-Residential Damage:

3 structures x (\$359,133 average replacement value¹⁰ x 0.28) = \$301,671.7

⁵ "Understanding Your Risks, Identifying Hazards, and Estimating Losses", FEMA, page 4-13.

⁶ There are currently no residential or non-residential structures located within Brookline's 500-year floodplains.

⁷ "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page 4-13.

⁸ Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page 4-13.

Low Risk

Considers 1-foot flooding in 100-year floodplain areas and assumes that on average, all structures receive 15% damage¹⁰.

Residential Damage:

$$44 \text{ structures} \times (\$162,814 \text{ average assessed value}^{10} \times 0.15) = \$1,074,572.4$$

Non-Residential Damage:

$$3 \text{ structures} \times (\$359,133 \text{ average replacement value}^{10} \times 0.15) = \$161,609.8$$

2. Dam Failure

Medium Risk

There are 6 dams located throughout Brookline. No known breaches of significance have been recorded and the likelihood of future breaches is considered quite low. The potential impact of a breached dam is more than a low priority and concern for the Town. The dollar amount of damage in the event of a dam breach will vary according to the extent and severity of the breach as well as the classification of the dam. Brookline's assessing records should be consulted to ascertain the range of possible damage to buildings in the vicinity.

3. Hurricanes

Low Risk

In 1985 Hurricane Gloria caused damage to Brookline in the form of downed trees and power lines as well as road closures. The total assessed value of all structures in Brookline is \$624,977,809. Assuming 1%-5% Town-wide building damage, a hurricane could result in \$6,249,778.09 to \$31,248,890.45 in building damage.

4. Tornados

Low Risk

In 1992, a downburst/tornado downed trees and caused the closure of North Mason Road. If a tornado impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage. The exact dollar amount of damage will vary depending on whether a tornado hits an inhabited area with a high density of buildings or whether it strikes a more rural area.

5. Downbursts

Low Risk

In 1992, a downburst/tornado downed trees and caused the closure of North Mason Road. If a downburst impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage. As with tornados, the exact dollar amount of damage will vary depending on whether a downburst hits an inhabited area with a high density of buildings or whether it strikes a more rural area.

6. Lightening

Low Risk

Thunderstorms present the danger of lightning strikes and have the potential of starting fires and causing human harm. Lightening typically strikes a small area and thus would not likely cause Town-wide damage. If lightening impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage.

7. Wildfires

Low Risk

There have been no recorded wildfires in Brookline's history. Although this natural disaster has yet to be a problem, there are large forested areas throughout the Town that could be of concern should fire spread. Brookline contains

approximately 5,509 forested acres with approximately 71% in blocks greater than 500 acres. The largest blocks are situated in the northwestern portion of Brookline. Some forestry or practiced burns should be conducted in order to ensure that the forest floors do not contain excessive layers of flammable debris. If wildfire impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage.

8. Severe Winter Weather

Medium Risk

There are three types of winter events: 1) Snowstorms/Blizzards; 2) Ice Storms; and 3) Extreme Cold. All of these events are a threat to the community with subzero temperatures from extreme wind chill and storms causing low visibility for commuters. Snowstorms are known to collapse buildings. Ice storms disrupt power, communication services, and have caused severe damage to timberland. Extreme cold affects the elderly. None of these storms affect one area of Town more than others. Elevation and orientation of structures are just two factors that affect the level of risk. Brookline's recent history has not recorded any loss of life due to the extreme winter weather. Snow and ice have caused power lines to sag in parts of Town, forcing road crews to turn around. Mitigation efforts have corrected this problem. Assuming 1%-5% Town-wide building damage, severe winter weather could result in \$6,249,778.09 to \$31,248,890.45 in building damage.

9. Earthquakes

Low Risk

There are no recorded earthquakes to date in Brookline. However, assuming 1%-5% Town-wide building damage should an earthquake occur, it could result in \$6,249,778.09 to \$31,248,890.45 in building damage.

10. Landslides

Low Risk

There are no recorded landslides in Brookline. There is development along the Nissitissit River and if the buffers are not properly maintained, this could lead to erosion and possible landslides posing a significant risk. There are a number of significant slopes throughout Brookline. It should also be noted that there could be a potential for landslides in the northeast corner of Brookline on sections of both Old Milford and Captain Seaver Road. If a landslide impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage.

11. Radon

High Risk

Radon has the potential to impact indoor-air and water quality throughout Brookline, although it is difficult to estimate its potential damage. According to the US EPA, property owners can install radon reduction systems to mitigate radon in their indoor air and water for an average of \$1,200. According to the 2010 US Census, there are 1,700 housing units in Brookline. If 10% of homes in Brookline installed radon reductions systems, it would cost \$204,000.

12. Drought

Low Risk

There are no recorded incidents of drought to date in Brookline. Drought causes the most significant impact to agricultural lands and assets. According to Current Land Use Categories and Acreage, defined in the 2012 Brookline Master Plan, there are no agriculture parcels in Brookline.

13. Explosions/Fires

Low Risk

There have been no recorded explosions in Brookline. There have been three large structural fires in Brookline's history: the Ice House, Tapley's Mills, and the Dairy Farm. Explosions/Fires can occur at utilities such as electrical substations, power lines or gas lines, hazardous materials sites, and all structures throughout the Town. Assuming 1%-5% Town-wide building damage, explosions and fires could result in \$6,249,778.09 to \$31,248,890.45 in building damage.

14. Traffic Congestion/Accidents

Medium Risk

Vehicular accidents are a significant threat to the Town of Brookline. The road network in Brookline provides major north-south access to commuters throughout the region. This roadway network intersects in the Town center and has experienced its fair share of accidents along State Route 13 and specific intersections. There have been recurring vehicle accidents at the intersections of State Route 13 and South Main Road; Mason Road, Milford Street, North Mason, and most notably the northern section of State Route 13 near Hood and Old Milford Road. Poor winter driving conditions, relatively steep grades, and a well-traveled commuting route have made this section of Brookline a dangerous location for driving.

15. Hazardous Material Incidents

High Risk

These incidents can be separated into two categories: 1) Fixed Facilities, or 2) Transportation. Fixed facilities include companies that store hazardous waste at their facility and all hazardous waste sites. Several fixed facilities in Brookline handle hazardous materials (see Table 5), making it a high risk for the Town. Companies such as Bingham Lumber and Superior Auto Repair store hazardous materials on site. Hazardous materials are transported along State Routes 13 and 130 in Brookline. Local police have noticed natural gas, fertilizer, and gasoline being transported on a weekly basis. NHDOT also utilizes these routes to transport hazardous materials. Although no hazardous spills have occurred in Brookline, the continual use of these routes for transportation is a note for concern should an accident occur.

16. Terrorism

Low Risk

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. Considering the potential effects of terrorist activities on surrounding communities, Regional Mutual Aid Agreements specifically addressing terrorism are essential. Assuming terrorism impacted 1%-5% of buildings Town-wide, it could result in \$6,249,778.09 to \$31,248,890.45 in building damage.

Potential impact areas:

- Municipal Buildings
- Bridges
- Electrical Substations
- Telecommunications Towers
- High Voltage Power Lines
- Wells and Water Tanks
- Sewage Treatment Plants
- Hazardous Materials Sites
- Terrorist attack on Boston – Population from Boston area and this region may need to evacuate North
- Biological Pathogens
- Schools
- Multi-Family Housing Developments
- Town Festivals/Activities

17. Vandalism

Low Risk

There has been no recorded vandalism in Brookline. If vandalism impacted 1% of Brookline's buildings, it could result in \$6,249,778.09 in building damage.

TABLE 8: RISK PROBABILITY MATRIX

Hazard Type	Probability	Impact
Flooding	Medium	Low
Dam Failure	Low	Low
Hurricanes	Low	Medium
Tornadoes	Low	High
Downburst	Low	High
Lightning	Medium	Low
Wildfires	Low	Low
Severe Winter Weather	Medium	Medium
Earthquakes	Low	High
Landslides	Low	Low
Radon	High	Low
Drought	Low	Low
Explosions / Fires	Low	Low
Traffic Congestion / Accidents	Low	Low
Hazardous Materials Incidents	Low	Medium-High
Terrorism / Vandalism	Low	Low
Vandalism	Low	Low

Source: Brookline Hazard Mitigation Team; NRPC, 2011

Low, Medium, and High rankings were defined as follows:

- Low probability = hazard is not likely to occur within 50 years
- Medium probability = hazard is likely to occur within 25 years
- High probability = hazard is likely to occur within 10 years
- Low impact = little impact would be caused to facility and community from hazard
- Medium impact = moderate impact would be caused to facility and community from hazard
- High impact = significant impact would be caused to facility and community from hazard

E. Assessment of Future Development Losses⁹

The Brookline Master Plan, 2012 Update, was used to form the content of this section.

The future use of land is dependent on a number of factors. First and foremost are the constraints of the land. Attempts to push against these constraints in order to develop a poorly suited parcel of land often leads to a higher potential risk of being impacted by a natural hazard. The second factor is what does local land use laws permit. The

⁹ 2011 Brookline Master Plan

goals of a community's master plan, economic trends, remaining developable land, redevelopment of land, adequate infrastructure, and the local and regional transportation network are also important factors in determining future land uses.

As mentioned previously in Development Trends, the Town of Brookline encompasses approximately 20.2 square miles. Elevations range from a low point of under 200 ft. above aMSL in the southeast to just over 800 ft. aMSL along the eastern border on Birch Hill. The higher elevations and steep slopes are found in the central and northern areas of Brookline. Southeastern and southwestern Brookline is relatively flat. The few prime agricultural soils in Brookline are scattered throughout the Town and are not confined to one specific location. Brookline has approximately 5,509 acres remaining in forest, with up to approximately 71% of that in forest blocks of 500 acres or more. Finally, roughly 12,924 acres are taken up by watershed, with about 227 acres of lakes and ponds.

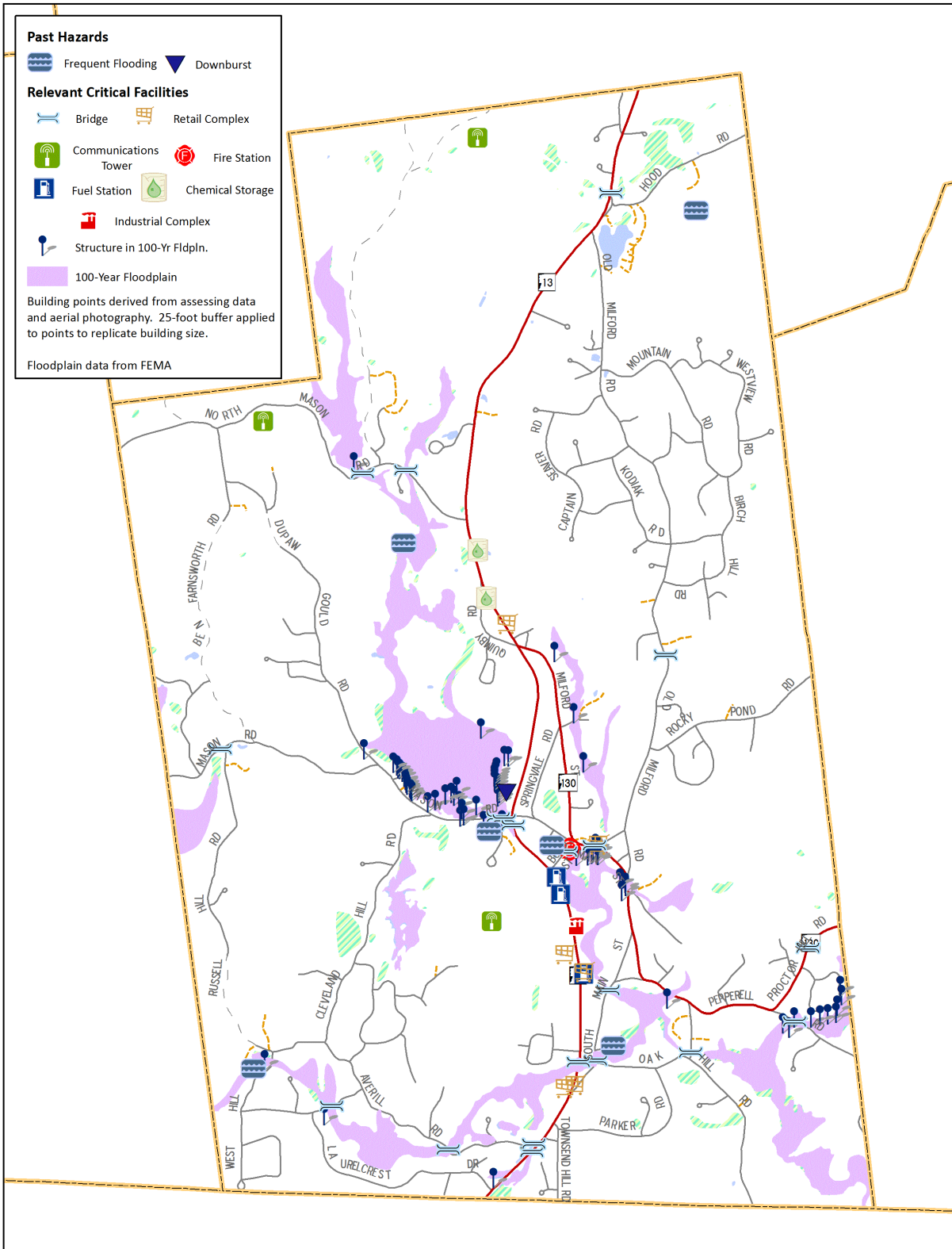
Based on GIS calculations, 5,719 acres are currently developed, while approximately 2,762 acres are currently protected (which includes open space, recreation, and parcels designated as "water"). Of the 2,762 protected acres, 227 acres of lakes and ponds and 981 acres are located within the 100 year floodplain. Therefore, this leaves Brookline a current estimate of 2,508 acres of developable land.

Looking at the developable land in Brookline, there is a potential for a maximum of approximately 1,285 new single-family housing units in Brookline based on the ratio of current housing units to developable land. There are an estimated 2,429 acres remaining in the Agricultural and Residential District to be developed. Finally, approximately 79 acres are available for development within the Industrial District.

As developable land becomes scarce, there is pressure to increase densities and utilize flood-prone land along the Nissitissit River, Lake Potanipo, and its upstream tributaries. Maintaining zoning standards to protect watersheds and their floodplains from development and maintaining existing controls for new construction on poor soils or steep slopes is important. To mitigate potential future hazard damage, adequate waters and pressure must be maintained for fire protection. It is important that all new residential development be required to have sprinklers and therefore a new ordinance must be developed and adopted by the Town to address this problem.

The transportation network needs to grow with development to allow for emergency vehicles to operate within necessary response times or if necessary, to provide for orderly evacuations. Updating flood maps will insure accuracy that is important in locating developments on the remaining land in Brookline.

MAP 7: FACILITIES IN BROOKLINE IDENTIFIED IN POTENTIAL LOSS ANALYSIS



Source: NRPC GIS, 2011

CHAPTER V. EXISTING AND PROPOSED HAZARD MITIGATION STRATEGIES

The next step involves identifying existing mitigation strategies for the hazards likely to affect the Town and evaluate their effectiveness. This section outlines those programs and recommends improvements and changes to these programs to ensure the highest quality emergency service possible.

Mitigation Goals

- Ensure culvert maintenance and improvements on all Town roads leading to evacuation routes.
- Evaluate a program with the intention of installing generator hook ups in every residential structure.
- Remain compliant with the NFIP.
- Educate and inform the public for better preparedness and response to hazard events.

Existing hazard mitigation strategies were obtained during a brainstorming session with the Team. In addition, the Town of Brookline Emergency Management Plan and the Town of Brookline Zoning Bylaws were used to form the content of this section. Table 9 below provides a comprehensive list of all existing mitigation strategies currently in place.

A. Existing Mitigation Strategies

TABLE 9: EXISTING MITIGATION STRATEGIES

Hazard Type	Existing Protection Program or Activity Description	Area of Town Covered	Enforcement Department	Effective-ness	Improvements or Changes Needed
Flooding	Designated a wetland conservation district that requires a 50 foot non-interference buffer from wetlands and water bodies in which development may only occur with a special exception from the Zoning Board of Adjustment	Within 50 feet of wetlands and water bodies	Building Inspector and Zoning Board of Adjustment	High	As the amount of impervious surface increases in Brookline, consider adopting a Permanent Stormwater Management ordinance, similar to the model outlined in the Innovative Land Use Planning Techniques Handbook, and/or a Maximum Impervious Surface ordinance.
Flooding	Created a floodplain ordinance that limits development from occurring within the floodplain	All flood hazard areas shown in the Flood Insurance Rate Maps	Building Inspector and Zoning Board of Adjustment	Medium	Update floodplain boundaries as new information because available from FEMA.
All	Adopted building codes compliant with International Building Code Standards	All	Building Inspector	High	Ensure updated building codes are incorporated into regulations.
All	Designated the EOC at the Safety Complex	All	Police, Fire, and Emergency Management Department	High	Training for National Incident Management Systems
Explosions/Fires	Implemented residential sprinkler requirements for homes outside the Fire Protection Area	All	Fire Department	Medium	Pending State Legislation

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Hazard Type	Existing Protection Program or Activity Description	Area of Town Covered	Enforcement Department	Effective-ness	Improvements or Changes Needed
Flooding	Highway crew regularly inspect and maintain storm drains	All	Road Agent	High	As storm frequencies become greater, storm drains may be under-sized for the amount of runoff.
All	Continual tree maintenance to minimize potential damage from fallen/damaged trees	All	Road Agent and Public Service Programs	High	Establish maintenance plan.
All	Established portable weather station to provide detailed weather information	All	Richard Maghakian Memorial School Science Department	High	Incorporate weather data into hazard mitigation planning process.
All	Created a Code Red Emergency Response System	All	Police, Fire, and Emergency Management Department	High	Continue outreach to ensure all residents are enrolled.
Hazardous Materials Incidents	Ensuring that companies perform tank inspections with assistance from NHDES for oil leaks and potential ruptures/explosions	All	NHDES	High	Create database of inspections.
Traffic Congestion/Vehicular Accidents	Continual culvert and road improvements on all Town roads	All roads in Brookline	Road Agent	High	As storm frequencies become greater, culverts may be under-sized for the amount of stormwater discharge.
All	Introducing curriculum highlighting the importance of safety in public schools	All	Police, Fire, and Emergency Management Department	High	Continue to expand program
All	Established a statewide communication system with radio interoperability on the same frequency	All	Police, Fire, and Emergency Management Department	High	Include in Emergency Preparedness Guide
Flooding	Updated Brookline floodplain maps	All properties within the floodplain	Town Planner	High	Update as new information becomes available from FEMA.
All	Developed and implemented a vaccination program	All	Police, Fire, and Emergency Management Department	Medium	Update as new information becomes available from CDC.
All	Established a cooling/heating station and an emergency shelter at the Fire Department, Police Department, and Safety Complex	All	Police, Fire, and Emergency Management Department	High	Re-evaluate to ensure capacity is adequate as population grows.

Source: Brookline Hazard Mitigation Team; NRPC, 2011

B. Completed or Implemented Mitigation Measure

Since the last plan was adopted the Town of Brookline has completed or implemented the following measures. These measures reflect progress in local mitigation efforts.

- Updated Brookline floodplain maps

- Developed and implemented a vaccination program
- Established a cooling/heating station and an emergency shelter at the Fire Department, Police Department, and Safety Complex
- Installed generator on Potanipo Hill

Newly added measures to Table 10 include:

- Assess past flooding events around West Hill
- Reconfigure the intersections of Old Milford Road/State Route 13, South Main Street/State Route 13, and Cross Road/State Route 130
- Repair and upgrade Bond Street Bridge

Several measures were completely removed from Tables 9 and 10 to reflect changes in the Town's priorities.

- Fire Sprinkler Ordinance requiring all new homes in Brookline to be outfitted with a sprinkler system
- Develop measures to prevent drinking water contamination for future developments that utilize more than 1 well per household
- Provide fire and public safety training with use of a "Fire Trailer." Also functions as mobile operations center and decontamination service.

C. Proposed Mitigation Strategies

In addition to the programs and activities that Brookline is currently undertaking to protect its residents and property from natural and manmade disasters, a number of additional strategies were identified by the Team for consideration. The process of compiling a comprehensive list of all mitigation strategies currently in place throughout the Town helped the Team to identify gaps in the existing coverage and improvements which could be made to the existing strategies. These types of actions were considered when determining new projects, programs, and activities which the Town of Brookline can develop.

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

Prevention measures include: planning, zoning, open space preservation, floodplain and wetland development regulations, storm water management, best management practices, communications systems with rail companies, and communication with landowners regarding hazardous materials.

Property Protection includes: utility relocation/burying or flood proofing, lightning protection for elevated structures, identifying all water sources in recreational facilities, sewer backup protection, insurance, and minimization actions.

Structural Protection includes: placement of anemometers, evacuation plans for each building, enclosing hazardous facilities, detention/retention basins, larger culverts, and higher flood standards for construction projects.

Emergency Services include: SCADA intrusion systems, regional mutual aid agreements, and protection of critical facilities, health and safety maintenance, and an inventory of all assets in Town.

Public Information and Involvement measures include: providing map information, informational mailings or workshops, real estate disclosure of flood hazards, environmental education, and public announcements on cable access channels which provides instantaneous updates on emergency situations in Town.

The brainstorming session resulted in a list of actions that could be taken to mitigation for future hazards. These results are compiled in Table 10.

TABLE 10: PROPOSED MITIGATION STRATEGIES

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Hazard Type	Potential Program or Activity	Description of Proposed Strategy	Type of Activity
All	Review and update Building Codes, Floodplain Ordinance, and Zoning Regulations.	Updated regulations will strengthen structural integrity, limit floodplain development, and limit need for emergency response to damaged structures.	Prevention
All	Update and reformat the Emergency Operations Plan. Currently under development.	Provide emergency response service to access properties Town-wide	Emergency Services
All	Create regional communication system with radio interoperability on the same frequency	Will assist with emergency evacuations and procedures	Emergency Services
All	Survey elderly population and develop database of information	Provide emergency services to address special elderly needs	Emergency Services
All	Install generator at Ball Hill Cell Tower	Would provide a backup power source in the event of an electrical outage	Emergency Services
Traffic Congestion/Vehicular Accidents	Establish culvert improvement projects to enhance evacuation capabilities especially on all Town roadways leading to evacuations routes	Protect conditions of roads proposed for evacuation	Infrastructure Protection
Hazardous Materials Incidents	Ensure the SMART Team develops a notification, evacuation, and contingency plan that addresses hazardous materials spills along the roads and neighboring water bodies	Training emergency personnel on evacuation procedures in case of a spill	Emergency Services/ Property Protection
All Hazards	Distribute Community Hazard Guides to the general public	Provide information in a booklet for the public, outlining preventative measures and what to do in an emergency. Include measures for property and structural protection, as well as emergency contact information.	Prevention/ Public Education and Awareness
Lightning	Compile a Lightning Evacuation Plan that addresses departmental responsibilities, evacuation procedure, and safety precautions	Lightning protection for elevated and/or exposed structures	Emergency Services
Flooding	Assess past flooding events around West Hill	Would determine whether further mitigation measures need to be enacted to prevent future flooding issues	Emergency Services
All	Install a generator at Richard	The installation of a	Emergency

Hazard Type	Potential Program or Activity	Description of Proposed Strategy	Type of Activity
	Maghakian Memorial School to provide backup electricity to the school's well, sewage system, kitchen, and gym	generator would protect this facility and potential shelter and will enable emergency preparations to be conducted at additional sites	Services
Vehicular Accidents	Reconfigure the intersections of Old Milford Road/State route 13, South Main Street/State route 13, and Cross Road/State route 130	Would help address high rate of vehicular accidents along these heavily traveled intersections	Emergency Services/ Traffic Congestion Management
All	Repair and upgrade Bond Street Bridge	Would address safety issues and increase the longevity of this important river crossing	Emergency Services/ Traffic Congestion Management
All	Upgrade radio communications systems for fire department	Would improve overall communications with other municipal departments	Emergency Services

Source: Brookline Hazard Mitigation Team; NRPC, 2011

D. Prioritization of Proposed Mitigation Strategies

The goal of each strategy is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic, and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies and discussed in Table 11:

- **Social:** Is the proposed strategy socially acceptable to the community? Is there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical:** Will the proposed strategy work? Will it create more problems than it solves?
- **Administrative:** Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- **Political:** Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal:** Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
- **Economic:** What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental:** How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

The cost and benefit of each proposed mitigation strategy was evaluated and assigned a score (Very Beneficial = 3, Beneficial = 2, Somewhat Beneficial = 1, Not Beneficial = 0) based on the above criteria. An evaluation chart with total score and priority for each strategy can be found in the collection of individual tables under Table 11.

TABLE 11: STAPLEE ANALYSES OF PROPOSED MITIGATION STRATEGIES

Definition of rating scale: 3 = Very Beneficial; 2 = Beneficial; 1 = Somewhat Beneficial; 0 = Not Beneficial

Mitigation Action: Upgrade radio communications systems for fire department.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes.	0	3
Is it Administratively workable?	Yes.	0	3
Is it Politically acceptable?	Yes. Pending budgetary appropriations.	0	3
Is there Legal authority to implement?	Yes. Upon Approval of the Selectmen.	0	3
Is it Economically beneficial?	Yes. The costs include upgrading the appropriate equipment. The benefits increased communications between municipal departments.	0	3
Is it Environmentally beneficial?	Yes. It may better Brookline to address a particular hazard.	0	3
SUB-TOTAL OF COST/BENEFIT		0	21
TOTAL SCORE	21-0=21 (BENEFIT MINUS COST)		21
PRIORITY			No. 1

Mitigation Action: Review and update Building Codes, Floodplain Ordinance, and Zoning Regulations.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. It also appeared as a recommendation in the 2012 Brookline Master Plan update.	0	3
Is it Administratively workable?	Yes, although it will require staff time and coordination with various departments and boards in order to complete the document and address multiple issues for the Town.	1	2
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes.	0	3
Is it Economically beneficial?	Yes. It would limit need for emergency response to damaged structures.	0	3
Is it Environmentally beneficial?	Yes. It would limit development in the floodplain.	0	3
SUB-TOTAL OF COST/BENEFIT		1	20
TOTAL SCORE	20-1=19 (BENEFIT MINUS COST)		19
PRIORITY			No. 2

Mitigation Action: Update and reformat the Emergency Operations Plan.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. It will require staff time and provide municipal officials and emergency personnel with an updated Emergency Operations Plan.	0	3
Is it Administratively workable?	Yes. The Emergency Management Director will need to work with the various departments in order to complete the document and address multiple issues for the Town.	0	3
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes. Upon approval of the Board of Selectmen.	0	3
Is it Economically beneficial?	Yes. It would help to maintain efficiency among emergency personnel in the event of a disaster. This would therefore mitigate the economic effects of unplanned emergency management.	1	2
Is it Environmentally beneficial?	No environmental impacts or benefits.	0	3
SUB-TOTAL OF COST/BENEFIT		1	20
TOTAL SCORE	20-1=19 (BENEFIT MINUS COST)	19	
PRIORITY		No. 2	

Mitigation Action: Reconfigure the intersections of Old Milford Road/State route 13, South Main Street/State route 13, and Cross Road/State route 130.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes.	0	3
Is it Administratively workable?	Yes. It would be coordinated by the Road Agent and NHDOT.	0	3
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes.	0	3
Is it Economically beneficial?	Maybe. Transportation related grants must be secured at both the local and statewide level.	1	2
Is it Environmentally beneficial?	No environmental impacts or benefits.	0	3
SUB-TOTAL OF COST/BENEFIT		1	20
TOTAL SCORE	20-1=19 (BENEFIT MINUS COST)	19	
PRIORITY		No. 2	

Mitigation Action: Install a generator at Richard Maghakian Memorial School to provide backup electricity to the school's well, sewage system, kitchen, and gym.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. Many town facilities have back-up generators.	0	3
Is it Administratively workable?	Yes. The Board of Selectmen needs to authorize the purchase.	0	3
Is it Politically acceptable?	It could be dependent on funding sources and justification of the need.	0	3
Is there Legal authority to implement?	Yes. The Selectmen can approve funding.	0	3
Is it Economically beneficial?	Yes. The costs involved are to purchase and install a generator at the school. The benefit is additional facilities and shelters with back-up power sources.	1	2
Is it Environmentally beneficial?	No environmental impacts.	0	3
SUB-TOTAL OF COST/BENEFIT		1	20
TOTAL SCORE	20-1=19 (BENEFIT MINUS COST)	19	
PRIORITY		No. 2	

Mitigation Action: Install generator at Ball Hill Cell Tower.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. Many town facilities have back-up generators.	0	3
Is it Administratively workable?	Yes. The Board of Selectmen needs to authorize the purchase.	0	3
Is it Politically acceptable?	It could be dependent on funding sources and justification of the need.	0	3
Is there Legal authority to implement?	Yes. The Selectmen can approve funding.	0	3
Is it Economically beneficial?	Yes. The costs involved are to purchase and install a generator. The benefit is additional facilities and shelters with back-up power sources.	1	2
Is it Environmentally beneficial?	No environmental impacts.	0	3
SUB-TOTAL OF COST/BENEFIT		1	20
TOTAL SCORE	20-1=19 (BENEFIT MINUS COST)	19	
PRIORITY		No. 2	

Mitigation Action: Distribute Community Hazard Guides to the general public.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. It will require staff time and will provide direction to the public on procedures, contacts, and shelters in a variety of emergency situations.	1	2
Is it Administratively workable?	Yes. Brookline staff will need to distribute the booklets.	0	3
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes. Upon approval of the Board of Selectmen.	0	3
Is it Economically beneficial?	Yes. The costs include staff time, printing costs, and distributing the booklets. Benefits include a comprehensive public guide on how to handle emergency situations.	1	2
Is it Environmentally beneficial?	No environmental impacts or benefits.	0	3
SUB-TOTAL OF COST/BENEFIT		2	19
TOTAL SCORE	19-2=17 (BENEFIT MINUS COST)	17	
PRIORITY		No. 3	

Mitigation Action: Ensure the SMART Team develops a notification, evacuation, and contingency plan that addresses hazardous materials spills along the roads and neighboring water bodies.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It will benefit the entire Town. This project would help all residents of Brookline equally by working to safeguard the community against hazardous spills.	0	3
Is it Technically feasible and potentially successful?	Yes. It is feasible, but may take some time to establish.	1	2
Is it Administratively workable?	Yes. Brookline can partner with Hudson and Nashua as soon as they complete their contingency plan.	0	3
Is it Politically acceptable?	This is to be determined. It has not been officially proposed.	0	3
Is there Legal authority to implement?	Unknown. Will need to determine jurisdictional authority and pending approval from NHDES.	0	3
Is it Economically beneficial?	Yes. Staff time will be needed to develop the plan. The benefits are increased safety and knowledge of what is being transported through the community so they can plan around those transport events.	1	2
Is it Environmentally beneficial?	Yes. A potential incident could migrate via wind or in the Town aquifers.	0	3
SUB-TOTAL OF COST/BENEFIT		2	19
TOTAL SCORE	19-2=17 (BENEFIT MINUS COST)	17	
PRIORITY		No. 3	

Mitigation Action: Survey elderly population and develop database of information.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Possibly. There is a potential for conflict from special needs persons or parents and the elderly against being identified for the survey.	0	3
Is it Technically feasible and potentially successful?	Yes. Would only require computer to develop the survey and a mass mailing.	1	2
Is it Administratively workable?	Yes. The only staff time that is needed will be for creation and mailing of the surveys.	0	3
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes. Upon approval from the Board of Selectmen	0	3
Is it Economically beneficial?	Yes. Having this information in a database may mitigate problems during emergency response to these populations.	1	2
Is it Environmentally beneficial?	No environmental impacts or benefits.	0	3
SUB-TOTAL OF COST/BENEFIT		2	19
TOTAL SCORE	19-2=17 (BENEFIT MINUS COST)	17	
PRIORITY		No. 3	

Mitigation Action: Establish culvert improvement projects to enhance evacuation capabilities especially on all town roadways leading to evacuations routes.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone.	0	3
Is it Technically feasible and potentially successful?	Yes. Culvert improvement projects have been previously completed by the Town.	1	2
Is it Administratively workable?	Yes. Staff time would be required to complete the projects.	0	3
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes. Upon approval of the Board of Selectmen.	0	3
Is it Economically beneficial?	Yes. The culvert improvements would mitigate road degradation due to natural disasters and in the end save the Town money.	1	2
Is it Environmentally beneficial?	Yes. Improved culverts often lead to cleaner stormwater runoff.	0	3
SUB-TOTAL OF COST/BENEFIT		2	19
TOTAL SCORE	19-2=17 (BENEFIT MINUS COST)	17	
PRIORITY		No. 3	

Mitigation Action: Assess past flooding events around West Hill.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. It will require staff time and the development of a well-organized document highlighting past flooding trends.	1	2
Is it Administratively workable?	Yes. It would be coordinated by the Fire, Police, and Emergency Management Department.	1	2
Is it Politically acceptable?	Yes.	0	3
Is there Legal authority to implement?	Yes.	0	3
Is it Economically beneficial?	Yes. The benefits include determining whether further mitigation measures need to be enacted to prevent future flooding issues. The primary costs include staff time and the plan development process.	1	2
Is it Environmentally beneficial?	No environmental impacts.	0	3
SUB-TOTAL OF COST/BENEFIT		3	18
TOTAL SCORE	18-3=15 (BENEFIT MINUS COST)		15
PRIORITY			No. 4

Mitigation Action: Repair and upgrade Bond Street Bridge.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes.	1	2
Is it Administratively workable?	Yes. It would be coordinated by the Road Agent	1	2
Is it Politically acceptable?	Yes.	1	2
Is there Legal authority to implement?	Yes.	0	3
Is it Economically beneficial?	Yes. The benefits include increased roadway safety. The costs include redesigning the bridge, construction, and maintenance.	1	2
Is it Environmentally beneficial?	No environmental impacts or benefits.	0	3
SUB-TOTAL OF COST/BENEFIT		4	17
TOTAL SCORE	17-4=13 (BENEFIT MINUS COST)		13
PRIORITY			No. 5

Mitigation Action: Compile a Lightning Evacuation Plan that addresses departmental responsibilities, evacuation procedure, and safety precautions.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. The plan will work to identify actions necessary to plan for lightning events, which are common in NH.	1	2
Is it Administratively workable?	Yes. Staff time would be allocated to developing the plan.	1	2
Is it Politically acceptable?	Yes.	1	2
Is there Legal authority to implement?	Yes.	0	3
Is it Economically beneficial?	Yes. The costs are related to staff time. The benefits are a plan of action in the event of a severe lightning storm where the public is at risk.	1	2
Is it Environmentally beneficial?	No environmental impacts.	0	3
SUB-TOTAL OF COST/BENEFIT		4	17
TOTAL SCORE	17-4=13 (BENEFIT MINUS COST)	13	
PRIORITY		No. 5	

Mitigation Action: Create regional communication system with radio interoperability on the same frequency.

Criteria	Evaluation	Cost	Benefit
Is it Socially acceptable?	Yes. It benefits everyone equally.	0	3
Is it Technically feasible and potentially successful?	Yes. It is feasible, but may take some time to establish. It could take time to accommodate a new communications system.	1	2
Is it Administratively workable?	Implementation may take time due to the need to coordinate with a range of people.	1	2
Is it Politically acceptable?	Yes. Pending budgetary appropriations.	1	2
Is there Legal authority to implement?	Yes. Upon Approval of the Selectmen.	1	2
Is it Economically beneficial?	Yes. The costs include hardware for a new system and staff time. The benefits include a comprehensive communications system.	1	2
Is it Environmentally beneficial?	Yes. A regional communications system will facilitate communications across communities in emergency situations. It may better Brookline to address a particular hazard.	0	3
SUB-TOTAL OF COST/BENEFIT		5	16
TOTAL SCORE	16-5=11 (BENEFIT MINUS COST)	11	
PRIORITY		No. 6	

Source: Brookline Hazard Mitigation Team; NRPC, 2011

Each strategy was evaluated and prioritized according to the total score. The highest scoring strategies were determined to be of more importance, economically, socially, environmentally, and politically. Therefore these strategies were prioritized over those that were scored lower. All of the strategies are included in Table 11 in order of priority.

CHAPTER VI. IMPLEMENTATION SCHEDULE

This step involves developing an action plan that outlines who is responsible for implementing each of the prioritized strategies determined in the previous step, as well as when and how the actions will be implemented. The following questions were asked to develop an implementation schedule for the identified priority mitigation strategies:

- WHO?** Who will lead the implementation efforts? Who will put together funding requests and applications?
- WHEN?** When will these actions be implemented, and in what order?
- HOW?** How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

Table 12 is the Action Plan. In addition to the prioritized mitigation projects, Table 12 includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

TABLE 12: PRIORITIZED MITIGATION PROJECTS AND ACTION PLAN

Project	Responsibility/ Oversight	Cost	Funding/Support*	Timeframe
Upgrade radio communications systems for fire department	Fire Department	\$7,500	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
Reconfigure the intersections of Old Milford Road/State route 13, South Main Street/State route 13, and Cross Road/State route 130	Road Agent	\$50,000	Local/FEMA's Hazard Mitigation Assistance Program	3-5 Years (2014-2016)
Update and reformat the Emergency Operations Plan	Emergency Management Director and Board of Selectmen	\$3,000	State Bureau of Emergency Management	2 Years (2013)
Install a generator at Richard Maghakian Memorial School to provide backup electricity to the school's well, sewage system, kitchen, and gym	Emergency Management Director	\$10,000	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
Install generator at Ball Hill Cell Tower	Emergency Management Director	\$7,500	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
Distribute Community Preparedness Guides to the general public	Emergency Management Director	\$2,500	Local/Emergency Management Performance Grant (EMGP)	2 Years (2013)
Survey elderly population and develop database of information	Emergency Management Director, Brookline Health Officer, and Potential Committee	\$1,500	Local/FEMA's Hazard Mitigation Assistance Program	2 Years (2013)
Ensure the SMART Team develops a notification, evacuation, and contingency plan that addresses hazardous materials spills along the roads and neighboring water bodies	Emergency Management Director, Fire Department, and Police Department	\$2,500	State Bureau of Emergency Management	2 Years (2013)

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Project	Responsibility/ Oversight	Cost	Funding/Support*	Timeframe
Establish culvert improvement projects to enhance evacuation capabilities especially on all town roadways leading to evacuations routes	Road Agent	\$1,000	Local/FEMA's Hazard Mitigation Assistance Program	1-2 Years (2012-2013)
Assess past flooding events around West Hill	Emergency Management Director, Fire Department, Police Department, and Road Agent	\$1,000	Local/FEMA's Hazard Mitigation Assistance Program	3-5 Years (2014-2016)
Compile a Lightning Evacuation Plan that addresses departmental responsibilities, evacuation procedure, and safety precautions.	Emergency Management Potential Plan Committee	\$2,500	Local/FEMA's Hazard Mitigation Assistance Program	2 Years (2013)
Repair and upgrade Bond Street Bridge	Road Agent	\$25,000	Local/FEMA's Hazard Mitigation Assistance Program	1-2 Years (2012-2013)
Create regional communication system with radio interoperability on the same frequency	Emergency Management Director, Fire Department, and Police Department	\$5,000	Local/FEMA's Hazard Mitigation Assistance Program	2 years (2013)

* Note: For descriptions of above mentioned funding sources, please see Appendix D.

Source: Brookline Hazard Mitigation Team; NRPC, 2011

CHAPTER VII. UPDATING THE PLAN AND CONTINUED PUBLIC INVOLVEMENT

The completion of a planning document is merely the first step in its life as an evolving tool. The Plan is a dynamic document which must be reviewed on a regular basis as to its relevancy and usefulness and to add new tasks as old tasks are completed. Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the Plan where necessary.

A. Maintenance and Update of the Hazard Mitigation Plan

It is required that the Town update the Plan at least every five years. In order to track progress and update the Mitigation Strategies identified in the Action Plan (Table 12), it is recommended that the Town of Brookline revisit the Plan annually. In addition, it is especially important to incorporate updates within one year after a Presidential Disaster Declaration. The Emergency Management Director is responsible for initiating this review and needs to consult with members of the Team and the community.

Changes should be made to the Plan to accommodate projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this Plan to determine feasibility of future implementation. New mitigation actions or plans proposed upon adoption of the Plan must follow the STAPLEE analysis method previously utilized for the Plan. This will not only ensure consistency with the adopted Plan, but more importantly will guide the members to evaluate its feasibility, public and political approval, and overall potential for success.

B. Utilization of Existing Municipal Plans, Regulations and Programs

Relevant elements of the Brookline Hazard Mitigation Plan will be incorporated into the following documents as they are updated.

MASTER PLAN

The Town of Brookline Planning Department and Planning Board recently completed an update of their 1998 Master Plan. The update includes the addition of a Natural Hazards Mitigation chapters, which was derived from elements of this Plan.

ZONING ORDINANCE AND REGULATIONS

As the Planning Board and town staff update the Zoning Ordinance and Regulations they should review and ensure that existing and proposed changes do not conflict with any proposed mitigation actions. All Zoning Ordinances and Regulation updates, if relevant, should be consistent with the goals and content of this plan.

CAPITAL IMPROVEMENTS PLAN

The Town of Brookline has a Capital Improvements Program in place. The Capital Improvements Committee (CIC) recently developed a 2005-2010 Capital Improvements Plan for Brookline. The Team will need to meet with the CIC to discuss the possibility of dedicating a section of the funds towards proposed Hazard Mitigation projects proposed in this Plan as well as new projects that may be discussed in future Hazard Mitigation meetings.

C. Continued Public Involvement

In keeping with the process of adopting the Plan, the Emergency Management Director will be responsible for ensuring that the Town Departments and the public have an opportunity to participate in the maintenance and update of the Plan. A public hearing will be held to receive public comment during the annual review period and the final product adopted by the Board of Selectmen appropriately.

During the maintenance and update process of the Plan, the following techniques will be used to ensure continued public involvement:

- Provide personal invitations to the Board of Selectmen;
- Provide personal invitations to the Budget and CIP Committees;
- Provide personal invitations to the Town Department heads;
- Post notices of meetings at the Town Hall, Library, and the Town website;
- Submit public service announcements and community event announcements to the Hollis/Brookline Journal, Nashua Telegraph, and the Brookliner.

These techniques are just examples of what the Team can utilize. It may be necessary for the Team to form a new group upon adoption of the Plan dedicated to implementation, update, and education/outreach of the Plan. As indicated below in Table 13, this is noted as the Hazard Mitigation Implementation Team. This will also allow new members to join from other municipal departments and the public. The Emergency Management Director and/or Team members must try to adhere to the following agenda, tasks, and responsibilities in order to ensure that the mitigation actions and plans are implemented.

TABLE 13: ANNUAL PLAN UPDATE AND PUBLIC INVOLVEMENT AGENDA

MEETING SCHEDULE	TASK	RESPONSIBILITY
Twice a year	Assess current status of funding for mitigation projects. Discuss any new projects/plans that should be obtained for Brookline.	Department heads or any municipal officials interested in working with the Team to find new sources of funding. The original Team may decide to form a new Team to implement the proposed strategies/plans from the Plan.
Annually	Meet to discuss the Plan content and any updates needed for the Plan.	Hazard Mitigation Implementation Team
Annually	Discussion and evaluation of Training Programs and public outreach efforts. New public outreach methods discussed.	The Team and other interested municipal officials.

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