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SECTION 1—INTRODUCTION

Natural hazards pose a risk to the built environment of a community. The Natural Hazard Mitigation Chapter documents the physical characteristics, severity, frequency, and extent of these hazards as well as any potential vulnerability resulting from land use and zoning policies.

This chapter provides a summary of the more detailed Brookline Hazard Mitigation Plan, which is written and updated independently of the Town's Master Plan. It begins with an overview of how Brookline's Hazard Mitigation Plan was developed as well as its relation to the Master Plan. It then provides descriptions of potential hazards to the community and to critical facilities as well as a history of past hazard events. Next, the chapter prioritizes critical facilities and areas of concern and concludes with current and future mitigation strategies.

1.1 ~ Overview of the Development of the Brookline Hazard Mitigation Plan

The New Hampshire Department of Safety, Division of Homeland Security and Emergency Management (HSEM) has a goal for all communities within the State 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.

In April of 2011, the Nashua Regional Planning Commission (NRPC) organized the first public meeting with representatives from the Town of Brookline to begin the initial stages of the Hazard Mitigation 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." In addition, information and recommendations from the following documents were considered and included if applicable into the update of the 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.

SECTION 2—METHODOLOGY

The following is a summary of the nine-step process conducted to compile the Brookline Hazard Mitigation 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, Library, and Hollis/Brookline Journal, as well as on the Town website.

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) Severe winter weather
- 2) Hurricanes
- 3) Dam failure
- 4) Landslides/earthquakes
- 5) Wildfires
- 6) Tornado/downbursts
- 7) Lightning
- 8) Flooding
- 9) Dam failure
- 10) Traffic congestion and vehicular accidents
- 11) Explosions/fires
- 12) Hazardous materials incidents
- 13) Terrorism

The Team then constructed 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. 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 in the Brookline Hazard Mitigation Plan 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.

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: technical and administrative applicability, political and social acceptability, legal authority, environmental impact, and financial feasibility. Each factor was then scored and all scores were totaled for each strategy. Strategies were ranked by overall score for preliminary prioritization and 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.

SECTION 3—POTENTIAL HAZARDS**3.1 ~ 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. Each critical facility and area was mapped.

- **Flooding**—the entire Town is vulnerable to this hazard; even people who do not live near water are susceptible to flooding.
- **Dam Failure**—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.
- **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, covered over 50 miles, produced Enhanced Fujita (EF)-0 to EF-2 damage up to ¼ mile wide, and caused 1 fatality.
- **Downburst**—the entire Town is vulnerable to this hazard, commonly called a “microburst.” Associated with severe thunderstorms, downbursts cause straight-line wind damage ranging from about 60 – 150 mph. They are typically short-lived and have a narrow damage path.
- **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**—although 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. They 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 ways to reduce risk.

SECTION 4—CRITICAL FACILITIES AND MITIGATION STRATEGIES

4.1 ~ 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. The facilities were divided 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
 - State Route 13 – Near Hood Road
 - Main Street Bridge



**Brookline Safety
Complex**



Main Street

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 Route 13 in northern Brookline

2. Water Supply Pumps/Tanks/Wells/Reservoirs

- CSDA Well

3. Commercial – Economic Impact Areas –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



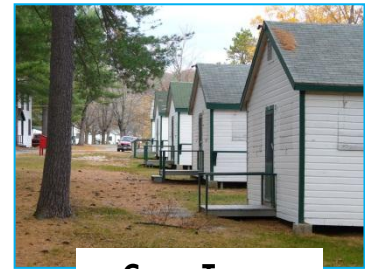
Sport Stop

4. Events

- Old Home Days - July
- 4th of July Parade and Fireworks - July
- Tree Lighting - December
- Brookline Soccer/Baseball Games –Spring, Summer, and Fall
- Fishing Derby - February
- Fire Department Annual BBQ - July

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



Camp Tevya

6. Areas in the Floodplain

- All dwelling units, businesses, and bridges 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



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



Brookline Village Store

4.2 ~ Existing Mitigation Strategies

The following table identifies mitigation strategies that the Town currently has in place and continues to implement. These measures have been developed over time by Town staff. This list was originally identified in the development of the 2006 Brookline Hazard Mitigation Plan. Additional items that have been completed since the initial plan are now identified in this table.

TABLE 1: Existing Mitigation Strategies

Hazard Type	Existing Protection Program or Activity Description	Area of Town Covered	Enforcement Department	Effectiveness
All	Adopted building codes compliant with International Building Code Standards	All	Building Inspector	High
All	Installed generators at the Captain Samuel Douglass Academy, Town Hall, Fire Station, Safety Complex, and atop Potanipo Hill	Most Town facilities	Each respective department head	High
All	Designated the EOC at the Safety Complex	All	Police, Fire, and Emergency Management Department	High
All	Continual tree maintenance to minimize potential damage from fallen/damaged trees	All	Road Agent and Public Service Programs	High
All	Established portable weather station to provide detailed weather information	All	RMMS Science Department, CSDA	High
All	Created a Code Red Emergency Response System	All	Police, Fire, and Emergency Management Department	High
All	Introduced curriculum highlighting the importance of safety in public schools	All	Police, Fire, and Emergency Management Department	High
All	Established a statewide communication system with radio interoperability on the same frequency	All	Police, Fire, and Emergency Management Department	High

Hazard Type	Existing Protection Program or Activity Description	Area of Town Covered	Enforcement Department	Effectiveness
All	Developed and implemented a vaccination program	All	Police, Fire, and Emergency Management Department	Medium
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
Explosions/Fires	Implemented residential sprinkler requirements for homes outside the Fire Protection Area	All	Fire Department	Medium
Flooding	Updated Brookline floodplain maps	All properties within the floodplain	Town Planner	High
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
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
Flooding	Highway crew regularly inspects and maintains storm drains	All	Road Agent	High
Hazardous Materials Incidents	Ensuring that companies perform tank inspections with assistance from NHDES for oil leaks and potential ruptures/explosions	All	NHDES	High
Traffic Congestion/ Vehicular Accidents	Continual culvert and road improvements on all Town roads	All roads in Brookline	Road Agent	High

Source: Brookline Hazard Mitigation Team, NRPC, 2011

4.3 ~ Prioritized Mitigation Projects and Action Plan

The following table identifies a list of prioritized mitigation projects for short term implementation by different departments in the Town.

TABLE 2: Prioritized Mitigation Projects and Action Plan

Project	Responsibility/Oversight	Funding/Support	Timeframe
Upgrade radio communications systems for Fire Department	Fire Department	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
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	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
Install generator at Ball Hill Cell Tower	Emergency Management Director	Local/FEMA's Hazard Mitigation Assistance Program	1 year (2012)
Establish culvert improvement projects to enhance evacuation capabilities, especially on all Town roadways leading to evacuations routes	Road Agent	Local/FEMA's Hazard Mitigation Assistance Program	1-2 Years (2012-2013)
Repair and upgrade Bond Street Bridge	Road Agent	Local/FEMA's Hazard Mitigation Assistance Program	1-2 Years (2012-2013)
Update and reformat the Emergency Operations Plan	Emergency Management Director and Board of Selectmen	State Bureau of Emergency Management	2 Years (2013)
Distribute Community Preparedness Guides to the general public	Emergency Management Director	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	Local/FEMA's Hazard Mitigation Assistance Program	2 Years (2013)

Project	Responsibility/Oversight	Funding/Support	Timeframe
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	State Bureau of Emergency Management	2 Years (2013)
Compile a Lightning Evacuation Plan that addresses departmental responsibilities, evacuation procedure, and safety precautions	Emergency Management Potential Plan Committee	Local/FEMA's Hazard Mitigation Assistance Program	2 Years (2013)
Create regional communication system with radio interoperability on the same frequency	Emergency Management Director, Fire Department, and Police Department	Local/FEMA's Hazard Mitigation Assistance Program	2 years (2013)
Reconfigure the intersections of Old Milford Road/State Route 13, South Main Street/State Route 13, and Cross Road/State Route 130	Road Agent	Local/FEMA's Hazard Mitigation Assistance Program	3-5 Years (2014-2016)
Assess past flooding events around West Hill	Emergency Management Director, Fire Department, Police Department, and Road Agent	Local/FEMA's Hazard Mitigation Assistance Program	3-5 Years (2014-2016)