
Multi-Hazard Mitigation Plan Update 2017

Town of Strafford, NH

April 14, 2017

Submitted to the New Hampshire Homeland Security & Emergency Management
By the
Town of Strafford, NH
with Strafford Regional Planning Commission

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The following organizations have contributed invaluable assistance and support for this project:

The Strafford Multi-Hazard Mitigation Committee

New Hampshire Homeland Security Emergency Management (HSEM)

The Town of Strafford

The 2017 Town of Strafford Multi-Hazard Mitigation Planning Committee

Eight Planning Committee members have attended meetings and been instrumental in completing this plan:

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Joann Brown	Conservation Commission and former Selectmen, Town of Strafford
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Executive Summary

This Plan was revised and updated to meet statutory requirements and to assist the Town of Strafford in reducing and mitigating future losses from natural and man-made hazardous events. An initial edition of this Plan was developed and presented to FEMA in 2004. The plan was revised in 2012, and was updated in 2017 to reflect the most recent information obtained through the evolution of the hazard mitigation program at the State. This update was developed by Strafford Regional Planning Commission (SRPC) and participants from the Multi-Hazard Mitigation Planning Committee, which was made up by the Fire Chief/EMD, Planner, Road Agent, Police Chief, Building Inspector, and members of the Conservation Commission, Planning Board, and Select Board.

The Plan references historical events, as well as identifies specific vulnerabilities that are likely to impact the town. Overall vulnerability to hazards includes:

High Vulnerability

Flooding
Severe Winter Weather
Severe Thunderstorms & Lightning
Hurricanes & Tropical Storms
Wildfire

Moderate Vulnerability

Tornado & Downburst
Drought
Public Health

Low Vulnerability

Landslide
Earthquake
Hazardous Material

A description of each hazard and the extent, past events and impacts, potential future impacts to the community, and potential loss estimates associated with each hazard was included in the plan. As part of this analysis, the planning team reviewed past and existing mitigation strategies and made updates for improvement. Lastly, the planning team developed a series of new mitigation actions to be completed over the course of this plan's five-year cycle. Each mitigation action was prioritized using the STAPLEE Method and responsibilities for implementation were identified.

This plan provides an updated list of Critical Infrastructure and Key Resources (CI/KR) categorized as follows: Emergency Response Services (ERS), Non-Emergency Response Facilities (NERS), Critical Infrastructure (CI), and Water Resources (WR). All critical assets were inventoried and mapped.

The revision process included reviewing other Town Hazard Plans, technical manuals, federal and state laws, the State Hazard Mitigation Plan, research data, and other available mitigation documents from multiple sources. Combining elements from these sources, the Planning Team was able to produce this integrated multi-hazards plan and recognizes that such a plan must be considered a work in progress.

The Town of Strafford received conditional approval on March 13, 2017. A public meeting was held and the plan was adopted by the Select Board on March 28, 2017. The Plan received formal approval from FEMA on April 14, 2017.

In addition to periodic reviews there are three specific situations, which require a formal review of the plan. The plan will be reviewed:

- Annually to assess whether the existing and suggested mitigation strategies have been successful and remain current in light of any changes in federal state and local regulations and statutes. This review will address the Plan's effectiveness, accuracy and completeness in regard to the implementation strategy. The review will address any recommended improvements to the Plan, and address any weaknesses identified that the Plan did not adequately address. This report will be filed with the Board of Selectmen.

- Every five years. The Plan will be revised and updated using the same criteria outlined above. At that time it is expected to be thoroughly reviewed and updated as necessary. The public will be allowed and encouraged to participate in that five year revision process.
- After any declared emergency event, the EMD using the same criteria outlined above.
- If the Town adopts any major modifications to its land use planning documents, the jurisdiction will conduct a Plan review and make changes as applicable.

Chapter 1: Multi-Hazard Mitigation Planning Process

Authority

Stafford's Multi-Hazard Mitigation Plan was prepared pursuant to Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act), herein enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390). This Act provides new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for state, local and tribal entities to closely coordinate mitigation planning and implementation efforts. This revised multi-hazard plan will be referred to as the "Plan." Stafford's Plan has been prepared by the Multi-Hazard Mitigation Committee (the Committee) with the assistance and professional services of Stafford Regional Planning Commission (SRPC) under contract with New Hampshire Homeland Security Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-2010 Edition). This plan is funded, in part, by HSEM through grants from FEMA (Federal Emergency Management Agency). Funds from town dues and matching funds for Committee member's time are also part of the funding formula.

Purpose and History

The ultimate purpose of Disaster Mitigation Act of 2000 (DMA) is to:

establish a national disaster hazard mitigation program –

To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and

To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster.

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section "322 – Mitigation Planning" which states:

As a condition of a receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government.

HSEM's goal is for all New Hampshire communities to complete a local multi-hazard plan as a means to reduce future losses from natural and man-made events before, during, or after they occur. HSEM has outlined a process whereby communities throughout the state may become eligible for grants and other assistance upon completion of this multi-hazard plan. The state's regional planning commissions are charged with providing assistance to selected communities to help develop local plans.

Stafford's Multi-Hazard Mitigation Plan is a planning tool for reducing future losses from natural and man-made disasters as required by the Disaster Mitigation Act of 2000.

The DMA places new emphasis on local mitigation planning. It requires local a local jurisdiction to prepare and adopt a FEMA approved jurisdiction-wide Hazard Mitigation Plan as a condition for receiving Hazard Mitigation Assistance (HMA)

project grants and other grants every five years. In addition to updating their plans every five years to continue program eligibility, local governments should review the plan yearly.

Scope of the Plan

This Plan addresses only one jurisdiction: the Town of Strafford, NH. The Plan addresses 11 types of natural and man-made hazards that may affect the Town:

- Flooding
- Severe Winter Weather
- Severe Thunderstorms & Lightning
- Hurricanes & Tropical Storms
- Tornado & Downburst
- Drought
- Landslide
- Earthquake
- Public Health Threats
- Hazardous Material
- Wildfire

It describes each hazard and identifies past occurrences of hazard events and assesses probability of future hazard events in the Town. The Plan assesses the vulnerability of key infrastructure and critical facilities; existing residential buildings and other structures within Strafford; and future development. The Plan also addresses the administrative, technical, and physical capacity of emergency response services and response coordination between federal, state, and local entities.

Multi-Hazard Mitigation Goals

The Town's multi-hazard goals are based on the State of New Hampshire Multi-Hazard Mitigation Plan (2013) goals and include:

- Ensure the protection of the general population, citizens and guests of Strafford New Hampshire, before during and after a hazard.
- Protect existing properties and structures through mitigation activities.
- Provide resources to residents of Strafford, when needed, to become more resilient to hazards that impact the town's critical support services, critical facilities, infrastructure, economy, environment, historical & cultural treasures and private property.
- Support the Presidential Policy Directive (PPD-8) through prevention, mitigation, preparedness, response and recovery actions.
- Work regionally to identify, introduce and implement cost effective hazard mitigation measures in order to accomplish the town's goals.
- Develop and implement programs to promote hazard mitigation to protect infrastructure throughout the town to reduce liability with respect to natural and human-caused hazards generally.

To address the challenges posed by climate change as they pertain to increasing risks in the town's infrastructure and natural environment.

Multi-Hazard Mitigation Planning Process

Overview

The Plan was developed and updated with substantial local, state, and federal coordination. The completion of this new multi-hazard plan required significant planning preparation and represents the collaborative efforts of the Town of Strafford, an ad-hoc local Multi-Hazard Mitigation Planning Committee, and SRPC. The Committee followed an established ten step multi-hazard mitigation planning process (see box, right).

The Committee met five times over a three month period to discuss the range of hazards included in this plan as well as brainstorm mitigation needs and strategies to address these hazards and their impacts on people, business, and infrastructure in the Town. All meetings were geared to accommodate brainstorming, open discussion, and an increased awareness of potential threats to the Town. This process results in significant cross talk regarding all types of natural and man-made hazards. Copies of the agendas and meeting minutes for all Planning Committee meetings are included in the Appendix of the Plan.

Public Involvement

Public involvement is an important part of the planning process. A local Multi-Hazard Mitigation Planning Committee (the Committee) was formed to guide and oversee the development of this Plan. Board of Selectmen; administrative staff; Conservation Commission members; Planning and Zoning Board of Adjustment Members; the Police, Fire, and Highway Departments; and local business owners, interested organizations, and residents of Strafford were invited to participate on the Committee. Community officials were encouraged to contact as many people as they could to participate in the planning process. Members of the public and other stakeholders from neighboring communities were also informed of and encouraged to attend the Committee's meetings.

To build awareness of the Plan and opportunity to be involved, a public notice, stressing the public nature of the process, was posted on the Town's website and notices were hung at the Town Hall for a one week period one week in advance of each Committee meeting. The Committee met five times between December 6, 2016 and February 22, 2017. A public notice was also posted on Strafford Regional Planning Commission's website, and information about the Plan was included in SRPC's news updates in order to ensure that adjacent communities were aware of Strafford's committee meetings and had the opportunity to attend.

All feedback from participants of the planning committee was incorporated into the Plan.

Ten Step Multi-Hazard Mitigation Planning Process

1. Establish and Orient a Hazard Mitigation Planning Committee
2. Identify Past and Potential Hazards
3. Identify of Hazards and Critical Facilities
4. Assess Vulnerability – Estimating Potential Losses
5. Analyze Development Trends
6. Identify Existing Mitigation Strategies and Proposed Improvements
7. Develop Specific Mitigation Measures
8. Prioritize Mitigation Measures
9. Prepare Mitigation Action Plan
10. Adopt and Implement the Plan

NOTE FROM THE PLANNING OFFICE

Strafford Regional Planning Commission has begun the process to update the Town of Strafford's Multi-Hazard Mitigation Plan. The fourth meeting with the Multi-Hazard Mitigation Planning Committee has been scheduled for Wednesday, February 1, 2017 at 3:30PM at the Town Hall at 12 Mountain View Drive. At the fourth meeting, the committee will review past declared disasters, discuss hazards, and identify mitigation strategies.

All citizens, businesses, municipal officials, and interested parties from Strafford and other communities are welcome to attend the meeting. If you are unavailable to attend, please forward any ideas or concerns to: Liz Durfee, Senior Regional Planner, Strafford Regional Planning Commission at 603-994-3500 or edurfee@strafford.org or to Scott Whitehouse, Fire Chief/Emergency Management Director at nitehitch@gmail.com.

This update of the 2012 Plan is funded by FEMA under contract to Strafford Regional Planning Commission and is a collaborative planning process with the Town.



**Strafford Regional Planning
Commission**

Administration

Communities

Regional Planning

Economic Development

Transportation

GIS & Data

SRPC to update Strafford Multi-Hazard Mitigation Plan

Date posted: Tue, Nov 22nd, 2016 12:00:00 am

Strafford Regional Planning Commission has begun the process to update the Town of Strafford's Multi-Hazard Mitigation Plan. The first meeting with the Multi-Hazard Mitigation Planning Committee has been scheduled for Tuesday, December 6, 2016 at 9:00AM at the Town Hall at 12 Mountain Drive. At the first meeting, the Planning Committee will review the Multi-Hazard Mitigation Plan and update process and discuss existing mitigation strategies, programs, and policies.

All citizens, businesses, municipal officials, and interested parties from Strafford and other communities are welcome to attend the meeting. If you are unavailable to attend, please forward any ideas or concerns to: Liz Durfee, Senior Regional Planner, Strafford Regional Planning Commission at 603-994-3500 or edurfee@strafford.org or to Scott Whitehouse, Fire Chief/Emergency Management Director at nitehitch@gmail.com.

This update of the 2012 Plan is funded by FEMA under contract to Strafford Regional Planning Commission and is a collaborative planning process with the Town.

Adoption and Integration

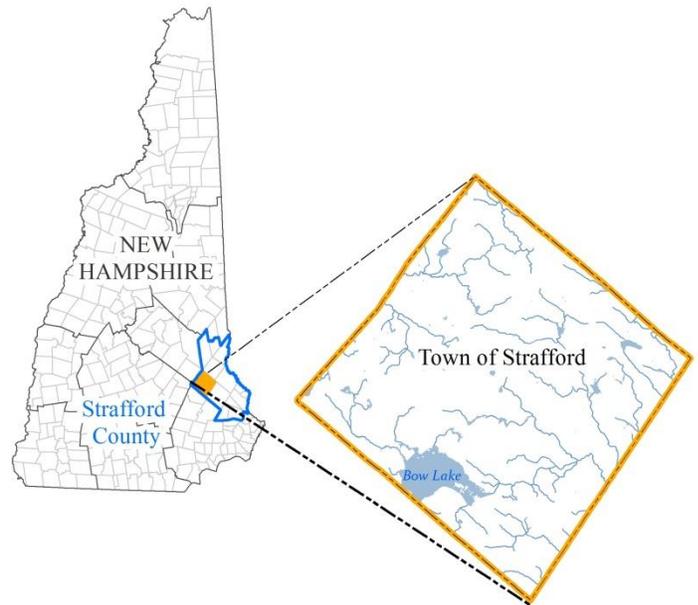
Once approved by the Planning Committee, the Plan will be forwarded to HSEM for Conditional Approval. Upon review and conditional approval by HSEM, the Board of Selectmen will hold a public meeting, to consider public comments and must promulgate a signed Resolution to Adopt the Plan.

Elements of the Plan will be incorporated into other planning processes and documents, such as the Town's Master Plan, Capital Improvement Plan, and Emergency Operations Plan. The Town will refer to this Multi-Hazard Mitigation, as appropriate, in other documents.

Chapter 2: Community Profile

The Town of Strafford is located in southeastern NH within Strafford County. The towns bordering Strafford are: Farmington, Rochester, and Barrington to the east and Barnstead, Northwood, and Pittsfield to the west, running from north to south respectively. Strafford contains 49.0 square miles of land area and 2.2 square miles of inland water, including Bow Lake.

The Town of Strafford comprises an area of 30,256 acres and contains regionally significant surface water features, including Bow Lake, the second largest lake in Strafford County at 1,160 acres, which is the source of the Isinglass River. Another land feature of Strafford is the Blue Hills Range, which forms a major divide between the Suncook-Merrimack watershed to the west, and the Isinglass, Cocheco and other watersheds that flow east to the seacoast (divides the Town in half). The headwaters of these streams lie along the flanks of the Blue Hills, which have a base elevation of 600- 800 feet above sea level (Parker Mountain peak elevation, highest in the range, is over 1,420 feet). Strafford is fortunate in having an abundance of wetlands that act as sponges during periods of high rainfall and runoff and help regulate stream flow during drier periods.



Historical Population Trends

Population change for Strafford totaled 2,879 over 50 years, from 770 in 1950 to 3,649 in 2000. The largest decennial percent change was a 77 percent increase between 1980 and 1990, which followed a 72 percent increase between 1970 and 1980. The 2008 Census estimate for Strafford was 4,065 residents, which ranked 94th among New Hampshire's incorporated cities and towns. In 2010, the town's population had decline to 3,991 (2010 Census).

Projected Population Change

National population projections by the Census Bureau suggest that the United States will reach a population of approximately 380 million by 2040 (an 18% overall population growth). Although the Stafford Planning Region is not expected to grow on pace with the national rate, it is expected to grow by close to 10%, a significantly higher rate than projected for the state of New Hampshire (7.2%). Population projections completed by the New Hampshire Office of Energy and Planning and the state's Regional Planning Commissions, suggest that the town of Strafford can expect an overall growth in population of 16% (approximately 9% per year in the first decade and then an average of 3% in the 2020s and 2030s) in the 30-year period between 2010 and 2040.

Migration

Data suggest that fewer New Hampshire residents are leaving the State of New Hampshire. Since 2005, the peak year of outmigration between 2000 and 2010, there has been a 17% decrease in residents exiting the state. Unfortunately, New Hampshire is also experiencing a declining rate of in-migration, meaning that fewer individuals are coming into the state.

Aging

Strafford, like so many communities in the region, experienced a significant increase in its 65 and older population between 2000 and 2010. The percent of the population age 65 and older increased from 7.7% in 2000 to 10.1% in 2010.¹ This trend is occurring across both the state and much of the New England and is a product of aging Baby-Boom and Generation X populations.

In the whitepaper series *The Two New Hampshires: What does it mean?* Ross Gittell addresses the aging population, and how concentrations of older age cohorts vary across the state. In the report Gittell defines two New Hampshires, rural and metro. Rural NH includes Cheshire, Sullivan, Belknap, Carroll, Grafton, and Coos Counties, while Metro NH includes Rockingham, Hillsborough, Strafford and Merrimack Counties. As Gittell notes, Rural NH has a far older population (median age) than Metro NH, and if this was its own state it would be the second oldest in the nation. Even Metro NH, if considered by itself, would be older than Massachusetts, Connecticut, Rhode Island, and Vermont.

Population and Age

While data show the region growing at a faster rate than the state over the next 25 years, the slowed growth rate beginning in 1990 has, and will continue to have, an effect on the region. As the regional population ages, and in-migration continues to decrease, the percentage of school age children is declining. Out of the 161 districts in the state, 130 experienced a decline in enrollment between 2000 and 2010.

The aging population, combined with a decrease in population ages 18 to 55, may result in a labor force shortage in coming years. Additionally, a trend known as 'brain drain', the emigration of highly skilled or trained individuals to other states, could have potentially negative impacts on local, regional and state economic systems.

With the expected increase in demand for health care, assisted living facilities, and nursing home capacity, and the potential for a smaller labor force, a care-provider shortage may emerge. Local governments will likely need to create programs and strategies in order to provide adequate health and social services for increased numbers of aging seniors.

Table 2.1 Population in Strafford 1990, 2000, 2010

	1990	2000	2010	% Change 1990-2000	% Change 2000-2010
Population	2,904	3,626	3,991	24.9	10.1

¹ US Census 2000 and 2010

Past Development Trends

While the population of the Town continues to grow, the rate of growth has decreased significantly from the level of growth that occurred in 70s and 80s. Despite its growing population, Strafford has significant open space areas. These include some of the largest blocks of open space uninterrupted by active roadways in southeastern New Hampshire. In addition, there is considerable undeveloped frontage on great ponds and rivers as well as significant farmland resources. Further, the town still retains a very rural/agricultural appearance due to the continued presence of rolling, open fields, farmsteads with outbuildings, and tended woodlands, all in fairly large tracts. These large parcels not only contribute to the overall character but also provide important unfragmented habitats for wildlife.

Strafford is a primarily a bedroom community with few commercial or industrial enterprises. The historic neighborhood centers are still recognizable with churches and former grange halls intact. The agricultural roots of the town continue to characterize the community with historic architecture, open fields, stone walls, hedgerows and wood lots, despite the closure of most of the working farms in the town.

Development has occurred within close proximity of major commuting routes to Concord, Portsmouth, and Rochester, as well as around Bow Lake. Many of the roads are maintained in an unpaved state, which adds to their historic character. Another valuable natural resource is the Town's scenic vistas. These include the views of Parker and Blue Job Mountains, lands along the Isinglass and Mohawk River corridors, and areas around the several lakes and ponds. Much of this land, however is in private hands, making it vulnerable to development.

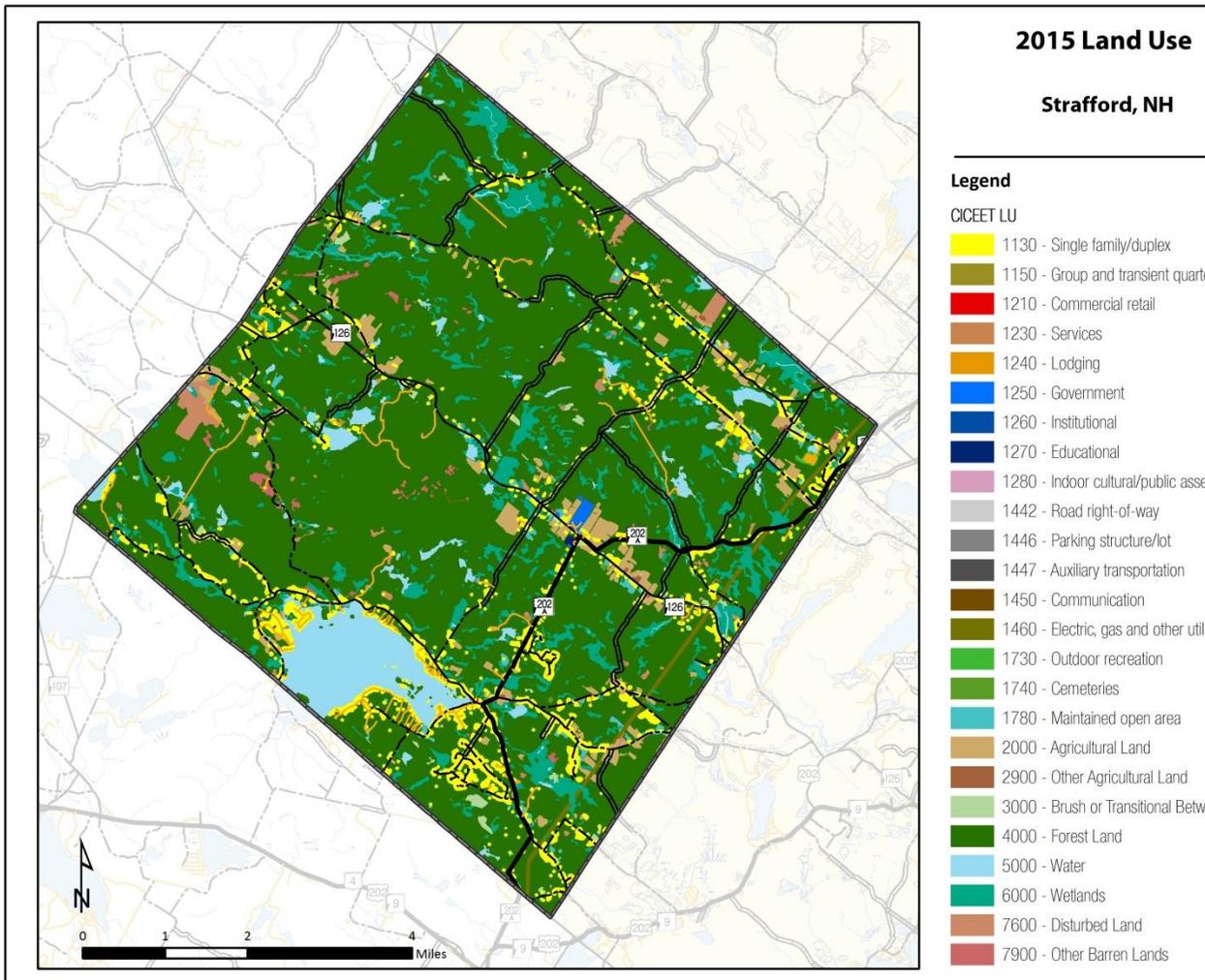
The Town recognizes that it will grow and develop further in the coming years. There is a desire that this new development be directed and managed in a way that will complement the Town's distinct character and rural traditions. Where there is interest in new commercial development, the Planning Board would like to steer this into the existing settlement crossroads rather than randomly placed in the rural countryside. This way, the existing centers would be enhanced and supported and the rural character of the surrounding countryside would be preserved. Recently, there has not been any commercial development and the several proposed subdivisions were bought out by conservation land grants. Crown Point Road has experienced some residential growth. There are also more facilities at the campground than five years ago.

Two potential problems related to future development include Strafford's geographic dispersal and lack of a central place to hold town-wide activities or to permanently set up special equipment for activities and instruction. Historically, this need was often fulfilled by activities at the school and social organizations such as the Grange. There were grange halls in all of the settlements in town but they now either meet sporadically, or are no longer active. The new town office is mostly used for governmental business. Additionally, Strafford has no public water or sewer systems, and, therefore, any sudden increase or premature development could severely impact Town resources.

Strafford has experienced very little development over the last several years. The Planning Committee noted that recent development had not occurred in areas that were prone to hazards. One of the Town's ongoing challenges with respect to hazards and emergency management is efficient access to properties via Class VI roads and Kooauke Island. However, because little change in development has occurred, the community's vulnerability has remained the same.

The Town's *Zoning and Land Use Ordinances, Subdivision Regulations, Non-Residential Site Plan Regulations, and Building Regulations* includes many regulations, standards, and requirements to direct development away from hazardous and to facilitate emergency response. These regulations include restrictions on development in areas where land is unsuitable due to flood hazards or steep slopes. The Town enforces minimum buffers from wetlands and bodies of water, both to reduce flood hazards and protect water quality from potential sources of pollution. The Town has a growth

management ordinance to limit development to areas that are compatible with the orderly and gradual expansion of community services, including police and fire protection, and road maintenance. For information on specific, existing strategies to direct development away from hazards, see Chapter 6.



Map 2.1 2015 Land Use

Table 2.2 Change in land use from 2010 to 2015

Land Use	Acres 2010	Acres 2015	% of Total Area of Town (2015)	% Change 2010-2015
Residential	2228.0	2365.4	7.2	0.62
Commercial, Services, Intuitional	72.0	74.3	0.2	0.33
Transportation, Communications	398.9	399.6	1.2	0.02
Outdoor and Other Built Up Land	275.8	297.3	0.9	0.78
Transitional	116.2	143.6	0.4	2.35
Agricultural	978.4	995.8	3.0	0.18
Forest	24216.8	23751.7	72.5	-0.19
Wetlands	2647.6	2534.5	7.7	-0.43
Disturbed, Non-Vegetated, or Barren Land	219.1	475.5	1.5	11.71
Water	1626.1	1741.2	5.3	0.71

Housing

In the period between 1990 and 2010, Strafford experienced an increase of nearly 520 total housing units. Occupancy-type data show that in the same 20-period, total renter-occupied unit count increased by 37.5% while owner-occupied housing units increased by 47.1%. During this time period, the vacant housing units increased by 23% and occupied housing units increased by 45.9%.

As of 2010, Strafford's occupied housing units are roughly 88% owner-occupied and 12% renter occupied. The town exhibits an 18% vacancy rate. With moderate population growth projected over the coming three decades, limited new housing unit development is expected.

Table 2.3 Housing units and tenure

	1990	2000	2010	% Change 1990-2010
Housing Units	1264	1564	1784	41.1
Occupied Housing Units	999	1281	1458	45.9
Owner Occupied housing Units	876	1139	1289	47.1
Renter Occupied Housing Units	123	142	169	37.5
Vacant Housing Units	265	283	326	23.0

Building trend data suggest that in the period between 2000 and 2015, the net number of building permits issued declined significantly from a high of 41 in 2002 to a low of 4 in 2008 (see Figure 1). In 2015, 8 residential permits were issued. This is representative of not only stagnating population growth, but also of the impacts of the economic recession of the mid-late 2000's. This data represents the best available data at the time of the preparation of the Plan.

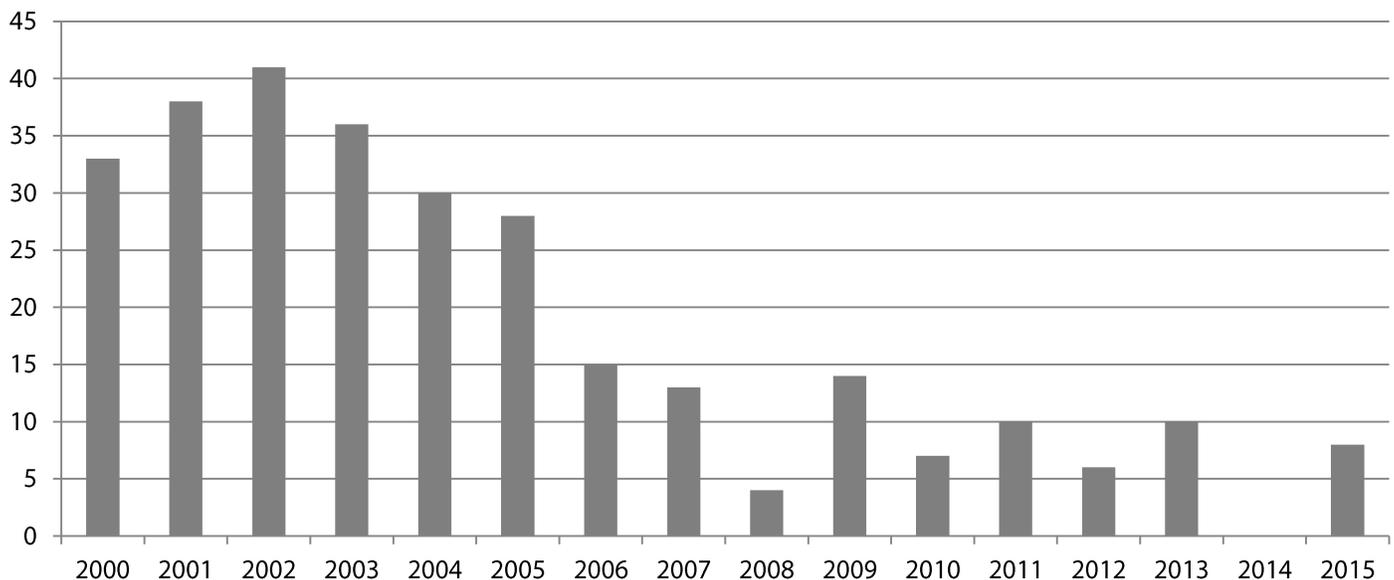


Figure 2.1 Net building permits in Strafford, 2000-2013, 2015 (Source: NHOEP, RLS, RPCs)

Chapter 3: Asset Inventory

Critical Facilities and Key Resources

This chapter includes Critical Facilities and Key Resources (CF/KR) within the Town of Strafford that were identified by the Committee during the update of this plan.

FEMA describes the term ‘critical facilities’ as all manmade structures or other improvements that, because of their function, size, service area, or uniqueness, have the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed, damaged, or if their functionality is impaired.² These facilities include all public and private facilities that a community considers essential for the delivery of vital services for the protection of the community, such as emergency operations centers, shelters, or utilities.²

“Critical facilities, and the functions they perform, are the most significant components of the system that protects the health, safety, and well-being of communities at risk.”

-FEMA Critical Facility Design Considerations

Table 3 includes a list of CF/KR, including the type of facility and building, and the address and phone number of the CF/KR, if available, as identified by the Planning Committee during the preparation of this Plan. Map 2 and 3 display the location of these facilities.

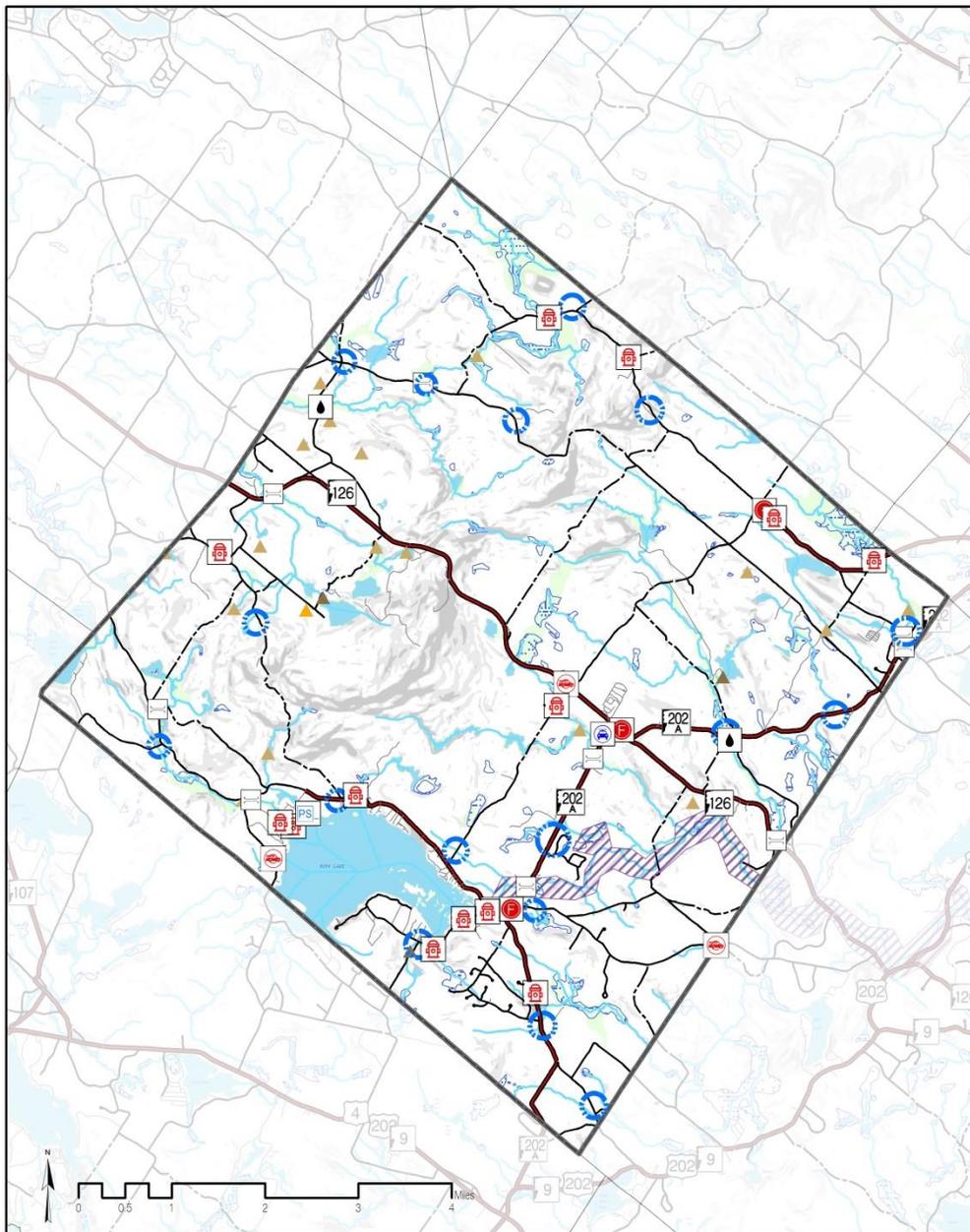
² https://www.fema.gov/media-library-data/20130726-1557-20490-2839/fema543_chapter1.pdf

Table 3.1 Critical Facilities and Key Resources

Facility Name	Facility Type	Building/Structure Type	Address	Phone
Strafford Town Hall	Town Hall / EOC	Town Hall	22 Rollercoaster Rd	603-664-2192
Police Station	Police Station	Police Station	34 Rollercoaster Rd	603-664-7462
Bow Lake Fire Station	Fire Station	Fire Station	360-372 Province Rd	603-664-6863
Center Fire Station	Fire Station	Fire Station	1187 Parker Mountain Rd	306-664-2915
Crown Point Fire Station	Fire Station	Fire Station	1 st Crown Point Rd	
Isinglass Country Store	Emergency Fuel	Fuel	410 Rollercoaster Rd	603-664-5622
NHDOT Division 6 Shed	Emergency Fuel	Fuel	Parker Mountain Road	
Dry hydrant	Fire Aid	Dry Hydrant	Water St	
Dry hydrant	Fire Aid	Dry Hydrant	Tasker Rd	
Dry hydrant	Fire Aid	Dry Hydrant	First Crown Point Rd	
Dry hydrant	Fire Aid	Dry Hydrant	Bow Lake Estates	
Dry hydrant	Fire Aid	Dry Hydrant	Water St	
Dry hydrant	Fire Aid	Dry Hydrant	Province Rd	
Dry hydrant	Fire Aid	Dry Hydrant	444 1 st Crown Point Rd	
Dry hydrant	Fire Aid	Dry Hydrant	Crown Point Rd at Berry River	
Dry hydrant	Fire Aid	Dry Hydrant	Huckins Rd at Huckins Brook	
Dry hydrant	Fire Aid	Dry Hydrant	1 st Crown Point Rd at Peasley River /Big River	
Dry hydrant (inactive)	Fire Aid	Dry Hydrant	Brown Rd	
Dry hydrant (active)	Fire Aid	Fire Pond	Province Rd	
Dry hydrant (active)	Fire Aid	Dry Hydrant	Pointe Trinity Dr	
Dry hydrant (inactive-private)	Fire Aid	Dry Hydrant	Drakes Hill Rd	
Fire Pond*	Fire Aid	Fire Pond	Northwood Rd	
Fire Pond	Fire Aid	Fire Pond	Parker Mountain Rd	
River Access*	Fire Aid	River Access	Wingate Rd	
River Access	Fire Aid	River Access	Strafford Rd at Mohawk River	
River Access	Fire Aid	River Access	Roller Coaster Rd at Isinglass River	
River Access	Fire Aid	River Access	Twombly Rd at Mohawk River	
Helipad	Military Facilities	Helipad	Academy Drive	603-664-9187
National Guard Training Center	Military Facilities	National Guard	Academy Drive	603-664-9187
Strafford School	Schools	School	22 Rollercoaster Rd	603-664-2842
Third Babtist Church, Christian Education Center	Shelter	Church	30 Strafford Road	603-664-7750
Strafford Transfer Recycling Station	Hazardous Material	Recycling Center	114 Ricky Nelson Rd	
North County Water Supply	Water Facility	Water Pump Station	102 Bow Lake Estates Rd	
Telephone switching station	Telephone	Telephone Switch Stn	Water St	
Telephone switching station	Telephone	Telephone Switch Stn	Drakes Hill Rd	
Telephone switching station	Telephone	Telephone Switch Stn	13 Central St, Farmington	
Telephone switching station	Telephone	Telephone Switch Stn	Parker Mountain Road	
Telephone switching station	Telephone	Telephone Switch Stn	Cross Rd	
Telephone switching station	Telephone	Telephone Switch Stn	Province Rd	
Bow Lake Inn	Lodging	Hotel/Motel	6 Drake Hill Rd	603-664-9908
Bow Lake Free will Baptist Church	Historic	Church	530 Province Rd	603-664-7401
Bow Lake Grange Hall	Historic	Meeting House	569 Province Rd	603-664-9362
Crown Point Baptist church	Historic	Church	274 1st Crown Point Rd	
Huckins Centennial Farm	Historic	Historical Site	22 Hillside Dr	
Stiles Centennial Farm	Historic	Historical Site	1309 Parker Mtn Rd	
Strafford Historical Society	Historic	Historical Society	11 Strafford Rd	603-664-7334
Third Baptist Church	Historic	Meeting House	30 Strafford Rd	603-664-7750
Waldron Store	Historic	Historical Society	492 Province Rd	
Boy Scout Camp (Parker Mountain)	Recreation - Outdoor	Athletic Assoc.	Boy Scout Rd	
KOA Campground	Recreation - Outdoor	Campground	Campground Rd	
Town Beach	Recreation - Outdoor	Beach	Water St	
YMCA Camp Foss	Recreation - Outdoor	YMCA/Athletic Assoc.	Willey Pond Rd	603-232-8642

Town of Strafford, NH
Multi-Hazard Mitigation Plan

Critical Infrastructure & Key Resources
Police, Fire, and Fire Aid



Legend

Critical Facilities and Key Resources

- Dry Hydrant
- Fire Pond
- Fire Station
- Water Pump Station
- Police Station
- River Access

Potential Hazards

- Past Flood Locations
- Bridges
- Dam Inundation Areas
- 100 Year Floodplain

Percent Slope

- 15.1-25%
- >25% slope symbol"/> >25%

Dams

Hazard Class

- High
- Significant
- Low
- Non-Menace

Roads

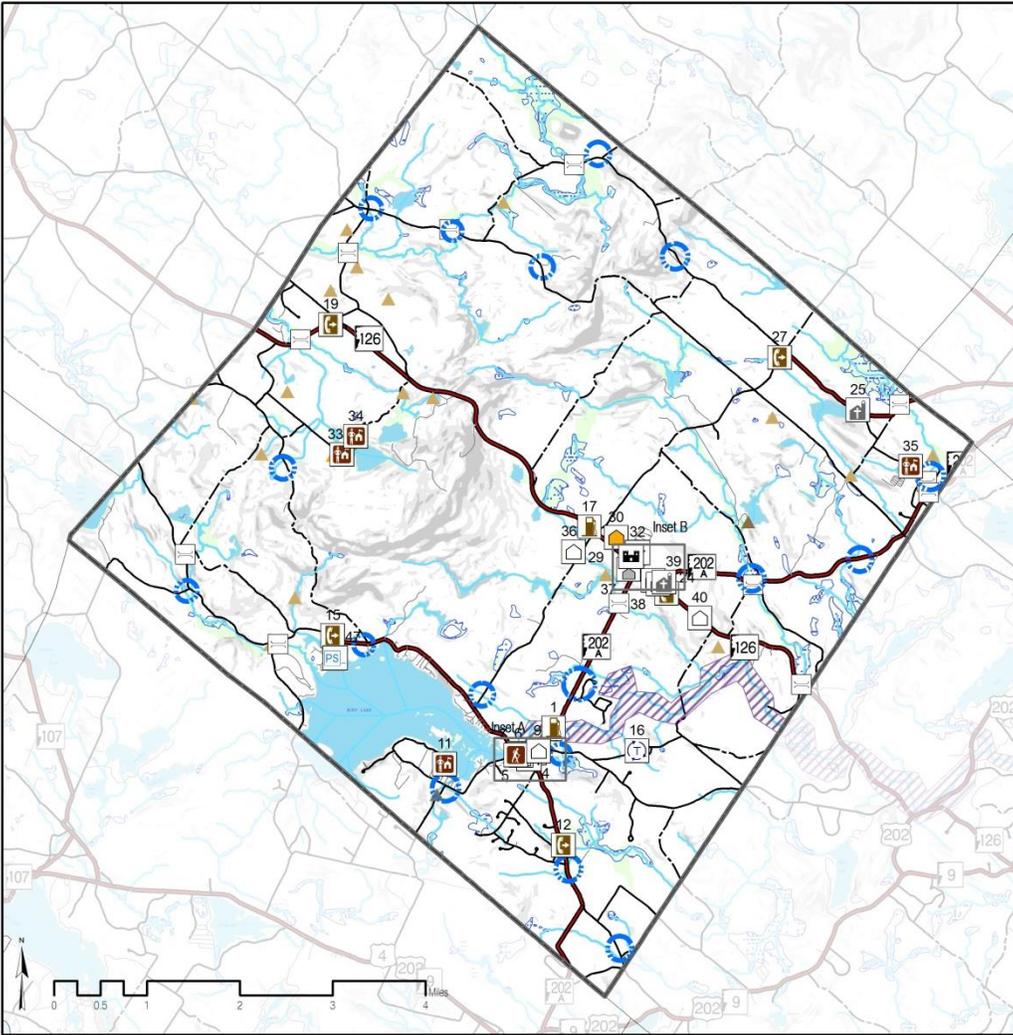
- State
- Federal
- Local
- Not Maintained
- Private

Water Features

- River, Stream
- Lake, Pond, River
- Wetlands

Map 3.1 Critical Infrastructure and Key Resources (A)

Town of Strafford, NH
Multi-Hazard Mitigation Plan
Critical Infrastructure & Key Resources



Legend

Critical Facilities and Key Resources

- Town Hall
- School
- Church
- Water Pump Station
- Fuel
- Helipad
- Hotel/Motel
- Historic Site
- National Guard
- Recycling Center
- Telephone Switch Stn
- Camp/Campground
- Outdoor Recreation

Potential Hazards

- Past Flood Locations
- Bridges
- Dam Inundation Areas
- 100 Year Floodplain

Percent Slope

- 15.1-25%
- >25%

Dams

Hazard Class

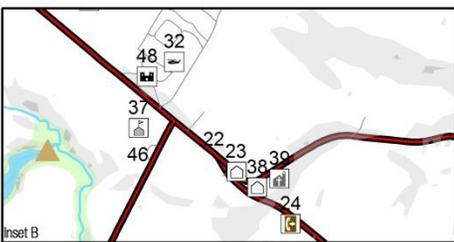
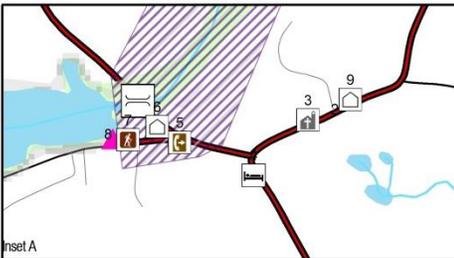
- High
- Significant
- Low
- Non-Menace

Roads

- State
- Federal
- Local
- Not Maintained
- Private

Water Features

- River, Stream
- Lake, Pond, River
- Wetlands



Map ID	Facility Name
29	Strafford Town Hall
1	Isinglass Country Store
17	NHDOT Division 6 Shed
32	Helipad
48	National Guard Training Center
37	Strafford School
38	Third Baptist Church, Christian Education Center
16	Strafford Transfer Recycling Station
47	North County Water Supply
4	Bow Lake Inn
2	Bow Lake Free will Baptist Church
6	Bow Lake Grange Hall
25	Crown Point Baptist church
36	Huckins Centennial Farm
40	Siles Centennial Farm
23	Strafford Historical Society
39	Third Baptist Church
9	Waldron Store
34	Boy Scout Camp (Parker Mtn)
35	KOA Campground
7	Town Beach
33	YMCA Camp Foss

Map 3.2 Critical Infrastructure and Key Resources (B)

Vulnerable Structures and Potential Loss

Critical Facilities/Key Resources and Other Assets

It is important to identify the critical facilities and other structures that are most likely to be damaged by hazards. Table X lists CF/KRs that are located within past and potential flood hazard areas.

Table 3.2

CF/KR and other Assets	Hazard	100% of Structure Value / Land
CF/KR		
Fire Pond on Northwood Rd	Flooding - Located in 100 yr Floodplain	\$5,000*
River Access on Wingate Rd		\$2,000*
River Access on Strafford Rd at Mohawk River		\$2,000*
Dry Hydrant on 1 st Crown Point Road at Big River		\$2,000*
Dry Hydrant on 1 st Crown Point Road at Berry River		\$2,000*
Isinglass County Store	Flooding - Located within Bow Lake Dam Inundation Zone	\$282,200 (improvements only)
Telephone Switching Station on Water St		Not available
Bow Lake Grange Hall		\$102,400 (improvements only)
Town Beach		\$237,500 (assessed value of land lot 29-40)
River Access on Strafford Rd at Mohawk River	Flooding – Located in an area that flooded in the past	\$2,000*
Bridges		
First Crown Point over Berry's River (ID 172/158)	Flooding - Located in Past Flooding Area	\$424,300
Barn Door Gap over Big River (ID 057/135)		\$367,400
Province Rd near 202-A over Isinglass River (ID140/055)	Flooding – Located in Bow Lake Inundation Zone	Owned by NHDOT
NH202-A over Isinglass River (ID 140/630)		Owned by NHDOT
Northwood Rd over Buzzel's Run Brook (ID 085/040)	Flooding – Located in the 100 yr Floodplain	\$695,300
NH202-A over Brook (ID139-096)		NHDOT
Province Rd over Isinglass River (ID140/055)		NHDOT
NH202-A over Isinglass River (ID 145/063)		NHDOT
Dams		
Pine Rock Farm Pond Dam	Flooding - Located in Past Flooding Area	The Dam Bureau at NHDES has looked into assessing values for state-owned dams with marginal success. They considered bond ratings, market value, and construction costs. They also developed a formula that calculated the cubic feet of water impounded as a monetary value. Because dams serve different purposes (recreational, hydro-power), assessed values are hard to estimate and cannot be determined.
Bow Lake Dam at Isinglass River		
Wildlife Pond Dam at Penny Brook		
Garboski Beaver Pond Dam		
TOTAL		\$2,124,100
The approximate assessed value for the bridges was calculated by multiplying \$1,000.00 per square foot of bridge. This estimate was provided by the Bridge Design Bureau at NHDOT and includes all cost (engineering, consulting and in-house design, construction, etc.) to build a new bridge. The square feet was calculated by multiplying the length of the bridge by 20 feet.		
*estimate		

In Strafford, ten CF/KR, eight bridges, and four dams are located in potentially hazardous areas were identified during the risk assessment. The potential total loss of CF/KR and municipal bridges is estimated at \$2,124,100.

One bridge/culvert (ID 057/135), located on Barn Door Gap Road over the Big River is classified as a Municipal Owned Red List bridge and requires yearly inspections due to known deficiencies, poor conditions, weight restrictions, or the type of construction. According NHDOT, the culvert is ranked as poor but the scour critical rating is stable for extreme flood.³ In 2015, the bridge on First Crown Point Road over the Big River (ID 069/164) was removed from the Municipal Red List.

Table 3.4 State and municipally owned bridges in Strafford

Bridge ID	Location	Owner
069/164	First Crown Point over Big River	Strafford
172/158	First Crown Point over Berry's River	Strafford
044/118	Wingate Rd over Big River	Strafford
057/135	Barn Door Gap Rd over Big River	Strafford
085/040	Northwood Rd over Buzzel's run Brook	Strafford
159/115	NH 202A over Mohawk River	NHDOT
159/167	Crown Point Rd over Berry's River	NHDOT
174/154	NH 202A over Berry's River	NHDOT
182/106	NH 126	NHDOT
049/097	NH 126 over Little River	NHDOT
139/096	NH 202A over unnamed brook	NHDOT
140/055	Province Rd over Isinglass River	NHDOT
145/063	NH 202A over Isinglass River	NHDOT

Buildings and Utilities

It is difficult to ascertain the amount of damage that could be caused by a natural or man-made hazard because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. The assumption used here when calculating the damage to property is that a hazard may result in low (1% of structures damaged), medium (5% of structures damaged), or high (10% of structures damaged) economic loss depending on the nature of the hazard. Table 3.5 displays total assessed value and low, medium, and high economic loss.

Table 3.5

Local Assessed Valuation (2014)				
	Total Assessed Value (2014)	Economic Loss		
		Low 1% Damage	Medium 5% Damage	High 10% Damage
Buildings				
Residential	\$228,667,600	\$2,286,676	\$11,433,380	\$22,866,760
Manufactured Housing	\$2,655,300	\$26,553	\$132,765	\$265,530
Commercial Industrial	\$6,110,600	\$61,106	\$305,530	\$611,060
Total Buildings	\$237,433,500	\$2,374,335	\$11,871,675	\$23,743,350
Utilities				
Public Water	\$120,100	\$1,201	\$6,005	\$12,010
Electric	\$4,325,300	\$43,253	\$216,265	\$432,530
Other	\$15,800	\$158	\$790	\$1,580
Total Utilities	\$4,461,200	\$44,612	\$223,060	\$446,120
Net Valuation Buildings and Utilities	\$241,894,700	\$2,418,947	\$12,094,735	\$24,189,470

Source: NH Department of Revenue Administration. 2015 Annual Report. Assessed value does not include value of land or local exemptions. (<http://revenue.nh.gov/publications/reports/documents/ar-2015.pdf>)

³ State of New Hampshire Department of Transportation. Municipal Owned Red List Bridges. December 31, 2015. https://www.nh.gov/dot/org/projectdevelopment/bridgedesign/documents/2016-03-31nhdot_municipal_red_list.pdf

The total local assessed value included in this analysis is \$241,894,700, including \$237,433,500 for buildings and \$4,461,200 for utilities. Based on this assumption, the potential loss from any of the identified hazards under a low, medium, and high damage scenario of buildings and utilities would range from **\$0 to \$2,418,947 (low)** or **\$2,418,947 to \$12,094,735 (medium)** or **\$12,094,735 to \$24,189,470 (high)** based on the 2014 Strafford Town valuation.

In order to stay consistent, the Committee made the decision to use the results derived from the hazard vulnerability assessment tool (Table 5.1). There was consensus that the overall threat rankings (severity x probability) associated with each hazard were an equal indicator to the percentage of damage and were therefore used to determine the potential loss.

Human loss of life was not included in the potential loss estimates, but could be expected to occur, depending on the severity and type of the hazard.

Chapter 4: National Flood Insurance Program

Communities that participate in the NFIP have adopted and enforce community floodplain regulations. One of the community’s requirements is to require and obtain certain elevation data for all new and substantially improved structures located in a special flood hazard area. Community permitting officials must review this elevation data to ensure floodplain development complies with the regulations.⁴

Strafford National Flood Insurance Program (NFIP) Status & Compliance

Strafford has been a member of the National Flood Insurance Program (NFIP) since February 28, 1975. The Town has significant portions of land (2,450 acres) in the 100-year floodplain along the Big, Berrys, Isinglass, and Little Rivers. There are limited structures within this floodplain according to available GIS Flood Insurance Rate Map (FIRM) data and aerial imagery.

Section 4.4 of Town’s Zoning Ordinance (as amended 2015)(included in Appendix) outlines the Town’s floodplain regulations. These regulations apply to all lands designated as special flood hazard areas by FEMA in its “Flood Insurance Study for the Town of Strafford, NH” together with the associated Flood Insurance Rate Maps and Flood Boundary and Floodway Maps of the Town of Strafford, dated February 28, 1975 (County of Strafford Map Revised May 17, 2005), or later revisions (amended 3-8-2005). The Town’s floodplain regulations ensure new and existing residential, non-residential, manufactured homes, recreational vehicles, and structures within the floodplain are elevated to or above the 100-year flood level and/or designed to avoid flood damage and to provide adequate draining paths.

According to information from the FEMA Community Overview provided by NH OEP Assistant Planner and State Floodplain Program Assistant Coordinator Kellie Walsh, there are a total of 17 policies in force in Strafford. Fifteen policies are single family, one policy is a 2-4 family policy, and one is non-residential. One loss has been paid (\$775.32). There are no NFIP insured structures that have been repeatedly damaged by floods. Table 4.1 displays the types of policies by zone. Policies in the B, C & Z Zones are located outside of the Special Flood Hazard Area and 100-year floodplain.

Table 4.1 Strafford Insurance Zone Policies (Source: FEMA Community Information System)

Zone	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	3	\$4,773	\$383,000	0	\$0	\$0
A Zones	5	\$8,216	\$662,800	1	\$775.32	\$175.00
B, C & X Zone – Standard	1	\$1,145	\$250,000	0	\$0	\$0
B, C & X Zone – Preferred	8	\$3,136	\$2,2660,000	0	\$0	\$0
Total	17	\$17, 270	\$3,955,800	1	\$775.00	\$175.00

As necessary, Strafford continues to work with elected officials and FEMA to correct existing compliance issues. Strafford’s FEMA CAV (Community Assistance Visit) from July 28, 2005 identified no problems or issues. The Town has continued communication with FEMA to discuss NFIP issues and continues to monitor designated flood areas throughout the town. In

⁴ <https://www.nh.gov/oep/planning/programs/fmp/documents/fs-2-elevation-certificate.pdf>

2009, the New Hampshire Geological Survey conducted a fluvial erosion assessment on the Isinglass River to delineate potential hazard zones along the river. These zones were created and mapped for the Town of Strafford to use for planning purposes. The community uses this data to identify areas that are vulnerable to erosion and therefore less suitable to development.

A FEMA Risk MAP Discovery Meeting was held on December 3, 2015 for thirteen communities, including Strafford, within the Piscataqua-Salmon Falls Watershed. This meeting was part of the process of gathering data and information about local flood risk and flood hazard standards to determine areas that require mapping, risk assessment, or mitigation planning assistance.

The Town has distributed NFIP educational brochures in the past and has identified this as an ongoing mitigation strategy. SRPC provided the Town with copies of two FEMA brochures for distribution to residents.

Chapter 5: Hazards & Mitigation Strategies

Overview

This section describes the location and extent of hazards that could impact the Town of Strafford, presents past hazard events in the Town or elsewhere in New Hampshire, and discusses their rank order placement. The Multi-Hazard Mitigation Planning Committee investigated past and potential hazards using a variety of sources and techniques, including but not necessarily limited to interviewing Town historians and other citizens; researching historical records archived at the Town Library; scanning old newspapers; reading published Town histories; consulting various hazard experts; and extracting data from the NH Hazard Mitigation Plan and other state and federal databases. Past and potential hazards were mapped where spatial data was available.

Rating Probability, Severity, and Overall Risk of Future Disasters

The nature of each hazard type and the quality and availability of corresponding data made the evaluation of hazard potential difficult. The Multi-Hazard Planning Committee considered what data was at hand and used its collective experience to formulate statements of impact or potential. Each hazard type was rated using a hazard vulnerability assessment tool (refer to Table 2.3). This tool estimates the probability of occurrence, severity, and overall risk of an event using a projected number system answering questions, which answer High (3), Moderate (2), and Low (1). A zero (0) score meant that there is no likelihood the hazard would impact the Town in the next 25 years. The ranges established for the average to determine severity were:

- **High** = >3
- **Moderate** = 2
- **Low** = 1 or below

The overall risk is a numeric indication developed by multiplying the total numbers of the probability and the severity.

Probability of Occurrence

Probability is based on a limited objective appraisal of a hazard's probability using information provided by relevant sources, observations and trends. The Planning Committee discussed and rated probability of each hazard.

- **High:** There is a very strong likelihood (67-100% chance) that Strafford will experience a hazardous event within the next 25 years. Score = 3
- **Moderate:** There is moderate likelihood (34-66% chance) that Strafford will experience a hazardous event within the next 25 years. Score = 2
- **Low:** There is little likelihood (0-33% chance) that Strafford will experience a hazardous event within the next 25 years. Score = 1

Severity

Severity is an estimate generally based on a hazard's impact human, property and business. The Planning Committee discussed the severity of each hazard. The severity was calculated by the average of human, property and business.

- **High:** The total population, property, commerce, infrastructure and services of the Town are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worst case scenario there could be a disaster of major to catastrophic proportions. Score = 3
- **Moderate:** The total population, property, commerce, infrastructure and services of the Town are exposed to the effects of a hazard of moderate influence; or the total population, property, commerce, infrastructure and services of the community is exposed to the effects of a hazard, but not all to the same degree; or an important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of moderate to major, though not catastrophic, proportions. Score = 2
- **Low:** A limited area or segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of minor to moderate proportions. Score = 1

Overall Risk

The risk number is one, which can help the Town weigh the hazards against one another to determine which hazard is most detrimental. This is calculated by multiplying the **Probability of Occurrence** score by the average of the **Severity** score (human, property, and business impacts).

- **High:** There is a great risk of this hazard in Strafford. Score = 4 or greater
- **Moderate:** There is moderate risk of this hazard in Strafford. Score = 2-3
- **Low:** There is little risk of this hazard in Strafford. Score = 1 or less

Hazard Ratings in Strafford, NH

The Committee determined that the hazards are distributed as follows:

∴ **5** hazards rated as having a **High** overall risk in Strafford:

- Flooding
- Severe Winter Weather
- Severe Thunderstorms & Lightning
- Hurricanes & Tropical Storms
- Wildfire

∴ **3** hazards rated as having a **Moderate** overall risk in Strafford:

- Tornado & Downburst
- Drought
- Public Health Threats

∴ **3** hazards rated as having a **Low** overall risk in Strafford:

- Landslide
- Earthquake
- Hazardous Material

Table 5.1 is the Town's vulnerability assessment tool, which provides more information on the multi-hazard threat analysis that was completed during a brainstorming session with the Planning Committee.

Hazard Vulnerability Table

Table 5.1 Hazard Vulnerability Assessment Tool - Town of Strafford

Hazard Event	Human Impact	Property Impact	Business Impact	Severity	Probability	Overall Threat
Impact Rankings: 0 – N/a 1-Low 2-Moderate 3-High	<i>Probability of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of service</i>	<i>Average of human, property, and business impacts</i>	<i>Likelihood this will occur within 25 years</i>	<i>(Severity x probability) Low = 0-1 Moderate = 2-3 High = > 4</i>
Flooding	2	2	2	2	3	6
Severe Winter Weather	2	1	2	1.7	3	5
Severe Thunderstorms & Lightning	1	2	1	1.3	3	4
Hurricanes & Tropical Storms	1	2	2	1.7	3	5.1
Tornado & Downburst	1	2	2	1.7	2	3.4
Drought	0	1	1	0.7	2	1.4
Landslide	0	0	0	0	0	0
Earthquake	1	1	1	1	1	1
Public Health Threats	1	1	1	1	3	3
Hazardous Material	1	1	1	1	1	1
Wildfire	2	3	3	2.7	3	5.7

Declared Disasters and Emergency Declarations

Table 5.2 Presidentially Declared Disasters (DR) 1990- October 2016 impacting the Town of Strafford

Date Declared	Event	Date of Event	Source	Program	Amount (Statewide)	Remarks
September 9, 1991	Hurricane Bob	August 18-20, 1991	FEMA 917-DR	PA	\$2,293,449	Extended power outage.
October 29, 1996	Severe Storms & Flooding	Oct 20-23, 1996	FEMA 1144-DR	PA	\$2,341,273	Heavy rains.
January 15, 1998	Ice Storm	January 7-35, 1998	FEMA 1199-DR	PA/IA	\$12,446,202	Minor damage. Roads were very icy.
May 25, 2006	Severe Storm & Flooding	May 12-23, 2006	FEMA 1643-DR	PA/IA	\$17,691,586	Numerous roads were closed or washed out. Limited access.
April 27, 2007	Severe Storm & Flooding	April 15-23, 2007	FEMA 1695-DR	PA/IA	\$26,826,780	A number of roads were closed. Water did not recede quickly due to the ground being frozen. Route 202A, which is a major road, was closed along with a number of bridges. Limited access in/out of the Town.
August 11, 2008	Severe Storms, Tornado, & Flooding	July 24, 2008	FEMA 1782-DR	PA	\$3,673,097	Very little impact. A few trees down.
January 2, 2009	Severe Winter Storm	December 11-23, 2008	FEMA 1812-DR	DFA/PA	\$14,898,663	The Town received approximately \$20,914 in emergency protective measures (category B) and \$750 in category E public buildings PA funds.
March 29, 2010	Severe Winter Storm	February 23- March 3, 2010	FEMA 1892-DR	PA	\$6,841,093	Local impacts included limited power outages. Strafford County per capita impact: \$6.16.
September 3, 2011	Tropical Storm Irene	August 26 – Sept 6, 2011	FEMA 4026-DR	PA	\$17,684,244	The primary impact from the storm was damage to roads and bridges. The Town received \$4,541 in federal assistance for a \$6,054 project for protective measures (MSCTRFB) \$3,856 in federal funds for a \$5,142 project for debris removal.

Date Declared	Event	Date of Event	Source	Program	Amount (Statewide)	Remarks
March 19, 2013	Severe Snow and Blizzard	February 9-11, 2013	FEMA 4105- DR	PA	\$6,153,471	Governor requested snow assistance. The President's declaration made snow assistance available for a period of 48 hours for Strafford County and 7 other counties. Statewide Public Assistance included \$5,824,040.89 for Categories A and B work and \$298,796.60 for Categories C-G work. Per capita impact in Strafford County was \$4.14. The Town of Strafford did not receive PA funds.
March 25, 2015	Severe Snow & Snowstorm	January 26-29, 2015	FEMA 4209- DR	PA	\$4,799,048	The primary impact was emergency protective measures. The per capita impact in Strafford County was \$4.16. The Town of Strafford received \$9,485 in federal funds towards a \$12,647 project for damage category B-Protective measures for 48 Hour Snow Removal.
11 declarations totaling approximately \$115,648,906						
Program Key: PA: Public Assistance, IA: Individual Assistance, DFA: Direct Federal Assistance						

Table 5.3 Emergency Declaration (EM) 1990-October 2016 impacting the Town of Strafford

Date Declared	Event	Date of Event	Source	Program	Amount (Statewide)	Remarks
March 16, 1993	Heavy Snow	March 13-17, 1993	FEMA 3101-EM	PA	\$832,396	Snow removal.
March 28, 2001	Snow Emergency	March 5-7, 2001	FEMA 3166-EM	PA	\$3,433,252	
March 11, 2003	Snow Emergency	February 17-18, 2003	FEMA 3177-EM	PA	\$2,288,671	
March 30, 2005	Snow Emergency	January 22-23, 2005	FEMA 3207-EM	PA	\$3,611,491	Snow removal. School closures.
December 13, 2008	Severe Winter Storm	December 11-23, 2008	FEMA 3297-EM	DFA/PA	\$900,000	Snow removal. School closures.
November 1, 2011	Severe Winter Storm	October 29-30, 2011	FEMA 3344-EM	PA	Data not available	Statewide Category B Public Assistance.
October 30, 2012	Hurricane Sandy	October 26-31, 2012	FEMA 3360-EM	PA	\$643,660	Strong Storm surge and heavy rains across New England, NYC and New Jersey caused significant damage resulting in an emergency declaration EM-3360 for Direct Federal Assistance and Category B (Emergency Protective Measures). Minor local impact in Town of Strafford.
7 emergency declarations totaling approximately \$11,709,470 Program Key: PA: Public Assistance, DFA: Direct Federal Assistance						

Flooding

Table 5.4 Hazard Overview

Hazard Type	Flooding
Location/Extent	Town-wide; Especially areas within the 100 year floodplain, downstream of dams, along river banks, near streams, wetlands, and other surface waters
Vulnerability	
Severity	Moderate
Probability	High
Overall Threat	High
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

Riverine flooding is the most common natural disaster to impact New Hampshire. Riverine flooding occurs when surface water runoff introduced into streams and rivers exceeds the capacity of the natural or constructed channels to accommodate the flow. As a result, water overflows the river banks and spills out into adjacent low lying areas.⁵ Floods are most likely to occur in the spring due to the increase in rainfall and the melting of snow; however, floods can occur at any time of the year because of heavy rains, hurricane, or a Nor’easter.

New Hampshire’s climate ranges from moderate coastal to severe continental, with annual precipitation ranging from about 35 inches in the Connecticut and Merrimack River valleys, to about 90 inches on top of Mount Washington. Localized street flooding occasionally results from severe thundershowers, or over larger areas, from more general rain such as tropical cyclones and coastal “nor’easters.” More general and disastrous floods are rare, but some occur in the spring from large rainfall quantities combined with warm, humid winds that rapidly release water from the snowpack.

Causes of flooding that could potentially affect Strafford include:

- 100-year rainstorm.
- Severe tropical storm (hurricane or tropical storm) that can bring torrential rainfall in excess of that from a 500-year storm.
- Rapid snow pack melt in spring can be a significant potential flooding source, given the northern, relatively cold location and climate of Strafford and has occurred multiple times in the past.
- River ice jams, which could occur although there are no records of ice jams in Strafford recorded in the USACE Ice Jam Database as of October 2016.

The “100-year flood” Term:

The “100-year flood” is a term often used to describe a flood that has a 1% chance of occurring in any year. But the phrase is misleading, and often causes people to believe these floods happen every 100 years on average. The truth is, these floods can happen quite close together, or not for long stretches of time, but the risk of such a flood remains constant from year to year. The 100-year-flood term was originated to delineate areas on a map to determine what properties are subject to the National Flood Insurance Program. Properties within the 100-year-floodplain, as defined by the Federal Emergency Management Agency, have special requirements and mortgage holders will require owners to carry flood insurance on these properties.

[Source: The Nurture Nature Center: Focus on Floods]

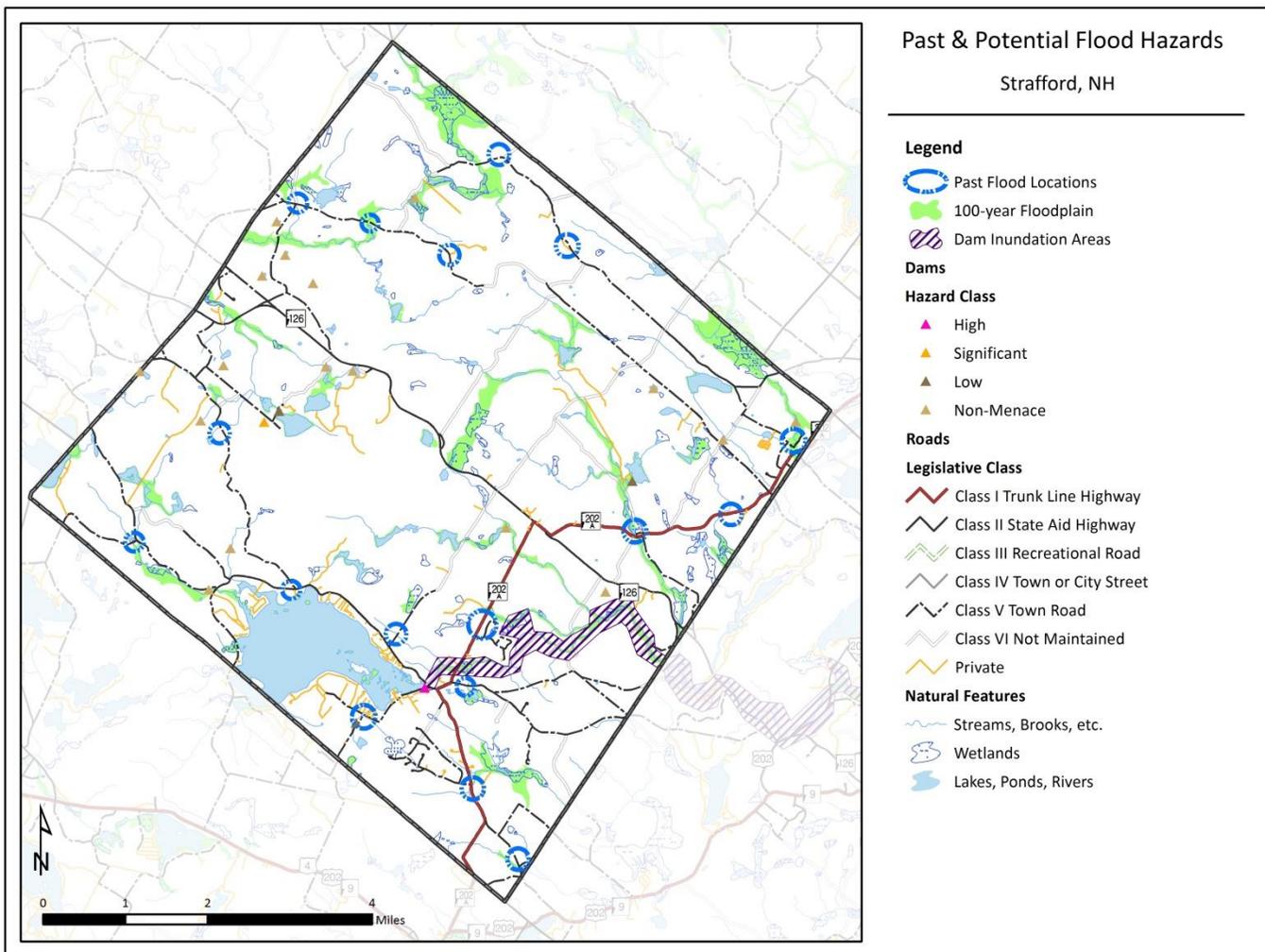
⁵ FEMA Training Chapter 2 Types of Floods and Floodplains (<https://training.fema.gov/hiedu/docs/fmc/chapter%20%20-%20types%20of%20floods%20and%20floodplains.pdf>)

- Erosion and mudslide in steep slope areas, such as in the west and northwest of the Town north of Bow Lake, or riverbanks resulting from heavy rainfall that can alter topology
- Dam breach or failure.

Extent of the Hazard

Flooding can occur in any area of the Town but is more likely to occur within the 100-year floodplain, downstream of dams, along river and stream banks, near wetlands and road crossings, and other low-lying areas. There are approximately 2,450 acres of land or 7.5% of the total area of the Town lies within the 100-year floodplain (see Map 5.1). Based on extent of the floodplain, Strafford has significant flooding potential along Big River in the north and Berry's River in the east. The headwaters of the Mohawk River in central Strafford and the input stream to Bow Lake, which roughly parallels Province Road in the southwest, also have a fairly substantial floodplain area. Areas where roads cross streams are also more susceptible to flooding.

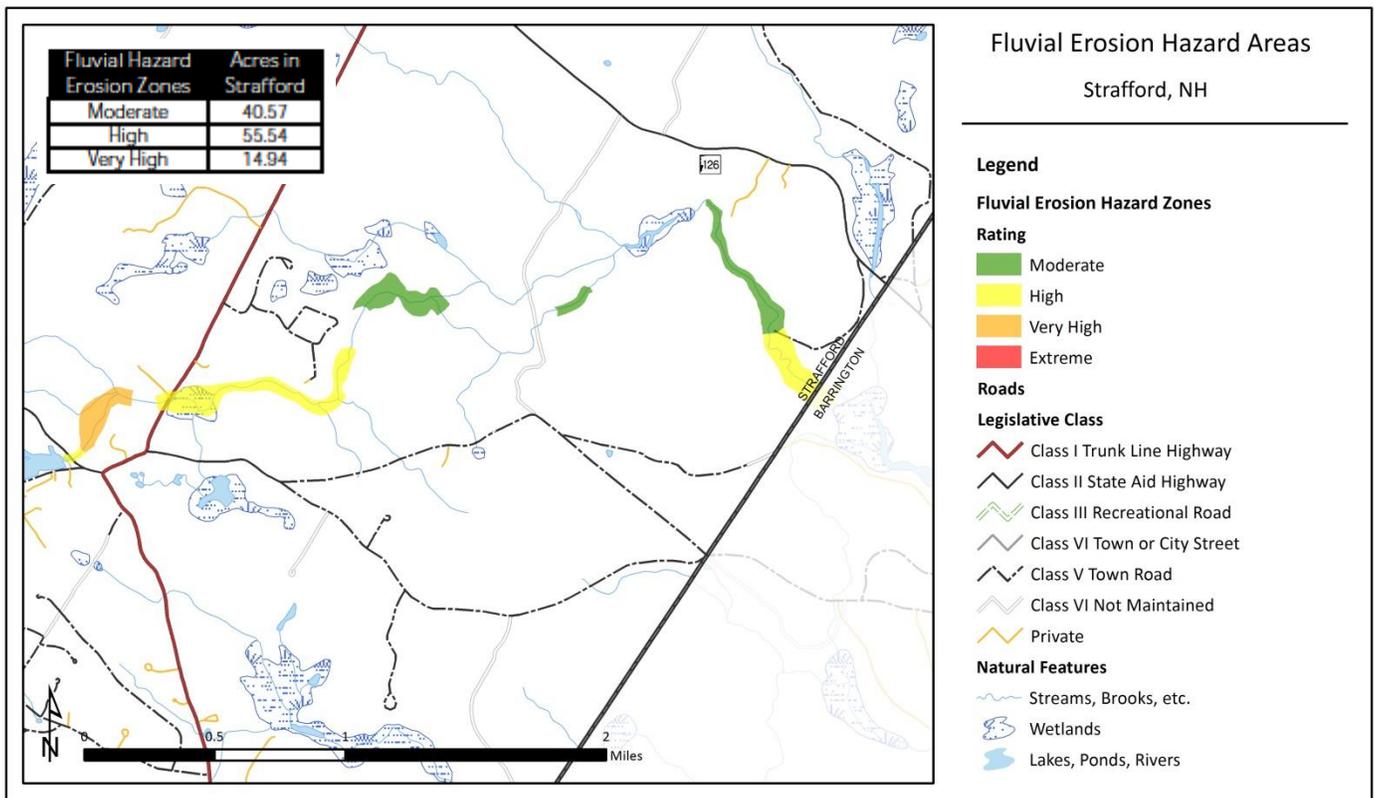
According to the digital floodplain data available, much of the immediate shoreline of Bow Lake is in floodplain, but due to dam control of Bow Lake and recognized base flood elevation, the area around Bow Lake is for the most part not considered to be within the floodplain.



Map 5.1. Past & Potential Flood Hazards

Although flooding of the full extent of this floodplain by definition would require a 100-year storm, smaller storms with a higher annual probability of occurrence could still flood significant portions of that floodplain. Some structures that could be impacted by a 100-year. storm could also be affected by smaller, more frequent flooding, however, Strafford has few structures within the floodplain. It is likely that the 100-year floodplain will expand in area when flood maps are updated due to better mapping technology and current precipitation data.

Map 5.2 shows fluvial erosion hazard areas (FEHA). In 2009, the New Hampshire Geological Survey conducted a fluvial erosion assessment on the Isinglass River, which originates in Strafford, to delineate potential hazard zones along the river. These zones were created and mapped for the Town of Strafford and have been used for planning purposes.



Map 5.2 Fluvial erosion hazard areas along the Isinglass River in Strafford

Dams

Dam failure could potentially result in flooding in Strafford. Map 5.1 shows dams in Strafford by Hazard Classes, which are described in the table below. There is one High Hazard dam in Strafford located at the eastern end of Bow Lake at the outfall to the Isinglass River. The dam at Bow Lake (#224.01) is a High Hazard Dam. The delineated dam inundation area for a 100-year storm breach of this dam is large and extends generally southeastward down the valley of the Isinglass River; across northern Barrington and into Rochester; then, after confluence with the Cocheco River, southeasterly down the Cocheco River valley to the dam in downtown Dover. Inundation waters would affect both Route 202 in Strafford and Route 125 in Barrington (see Map 5.1) and would largely destroy any structures in their path. The original Bow Lake dam, an earthen construction from around 1832 did collapse, and "its waters went rushing and roaring for eighteen miles to Dover, doing much damage in their course. The county immediately replaced the dam by one of granite, it being now one of the

most substantial ones in this part of the country" (Smith 1882). The granite dam has never breached, has been continually inspected, and is in excellent condition. The probability of this particular flooding hazard occurring is quite small.

Table 5.5 Dams in Strafford by Classification

Dam Classification	Classification Definition	Number of Dams in Strafford	Inspection Interval (Years)
High	Dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life.	1	2
Significant	Dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no probable loss of lives but major economic loss to structures or property.	1	4
Low	Dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no possible loss of life and low economic loss to structures/property.	3	6
Non-Menace	Dam that is not a menace because it is in a location and of a size that failure of misoperation of the dam would not result in probable loss of life or loss to property.	17	6

Past Events and Impacts

The Committee updated Map 5.1 with 17 past and potential flood hazard areas. The Committee reported the following flood hazards: The Isinglass River frequently floods over NH Route 202A when the dam is let out. Flooding occurs as water backs up on Wingate Road but the road does not typically wash out. The Town is currently planning for and identifying funding for the upgrade of the bridge on Barn Door Gap Road.

Three areas were especially impacted by the 2006 Mother’s Day floods: Province Road at Wildgoose Pond; Caanan Road at Hall Brook near the Barrington town line; and the intersection of Tasker Hill Road and Water Street. Each of these areas flooded again in 2007. These areas have since been upgraded and repaired or repaved. The Committee noted that the following areas were impacted by the 2007 floods: Strafford Road at the Mohawk River; the bottom of Whig Hill Road; Webber Road; Rollercoaster Road near the Isinglass Country Store; and NH Route 202A at the Isinglass River.

Although the storm could not be classified, a 1936 event was described at the time as causing "the greatest damage in New Hampshire's history" (Fahey 1936). Another extreme flooding event recalled by the 2012 Committee occurred in 1996 and resulted in a FEMA Disaster Declaration for Strafford County (#1144).

Potential Future Impacts on Community

Overall, flooding potential in Strafford is high. Flood conditions will continue to affect the Town of Strafford. Both seasonal flooding and flooding due to extreme weather events have the potential to occur during all seasons. Future flooding may occur in areas identified in Map 5.1. It is anticipated that flooding of the Isinglass over Rt 202A will continue to coincide with letting out the Bow Lake Dam. It is anticipated that low lying areas will continue to see some flooding.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to flooding is 12,094,735 to \$24,189,470.

Severe Winter Weather

Table 5.6 Hazard Overview

Hazard Type	Severe Winter Weather
Location/Extent	Town-wide
Vulnerability	
Severity	Moderate
Probability	High
Overall Threat	High
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

Winter snow and ice events are common in New Hampshire. The National Climatic Data Center (NCDC) Storm Events database reports 36 heavy snow events, 2 blizzards, 1 ice storm, and 6 winter storms (nor'easters) among large winter weather events impacting Strafford County from January, 1 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016). Heavy snow typically brings significant snow removal costs along with delays in transportation schedules. Wet snow can result in major infrastructure damage from heavy snow loads and has been the cause of human harm during long periods of shoveling, including back injuries and in some cases heart attacks to older individuals. The most severe damage, though, often comes from ice storms and winter nor'easters.

- The State's Multi-Hazard Mitigation Plan Update 2013 identifies four types of winter storms:
- *Heavy snowstorms*: A storm that deposits four or more inches of snow (or 10 cm) in a twelve-hour period
- *Blizzards*: A violent snowstorm with winds blowing at a minimum speed of 35 miles (56 kilometers) per hour and visibility of less than one-quarter mile (400 meters) for three hours
- *Nor'easter*: A large weather system traveling from south to north, passing along the coast. As the storm's intensity increases, the resulting counterclockwise winds which impact the coast and inland areas in a Northeasterly direction. Winds from a Nor'easter can meet or exceed hurricane force winds.
- *Ice Storms*: An event that occurs when a mass of warm, moist air collides with a mass of cold, arctic air. The less dense warm air will rise and the moisture may precipitate out in the form of rain. When this rain falls through the colder, denser air and comes in contact with cold surfaces, ice will form and may continue to form until the ice is as thick as several inches.

Extent of the Hazard

Snow and ice storms are a town-wide hazard.

Sperry-Piltz Ice Accumulation Index

The Sperry–Piltz Ice Accumulation Index, or SPIA Index, is a forward-looking, ice accumulation and ice damage prediction index that uses an algorithm of researched parameters that, when combined with National Weather Service forecast data, predicts the projected footprint, total ice accumulation, and resulting potential damage from approaching ice storms. It is a tool to be used for risk management and/or winter weather preparedness.

The Sperry-Piltz Ice Accumulation Index, or “SPIA Index” – Copyright, February, 2009

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	< 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
4	0.75 – 1.00	< 15	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	1.00 – 1.50	> = 35	
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

Past Events and Impacts

Three events of those listed in the NCDC database are of particular note for their severity:

The Ice Storm of 2008 (December 11th – 12th) was a major winter storm that brought a mixture of snow, sleet, and freezing rain. The greatest impact in the state was in southern and central New Hampshire where a significant ice storm occurred. Following the ice storm, recovery and restoration efforts were negatively impacted by additional winter weather events that passed through the state. The freezing rain and sleet ranged from 1 to 3 inches, ice accretion to trees and wires in these areas generally ranged from about a half inch to about an inch. The weight of the ice caused branches to snap, and trees to either snap or uproot, and brought down power lines and poles across the region. About 400 thousand utility customers lost power during the event, with some customers without power for two weeks. Property damage across northern, central and southeastern NH was estimated at over \$5 million. The Town of Strafford experienced downed trees.

The Blizzard of 2013 – NEMO (February 8th-9th) was an area of low pressure developed rapidly off the Carolina coast late on the 7th and early on the 8th. The storm moved very slowly northeast during the 8th and 9th as it continued to intensify. By the morning of the 10th, the storm was located just to the east of Nova Scotia. The storm brought heavy snow, high winds, and blizzard conditions to the southeastern part of the state. Snowfall amounts were generally 18 inches or more in the southeast where blizzard conditions caused considerable blowing and drifting snow. In western and northern sections, snowfall amounts were in the 4 to 18 inch range. Southeastern New Hampshire had blizzard conditions for about 3 to 10 hours.

According to the NOAA Northeast Snowfall Impact Scale (NESIS), which ranks storms that have large areas of 10 inch snowfall accumulations or greater based on a function of the area affected, the amount of snow, and the number of

people living in the path of the storm, Nemo was ranked as a 'major' event (<http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>).

The NCDRC Regional Snowfall Index for the stations near Strafford reported between 18 and 24 inches of snow (Rochester and Nottingham) and 12 to 18 inches (between Epson and Northwood) from February 8-February 10, 2013. According to the NH Union Leader, wind gusts of over 30-miles-per hour were expected to occur with the storm; however, the NH Electric Co-op reported only minor power outages.⁶ The Committee did not recall any atypical need for plowing and sand/salt.

The Blizzard of 2015 – JUNO (January 26th – 28th) was area of low pressure developed off the Delmarva peninsula on Monday, January 26th, and intensified rapidly as it moved slowly northward through the 27th. Snow spread northward across the region Monday night and became heavy on Tuesday, the 27th. Winds became strong during the day Tuesday leading to blizzard conditions at times along and inland from the coast. The snow persisted into Tuesday night in many areas with blowing and drifting snow. Snowfall amounts ranged from 10 to more than 30 inches across much of the southeastern part of the state.

Juno was ranked on the NESIS as a 'major' event passed on the area affected, the amount of snow, and the number of people living in the path of the storm. The Regional Snowfall Index for the station in Strafford reported between 18 and 24 inches from January 25-January 28th, 2015⁷. The Committee did not recall any atypical plowing or sand/salt needs.

Other, less recent events were also damaging. The nor'easter of December 7, 1996 was especially damaging to power systems and is described in the NCDRC database as "the most extensive and costliest weather related power outage in the state's history," at least until 1996 when that database entry was made. The 1998 ice storm probably surpassed this storm in power systems impact. This storm is thought to have been of the same magnitude as the one that occurred in the region in 1929, indicating a return period of approximately 70 years (CRREL 1998).

Extended Power Failures (M)

Extended power failure refers to a power failure that lasts for a period of days or weeks. Many things can cause power failure: downed power lines (due to storm, wind, accident, etc); failure of public utilities to operate or failure of the national grid. Extended power failure can present not only lighting difficulties but also heating, water supply and emergency services. In Strafford, there have been extended power outages on occasion, the worst in recent years was the ice storm of 2008 where power was out for as long as 11 days in some places. There are back-up generators at the Town Office and Police Station that act as emergency housing facilities. The majority of residential homeowners in Strafford have purchased personal back-up generators in recent years.

Potential Future Impacts on Community

Strafford will continue regularly to receive impacts from severe, regional winter weather events. Due to its heavily forested nature, the Town is most highly exposed in terms of damage to forest resources and the secondary impacts of those damages. Downed trees and extra plowing are likely the main concern associated with this hazard.

⁶ New Hampshire Union Leader. February 9, 2013. <http://www.unionleader.com/apps/pbcs.dll/article?AID=/20130209/NEWS1101/130209041/0/OPINION02>

⁷ <http://gis.ncdc.noaa.gov/map/viewer/#app=cdo&cfg=rsi&theme=rsi>

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to severe winter weather is 12,094,735 to \$24,189,470.

Severe Thunderstorms & Lightning

Table 5.7 Hazard Overview

Hazard Type	Severe Thunderstorms & Lightning
Location/Extent	Town-wide
Vulnerability	
Severity	Moderate
Probability	High
Overall Threat	High
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

As defined by NOAA, a thunderstorm is a rain shower during which thunder is heard. Because thunder comes from lightning, all thunderstorms have lightning. A thunderstorm is the result of convection, which is the upward atmospheric motion that transports whatever is in the air (such as moisture) with it. A thunderstorm is classified as *severe* if it has hail one inch or greater, winds gusting in excess of 50 knots (57.5 mph), or a tornado. Thunderstorm-related hazards that could impact Strafford include: high winds and downburst, lightning, hail, and, torrential rainfall. Thunderstorms and severe thunderstorms are a town-wide hazard. They are most likely to occur in spring and summer.

Extent of the Hazard

Lightning heats air to a temperature of 50,000 degrees Fahrenheit and causes the air to expand and contract rapidly, which causes thunder. A lightning strike occurs very quickly but can occur multiple times during a storm.

Past Events and Impacts

Thunderstorms are common in New Hampshire but can be considered generally less severe than in other areas of the country, such as the Great Plains states. Severe thunderstorms do occur in New Hampshire, though. The NCDC database lists 35 reported events (over 20 different days) of severe thunderstorm winds in Strafford County from January 1, 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016). During that time period there were three reported events in Strafford and one in Strafford Corner in July 2008, July 2012, August 2012, and July 2014.

Lightning can cause significant, sometimes severe, damage. Lightning strikes can cause direct damage to structures and serious injury or death to people and animals. Extensive damage

Lightning Activity Scale	
Lightning Activity Level (LAL)	Conditions
LAL1	No thunderstorms activity
LAL2	Isolated thunderstorms
LAL3	Widely scattered thunderstorms
LAL4	Scattered thunderstorms
LAL5	Numerous thunderstorms
LAL6	Widely scattered, scattered, or numerous DRY thunderstorms

also commonly results from secondary effects of lightning, such as electrical power surges, wildfire, and shockwave. According to lightning fatality data collected by the National Oceanic and Atmospheric Administration (NOAA), lightning kills an average of 49 people each year in the United States. There were 349 fatalities in the United States from 2005 to 2015.

There were no reported deaths in New Hampshire associated with lightning. The NCDC database lists two reports of lightning events in Strafford County from January 1, 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016). Neither event occurred in the Town of Strafford. While reports of significant lightning events have not occurred frequently in the past in Strafford County, lightning and thunder can occur throughout the jurisdiction.

Finally, hail is a fairly common part of thunderstorms in New Hampshire, but damaging hail is apparently not. The damage that can result from hail is mostly to cars and windows. The NCDC Storm Events database lists 23 reported hailstorms in Strafford County from January 1, 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016). Three of these events took place in Strafford – two on July 18, 2008 and one on June 26, 2009. The July 2008 events produced 1-2 inch hail but resulted in no direct or indirect injuries or death and no significant damage to property or crops. The June 2009 storm produced 0.75 inch hail. No injuries or significant damage was attributed to this event.

While the annual recurrence probability of thunderstorms in general is effectively 100%, the likelihood of severe thunderstorms is low. Strafford will continue to experience thunderstorms and should expect to sustain significant damage periodically.

Potential Future Impacts on Community

It is highly likely that the Town will continue to experience thunderstorms and lightning, however the severity of those impacts is anticipated to be low to moderate depending on factors include the location of lightning strikes, wind, or other factors such as flash flooding or downbursts that may accompany a thunderstorm.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to severe thunderstorms and lightning is 12,094,735 to \$24,189,470.

Hurricanes & Tropical Storms

Table 5.8 Hazard Overview

Hazard Type	Hurricanes & Tropical Storms
Location/Extent	Town-wide
Vulnerability	
Severity	Moderate
Probability	High
Overall Threat	High
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

A hurricane is the term used for tropical cyclones that occur in the Northern Hemisphere east of the International Dateline to the Greenwich Meridian. Tropical cyclones originate over tropical or subtropical waters and are characterized by organized deep convection and a closed surface wind circulation about a well-defined center. These events are called typhoons if they occur west of the International Dateline. Hurricane season in the Atlantic runs from June 1 to November 30.

According to the State Hazard Mitigation Plan (2013) tropical cyclones with maximum sustained winds of less than 39 mph are called tropical depressions. Once the tropical cyclone reaches winds of at least 39 mph, they are typically called a tropical storm and assigned a name. If the winds reach 74 mph or greater, they are upgraded and called a hurricane. The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating system based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures.

Extent of the Hazard

Hurricanes may impact all areas of the Town.

Past Impacts and Events

From 1938-2012 there have been twelve significant hurricanes or tropical storms that have impacted the county.

As wind events, historically hurricanes have caused damage in Strafford, most notably in 1938 and 1954. Quite a few other hurricanes have impacted the Town with high winds but relatively little damage. The Hazard Mitigation Committee notes that in 1993 a hurricane forced the evacuation of Camp Foss.

Scale Number (Category)	Sustained Winds (MPH)	Damage	Storm Surge
1	74-95	Minimal: Unanchored mobile homes, vegetation and signs.	4-5 feet
2	96-110	Moderate: All mobile homes, roofs, small crafts, flooding.	6-8 feet
3	111-130	Extensive: Small buildings, low-lying roads cut off.	9-12 feet
4	131-155	Extreme: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.	13-18 feet
5	More than 155	Catastrophic: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.	Greater than 18 feet

The NCDC Storm Events database lists 1 tropical storm even in Strafford County from January 1, 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016) that occurred on August 28, 2011 (Tropical Storm Irene).

Tropical Storm Irene (August 28, 2011) - brought a prolonged period of strong and gusty winds and heavy rain to the state. The high winds snapped or uprooted numerous trees throughout the state causing more than 160,000 customers to lose electrical and/or communication services. The heavy rains caused rivers and streams throughout the state to flood causing damage to bridges, roads, and property. The strongest winds across the state began Sunday morning in southern areas and spread northward during the day. Winds continued to be gusty overnight as the storm moved away from the area. Observed maximum wind gusts included 63 mph at Portsmouth, 52 mph at Concord, and 51 mph at Manchester. On the top of Mt. Washington, winds gusted to 104 mph as the storm approached and 120 mph as it moved away. The combination of wet soil and the prolonged period of strong and gusty winds brought down numerous trees throughout the state. One person was killed and three people were injured across the state due to falling trees or branches. Rainfall amounts across the state ranged from 1.5 to 3 inches across southeastern New Hampshire. Local impacts included wind, downed trees, and power outages. Heavy winds caused significant damage to roofs and property.

Quite a few other hurricanes have impacted the Town — including Donna, Gloria, and Bob — bringing high winds but causing relatively little damage.

The NOAA National Climatic Data Center's Storm Events database (NCDC 2015) does not list any Hurricanes as directly affecting Strafford County from January 1, 2010 to June 30, 2016, however, Strafford County did experience impacts from Hurricane Sandy. Hurricane Sandy was the last hurricane to hit the region during the period of October 26 to November 8, 2012. Strafford experienced minimal impacts associated with rain and wind. Presidential Declaration FEMA-4095 requested funds for debris removal and emergency protective measures. Strafford County was not included in the public assistance or direct federal assistance declaration. Strafford County did receive Emergency Declaration funds for Emergency Protective Measures.

Potential Future Impacts on Community

Strafford is vulnerable to hurricane hazards including wind, tornadoes, heavy rainfall, and inland flooding. Recurrence potential of hurricane and tropical storm hazards in Strafford is moderate. Hurricanes and tropical storms will continue to affect the Town of Strafford. As many as 10 significant Hurricanes have impacted Strafford and the surrounding region and it is likely that the region will be impacted by a significant storm of tropical origin within the foreseeable future

Based on historical data and statistical predictors, the Atlantic Basin averages approximately 12 total named storms per year. Six of those storms will become hurricanes with three becoming a category three or higher. With variability in sea-level pressure and sea-surface temperatures in the Atlantic Ocean, it is difficult to predict with certainty the number of storms in any given year. It is even more difficult to determine which of those storms will make landfall. Because Strafford is considerably inland from the New Hampshire coast, wind speeds may be diminished from their coastal strength, and significant impact on the town would be dependent on the exact track of these concentrated storms.

Hurricanes and tropical storms will continue to affect Strafford and recurrence potential of hurricane and tropical storm hazards is, therefore, moderate. It is likely that the region will be impacted by a significant storm of tropical origin within the foreseeable future.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to severe hurricanes and tropical storms is 12,094,735 to \$24,189,470.

Tornado & Downburst

Table 5.9 Hazard Overview

Hazard Type	Tornado & Downburst
Location/Extent	Town-wide
Vulnerability	
Severity	Moderate
Probability	Moderate
Overall Threat	Moderate
Potential Loss	\$2,418,947 to \$12,094,735

Description of the Hazard

A **tornado** is a violent windstorm characterized by a twisting, funnel shaped cloud with winds in excess of 200 mph, often accompanied by violent lightning, peripheral high winds, severe hail, and severe rain. Tornadoes develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Violent winds and debris slamming into buildings cause the most structural damage. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

A **downburst** is a severe localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories: microburst, which covers an area less than 2.5 miles in diameter and macroburst, which covers an area at least 2.5 miles in diameter.

Tornados and downbursts may impact all areas of Town.

Extent of the Hazard

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. The scale measures wind speeds of 65 to greater than 200 miles per hour. The damage path of a tornado can be in excess of one mile wide and 50 miles long, whereas a downburst is typically less than 2.5 miles. Downbursts can have wind speeds of 150 miles per hour.

Past Impacts and Events

Between 1991 and 2010, the average annual number of tornadoes in New Hampshire was one.⁸ Though the frequency of tornado events in New Hampshire is not great, the state has experienced large tornados throughout its history. An early example is the tornado that struck the state in September 1821. This tornado was reported to have tracked from the Connecticut River, near Cornish, and terminating near Boscawen. When the skies cleared, 6 people were dead, hundreds injured and thousands homeless.

In 1998 an F2 tornado in Antrim, N.H. blew down a 45-foot by 12-foot section of the Great Brook Middle School. Witnesses reported seeing a funnel cloud, and the weather service, after an inspection, confirmed it was a tornado. According to the June 2, 1998 edition of the Eagle Tribune, John Jensenius from the National Weather Service in Gray, Maine estimated that the twister cut a path half a mile long, up to 100 yards wide, and was on the ground for several minutes.

EF-0	65–85 mph winds
EF-1	86–110 mph
EF-2	111–135 mph
EF-3	136–165 mph
EF-4	166–200 mph
EF-5	>200 mph

⁸ NOAA. U.S. Tornado Climatology (<https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology>)

In July 2008, an F2 tornado and high winds created a path of destruction through five New Hampshire counties that destroyed homes, displaced families, downed trees and forest lands and closed major state roadways. The impact to residents was extensive, with over 100 homes rendered uninhabitable. Phone and electric service was cut off to over 12,500 customers. One fatality is attributed to a building collapse, and local hospitals reported numerous physical injuries associated with this severe storm.⁹

Since the July 2008 tornado (through June 30, the most current data available at the time this chapter was drafted in October 2016), The NCDC Storm Events database reports that eight tornados have hit New Hampshire, however none have hit Strafford County. The most recent event occurred in July 2015 in Warner.

Downburst activity is very prevalent throughout the State. However, the majority downburst activity is mostly unrecognized unless a large amount of damage has occurred. Several of the more significant and recent events are highlighted below:

- Central, NH – July 6, 1999 –Two roofs blown off structures, downed trees, widespread power outages, and damaged utility poles and wires; two fatalities.
- Stratham, NH – August 18, 1991 –\$2,498,974 worth of damages; five fatalities.
- Moultonborough, NH – July 26, 1994 –Downed trees, utility poles and wires. Approximately 1,800 homes without power and 50-60 homes damages.
- Bow, NH – September, 6, 2011 –City Auto in Bow had 15 campers damaged and estimated \$200,000 in damage.

While tornados are not common, they would cause significant impacts in the town, especially to older mobile homes that are not tied down properly. The probability of reoccurrence of a downburst may be higher. A tornado or downburst can impact the entire jurisdiction and may cause greater damage in the community center.

Tornadoes are rare in New Hampshire. The NCDC Storm Events database (NCDC 2004) lists only five tornadoes that have impacted Strafford County since 1950. One was an F1 event (73-112 mph) and the other four were F2 events (113-157 mph). These tornadoes also occurred one in each decade from the 1950's through the 1990's. The average annual probability of recurrence, therefore, is 10% (5/50 x 100). The probability would be slightly higher if local reports of tornadoes were considered; however, this 10% probability is for all of Strafford County, not just Strafford. The actual probability for Strafford should be much lower, considering the great dependence of impact upon the actual track of any tornado. The Hazard Mitigation Committee identified two tornadoes that occurred in Strafford in recent decades, one in the 1970's and one in 1998 (See Table 5.10). This admittedly minimal data nonetheless suggests a return period of about 25 years (i.e. an annual probability of occurrence of 4%). The tornado recurrence probability for Strafford, therefore, is relatively low.

Table 5.10 Historic Hazard Identification

Hazard	Date	Location	Remarks	Source
Tornado	1970s	Range Road	Destroyed barn	2005 Hazard Committee
Tornado	1998	Wingate Road "Snackity" area	Building and tree damage in various areas	2005 Hazard Committee
Hurricane	1993	Town-wide	Camp Foss was evacuated	2005 Hazard Committee
Wind Storm	February 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties	Limited power outage.	FEMA Disaster Declaration #1892 (<i>Public Assistance</i>) & Local Knowledge
Wind Event	Fall 2016	Wingate Rd, Barn Door Gap Rd, near Barnstead town line	Damaged 3 properties	2017 Committee

⁹ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

Potential Future Impacts on Community

It is possible that a tornado could strike Strafford in the future and imposed significant damage to property, forest resources, and potentially cause injury to people. Microbursts are more likely to occur. Microbursts could cause downed trees that damage structures and property.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to tornados and downbursts is \$2,418,947 to \$12,094,735.

Drought

Table 5.11 Hazard Overview

Hazard Type	Drought
Location/Extent	Town-wide
Vulnerability	
Severity	Low
Probability	Moderate
Overall Threat	Low
Potential Loss	\$0 to \$2,418,947

Description of the Hazard

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. The impacts of droughts are indicated through measurements of soil moisture, groundwater levels, and stream flow. The effect of drought on these indicators is variable during any particular event. For example, frequent minor rainstorms can replenish the soil moisture without raising groundwater levels or increasing streamflow. Low streamflow also correlates with low ground-water levels because ground water discharge to streams and rivers maintains streamflow during extended dry periods. Low streamflow and low ground-water levels commonly cause diminished water supply.

Drought is a regional hazard and can impact the entire jurisdiction. Agricultural land and residents who use dug, shallower wells may be more vulnerable to the effects of drought.

Extent of the Hazard

The National Drought Monitor classifies the duration and severity of the drought using precipitation, stream flow, and soil moisture data coupled with information provided on a weekly basis from local officials. There are five magnitudes of drought outlined in the New Hampshire State Drought Management Plan: Exceptional, Extreme, Severe, Moderate, and Abnormally Dry. At the time of the preparation of this Plan, Strafford was in an extreme state of drought.

Past Impacts and Events

While the impacts of drought are typically not as damaging and disruptive as floods or storm events, the impacts of long term drought or near drought conditions can impact crops and the water supply.

Periods of drought have occurred historically in New Hampshire. Six droughts of significant extent and duration were evident in the 20th century as noted below in Table 2.5. The most severe drought recorded in New Hampshire occurred from 1960 to 1969. This drought encompassed most of the northeastern United States (1956-1966). The drought of 1929-1936 was the second worst and coincided with severe drought conditions in large areas of the central and eastern United States. The drought of 2001-2002 was the third worst on record.¹⁰

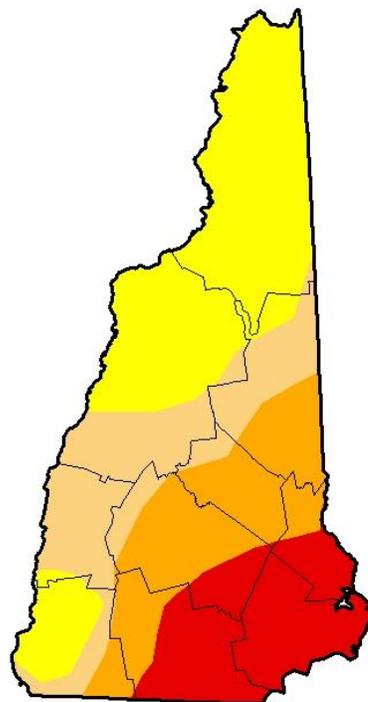
In more recent years, drought has again become a problem in New Hampshire. In 1999, a drought warning was issued by the Governor’s Office. In March 2002, all counties in New Hampshire with the exception of Coos County were declared in Drought Emergency. This was the first time that low-water conditions had progressed beyond the Level Two, Drought Warning Stage. With extreme variation in environmental conditions due to global warming possibly on the rise, drought probability may grow in the future. Currently, drought possibility seems moderate. The large amount of water resources and relatively sparse population in New Hampshire have tended to minimize the impacts of drought events in the region, but this regional protection may be endangered in the future with increases in drought frequency or severity.

Normal precipitation for the state averages 40 inches per year. During the summer of 2015, most of central and southern New Hampshire experienced its most recent drought, the first since 2001 – 2002 (was the 3rd worst on record, exceeded only by the national droughts of 1956-1966 and 1941-1942). While many communities experienced record snowfall totals this past winter (2014-2015), the lack of rainfall and higher-than-average temperatures resulted in river and groundwater levels to be lower than average. This resulted in the implementation of local water conservation plans throughout the region.¹¹

Drought conditions continued in intensified into 2016 in New Hampshire and in Southeast New Hampshire in particular. As of October 2016, nearly 20% of the state was categorized as being in extreme drought. One hundred and sixty community water systems have reported implementing a water restriction or ban, and 13 towns have reported implementing voluntary or mandatory outdoor use bans in the state.

Private wells have intermittently gone dry in Strafford. Residents have typically coped well with low water levels, however drought does threaten agricultural resources. Newer wells in the town are drilled wells and therefore less susceptible to drought.

U.S. Drought Monitor New Hampshire



October 11, 2016
(Released Thursday, Oct. 13, 2016)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	0.00	37.56	21.95	21.22	19.27	0.00
Last Week <small>10/4/2016</small>	15.44	22.12	21.95	21.22	19.27	0.00
3 Months Ago <small>7/12/2016</small>	16.44	41.96	24.41	17.18	0.00	0.00
Start of Calendar Year <small>12/29/2015</small>	50.84	34.27	14.88	0.00	0.00	0.00
Start of Water Year <small>9/27/2016</small>	15.33	22.23	21.95	21.22	19.27	0.00
One Year Ago <small>10/13/2015</small>	76.38	8.74	14.88	0.00	0.00	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Brian Fuchs
National Drought Mitigation Center



<http://droughtmonitor.unl.edu/>

¹⁰ NHDES. Drought Management Program. Publications. *NH Drought Historical Events*. Viewed on 8/10/15. <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>

¹¹ See: http://des.nh.gov/organization/divisions/water/dwqb/water_conservation/documents/waterban.pdf.

Table 5.12 New Hampshire Drought History & Conditions

Dates	Area Affected	Magnitude	Remarks
1929 – 1936	Statewide	-	Regional; recurrence interval 10 to > 25 years
1939 – 1944	Statewide	Severe Moderate	Severe in southeast NH and moderate elsewhere in the State. Recurrence interval 10 to > 25 years.
1947 – 1950	Statewide	Moderate	Recurrence interval 10 to >25 years
1960 – 1969	Statewide	Extreme	Longest recorded continuous spell of less than normal precipitation. Encompassed most of the northeast US. Recurrence interval >25 years.
2001 – 2002	Statewide	Severe	Recurrence interval 10 to >25 years
2015	Central & Southern NH	Moderate	Recurrence interval cannot yet be determined

Potential Future Impacts on Community

The National Drought Mitigation Center website (NDMC 2004) emphasizes that reliable drought prediction for regions above 30°N latitude is effectively impossible.

With extreme variation in environmental conditions due to climate change possibly on the rise, drought probability may grow in the future. Currently, drought possibility seems moderate. The large amount of water resources and relatively sparse population in New Hampshire have tended to minimize the impacts of drought events in the region, but this regional protection may be endangered in the future with increases in drought frequency or severity.

Historically, droughts in New Hampshire have had limited effect because of the plentiful water resources and sparse population. Since 1960, the population has more than doubled, which has increased demand for the State’s water resources. Further droughts may have considerable effect on the State’s densely populated areas along the seacoast and in the south-central area.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to tornados and downbursts is \$0 to \$2,418,947.

Earthquakes & Landslide

Table 5.13 Hazard Overview

Hazard Type	Earthquakes & Landslide
Location/Extent	Town-wide, Steep slopes and river banks
Vulnerability	
Severity	Low
Probability	Low
Overall Threat	Low
Potential Loss	\$0 to \$2,418,947

Description of the Hazard

The USGS defines an earthquake as a term used to describe both sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, avalanches, and tsunamis. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and are followed by vibrations of gradually diminishing force called aftershocks.¹² Earthquakes in the Northeast are not associated with specific known faults.

Due to the geology of the region, the area impacted by an earthquake in the Northeast can be up to 40 times greater than the same magnitude event occurring on the West coast. Earthquakes can occur at any time without warning.

An earthquake can impact all areas of the jurisdiction. People at greatest risk from earthquakes are those who live in unreinforced masonry buildings built on filled land or unstable soil.¹³

Extent of the Hazard

The magnitude and intensity of an earthquake is measured by the Richter scale and the Modified Mercalli Intensity (MMI) scale, respectively. The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes.¹⁴

MODIFIED MERCALLI SCALE		RICHTER SCALE	
I.	Felt by almost no one.	2.5	Generally not felt, but recorded on seismometers.
II.	Felt by very few people.	3.5	Felt by many people.
III.	Tremor noticed by many, but they often do not realize it is an earthquake.		
IV.	Felt indoors by many. Feels like a truck has struck the building.		
V.	Felt by nearly everyone; many people awakened. Swaying trees and poles may be observed.		
VI.	Felt by all; many people run outdoors. Furniture moved, slight damage occurs.	4.5	Some local damage may occur.
VII.	Everyone runs outdoors. Poorly built structures considerably damaged; slight damage elsewhere.		
VIII.	Specially designed structures damaged slightly, others collapse.	6.0	A destructive earthquake.
IX.	All buildings considerably damaged, many shift off foundations. Noticeable cracks in ground.		
X.	Many structures destroyed. Ground is badly cracked.	7.0	A major earthquake.
XI.	Almost all structures fall. Very wide cracks in ground.	8.0 and up	Great earthquakes.
XII.	Total destruction. Waves seen on ground surfaces, objects are tumbled and tossed.		

The Modified Mercalli Intensity (MMI) scale was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects actually experienced at a given place and therefore has a more meaningful measure of severity.¹⁴

Past Impacts and Events

Due to the state's location in an area of moderate seismic activity earthquakes are a common event in New Hampshire, but significantly damaging earthquakes are not. The Northeast States Emergency Consortium (NESEC, 2016) website presents

¹² The Northeast States Emergency Consortium Earthquake Hazards. <http://nesec.org/earthquakes-hazards/>. Viewed on 8/10/15

¹³ <http://nesec.org/earthquakes-hazards/>

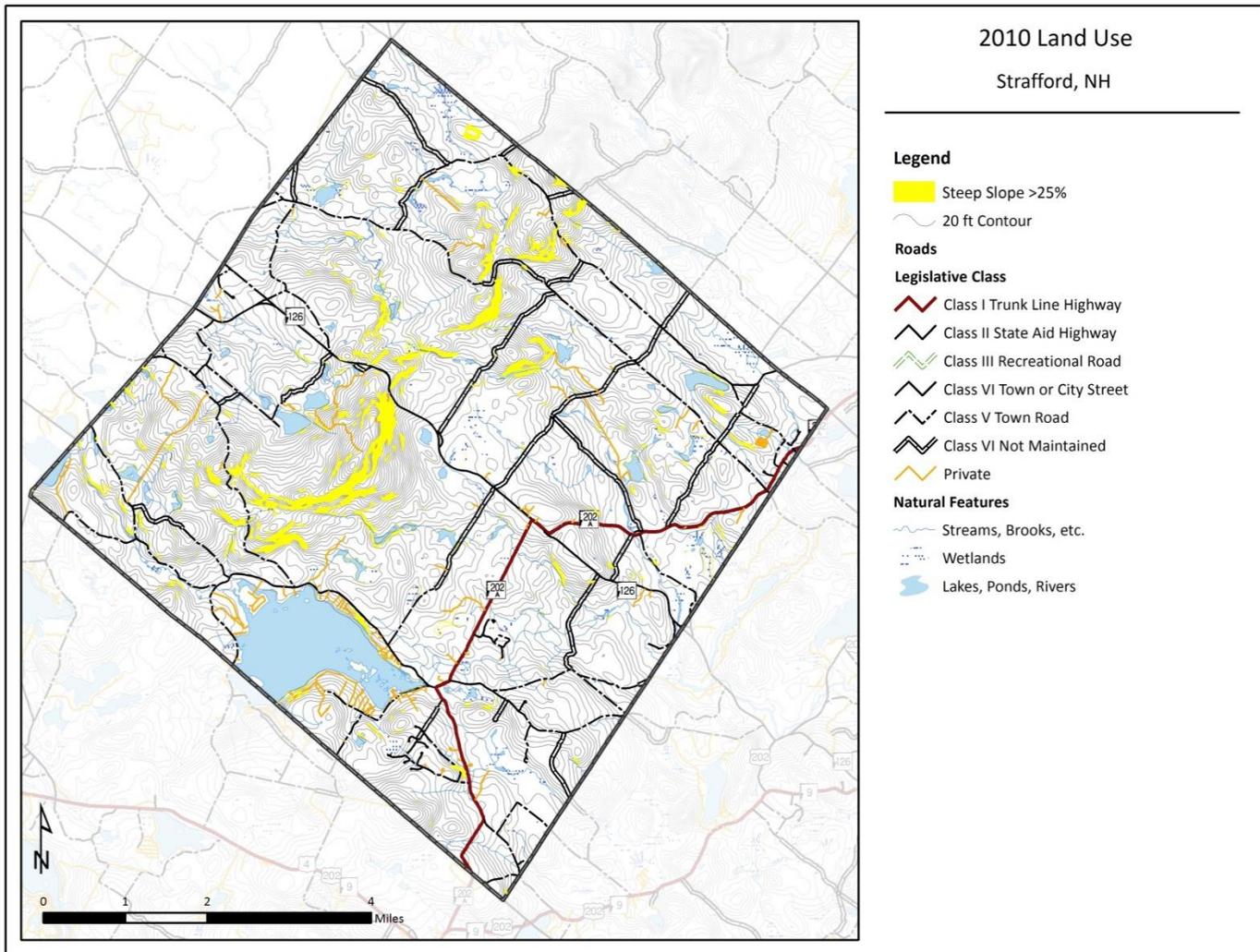
¹⁴ USGS. Earthquake Hazard Program. <http://earthquake.usgs.gov/learn/glossary/?term=Richter%20scale..> <http://pubs.usgs.gov/gip/earthq4/severitygip.html>.

a history of earthquake in the Northeast and documents that New Hampshire is an area of high earthquake probability. Three hundred and sixty earthquakes occurred in New Hampshire from 1638 to 2007. Approximately 40-50 earthquakes are detected in the Northeast annually.¹³ However, New Hampshire has only experienced nine earthquakes of significant magnitude (Richter Magnitude 4.0 or greater) in that time period. Strafford has experienced no major earthquakes in recent years. Earthquakes are on average an annual occurrence but significant quakes have an annual probability of occurrence (based on the 1638 to 2007 period) of about 2.4%.

Earthquakes could readily cause landslides, as could ground saturation from extended heavy precipitation events. Given seismic or precipitation events that could initiate landslide, landslide hazard is likely in steep slope areas. The Planning Committee noted no incidents of landslides occurring in Strafford.

Table 5.14 Notable Historic Earthquakes in NH 1638-2007 (Magnitude 4.0 or Greater)

Location	Date	Intensity MMI Scale	Magnitude Richter Scale
Central New Hampshire	June 11, 1638	-	6.5
Portsmouth	November 10, 1810	V	4.0
Near Hampton	July 23, 1823	IV	4.1
Ossipee	October 9, 1925	VI	4.0
Ossipee	December 20, 1940	VII	5.5
Ossipee	December 24, 1940	VII	5.5
West of Laconia	January 19, 1982	-	4.7
Northeast of Berlin	October 20, 1988	-	4.0
Southeast of Berlin	April 6, 1989	-	4.1



Map 5.3 Areas with steep slopes >25%

Potential Future Impacts on Community

Landslides could occur in Strafford in areas with steep slopes, where soils and loose bedrock formations would tend to slough off and move en masse downhill under gravity. Earthquakes could readily cause landslides, as could ground saturation from extended heavy precipitation events. Given seismic or precipitation events that could initiate landslide, landslide hazard is likely quite high in steep slope areas. There are approximately 1,145 acres of steep slopes greater than 25% in Strafford. Areas of steep slopes are especially prevalent in the west and northwest of Town above Bow Lake, though they are present elsewhere in the Town (see Map 5.3).

The USGS (1997) classifies landslide incidence regionally as very low (less than 1.5% of land area involved). The local probability in Strafford will depend on specific soil/rock types and upon the probability of initiating events. Potential impacts could include property damage, road closures, and increased erosion if forests were damaged.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to earthquakes and landslides is \$0 to \$2,418,947.

Public Health Threats

Table 5.15 Hazard Overview

Hazard Type	Public Health Threats
Location/Extent	Town-wide, school population and families may be more susceptible to certain epidemics
Vulnerability	
Severity	Low
Probability	Moderate
Overall Threat	Moderate
Potential Loss	\$2,418,947 to \$12,094,735

Description of the Hazard

Epidemic

As defined by the CDC, an epidemic is "the occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time."¹⁵ In addition to being categorized by the type of transmission (point-source or propagated), epidemics may occur as outbreaks or pandemics. As defined in the State Hazard Mitigation Plan, an outbreak is a sudden increase of disease that is a type of epidemic focused to a specific area or group of individuals. A pandemic is an epidemic that spreads worldwide, or throughout a large geographic area.

Epidemics may be caused by infectious diseases, which can be transmitted through food, water, the environment or person-to-person or animal-to-person (zoonoses), and noninfectious diseases, such as a chemical exposure that causes increased rates of illness. Infectious disease that may cause an epidemic can be broadly categorized into the following groups¹⁶:

- Foodborne (Salmonellosis, Ecoli)
- Water and Foodborne (Cholera, Giardiasis)
- Vaccine Preventable (Measles, Mumps)
- Sexually Transmitted (HIV, Syphilis)
- Person-to-Person (TB, Aseptic meningitis)
- Arthropodborne (Lyme, West Nile Virus)
- Zoonotic (Rabies, Psittacosis)
- Opportunistic fungal and fungal infections (Candidiasis).

An epidemic may also result from a bioterrorist event in which an infectious agent is released into a susceptible population, often through an enhanced mode of transmission, such as aerosolization (inhalation of small infectious disease particles).¹⁷

Lyme Disease

Lyme disease, which is spread to humans by the bite of an infected tick, is a growing threat in New Hampshire. New Hampshire has one of the highest rates of Lyme disease in the U.S.

¹⁵ Slate; <http://www.slate.com/id/2092969/>

¹⁶ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

¹⁷ Ibid.

Radon

Radon is a radioactive gas which is naturally occurring as a result of the typical decay of uranium commonly found in soil and rock (especially granite). Radon has carcinogenic properties and is a common problem in many states; New Hampshire has some isolated areas that are among the highest levels of radon in the United States according to the US Environmental Protection Agency (EPA). Whether or not a particular type of granite emanates radon is dependent on the geochemistry of that particular granite, some types are a problem and some are not. In other parts of the country, radon is associated with certain black shales, sandstones, and even limestones. The EPA has estimated that radon in indoor air is responsible for about 13,600 lung cancer deaths in this country each year (EPA document, EPA 811-R-94-001, 1994).¹⁸

Arsenic

Arsenic is a semi-metal element that is odorless and tasteless. Arsenic is a hazard because it can enter drinking water supplies, either from natural deposits in the earth or from agricultural and industrial practices.¹⁹

Wells drilled into New Hampshire's bedrock fractures have about a 1 in 5 probability of containing naturally occurring arsenic above 10 parts per billion. In addition, wells within short distances (~50 feet) can present very different water quality because of our highly fractured bedrock. Arsenic in water has no color or odor, even when present at elevated levels. Therefore, the only way to determine the arsenic level in your well water is by testing.

Extent of the Hazard

Public health threats are events or disasters that can affect an entire community.

Past Impacts and Events

Epidemic

There is no active High School in Strafford and many students attend Coe Brown Academy in Northwood. Because students are traveling for school, there is a threat of enabling infection and viruses to be transmitted from outside the town borders. There is also high attendance at Camp Foss and Beam Summer Camp with children coming from outside the Town. Because of these factors, an epidemic or pandemic could present a possible threat to Strafford. Lastly, the Town's total population nearly doubles in the summer months due to summer rentals along Bow Lake. Because of the influx of residents from neighboring towns or even states, there is a threat of enabling infection and viruses to be transmitted. With the occurrence of worldwide pandemics such as SARS, H1N1 and Avian Flu, Strafford could be susceptible to an epidemic and subsequent quarantine. While all individuals are potentially vulnerable to the hazard of an epidemic, epidemics often occur among a specific age group or a group of individuals with similar risk factors and exposure.¹⁸

Lyme Disease

The number of New Hampshire residents diagnosed with Lyme disease has increased over the past 10 years, with significant increases occurring since 2005.²⁰ In 2009, the rate of cases of Lyme disease reported in New Hampshire residents was 108 cases per 100,000 persons, which is significantly higher than the Healthy People 2010 science-based

¹⁸ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

¹⁹ EPA. Arsenic in Drinking Water. (<http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/index.cfm>)

²⁰ 2011 New Hampshire State Health Profile; Improving Health, Preventing Disease, Reducing Costs for All. NH Division of Public Health Services Department of Health and Human Services. <http://www.dhhs.nh.gov/dphs/documents/2011statehealthprofile.pdf>

10-year national objective for improving the health of all Americans objective of 9.7 cases per 100,000 persons.²¹ From 2009 to 2013, reported cases of Lyme disease in New Hampshire increased by approximately 20% from 1416 cases per year to 1691 cases per year.²² Rockingham, Strafford, and Hillsborough counties had the highest rates of disease in 2008-2009. In 2012, there were 172 reported cases of Lyme disease in Strafford County.²⁰

Radon

Exposure is a significant hazard in New Hampshire. According to a NH Bureau of Environmental & Occupational Health (BEOH) study looking at >15,000 indoor radon test results in single-family dwellings, households in northern, eastern, and southeastern regions of New Hampshire especially tend to have nominally high concentrations of radon in air or water (BEOH 2004); however, values in excess of the US Environmental Protection Agency’s 4.0 picocurie per liter (pCi/L) action guideline have been found in nearly every community in New Hampshire. Values exceeding 100 pCi/L have been recorded in at least eight of New Hampshire’s ten counties. The highest indoor radon reading in New Hampshire known to NHDES is greater than 1200 pCi/L; higher values probably exist. The probability of significant radon exposure is apparently quite high. In the BEOH study, 44.0% of tests in Strafford County exceeded the 4.0 pCi/L action level and 13.0% even exceeded 12.0 pCi/L.

In Strafford, between 30 and 39.9% of homes tested by homeowners from 1987 to 2008 tested at or above the radon action level of 4.0 pCi/L. The probability of significant radon exposure is fairly high.²³

Table 5.16 Summary Data for Strafford County (radon values in picocuries per liter)

County	# Test Results	% of tests > 4.0 pCi/L	% of tests > 12.0 pCi/L
Strafford	1,645	44.0%	13.0%
Statewide	15,860	32.4%	8.6%

Arsenic

From 1975 until 2001, the federal maximum contaminant limit (MCL) for arsenic in water supplied by public water systems was 50 parts per billion, because the health effects of exposure to lower concentrations was not recognized. Based on an exhaustive review of the new information about arsenic’s health effects, in January 2001 EPA established a goal of zero arsenic in drinking water. At the same time, EPA adopted an enforceable MCL of 10 parts per billion (ppb) based on balancing treatment costs and public health benefits. Studies have shown that chronic or repeated ingestion of water with arsenic over a person’s lifetime is associated with increased risk of cancer (of the skin, bladder, lung, kidney, nasal passages, liver or prostate) and non-cancerous effects (diabetes, cardiovascular, immunological and neurological disorders). The same studies found that dermal absorption (skin exposure) of arsenic is not a significant exposure path; therefore, washing and bathing do not pose a known risk to human health.²⁴

Potential Future Impacts on Community

Exposure to radon and arsenic will continue to be a concern in Strafford and throughout the state. It is likely that exposure to Lyme’s disease will increase in the future due to warmer temperatures. The spread of epidemics is also plausible.

Estimated Loss

²¹ HealthyPeople.gov. About Healthy People. Accessed April 2014. Available at: <http://healthypeople.gov/2020/about/default.aspx>

²² NHDHHS. State of New Hampshire Tickborne Disease Prevention Plan. March 31, 2015. <http://www.dhhs.state.nh.us/dphs/cdcs/lyme/documents/tbdpreventionplan.pdf>

²³NHDES http://des.nh.gov/organization/divisions/air/pehb/ehs/radon/documents/radon_by_town.pdf

²⁴ New Hampshire Environmental Services. Drinking Water and Groundwater Bureau. Arsenic in Drinking Water Fact Sheet.

Based 2014 valuation and the hazard ranking, the estimated potential loss due to public health threats is \$2,418,947 to \$12,094,735.

Wildfire

Table 5.17 Hazard Overview

Hazard Type	Wildfire
Location/Extent	Town-wide; remote, forested areas may be more vulnerable
Vulnerability	
Severity	Moderate
Probability	Moderate
Overall Threat	High
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. Forest fires occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassland areas. Strafford is a rural town with a predominantly forested landscape. Exposure to natural factors such as lightning that can cause wildfires is consequently high and can occur throughout the jurisdiction.

Extent of the Hazard

The National Wildfire Coordinating Group (NWCG) categorizes the size of a wildfire in six classes depending on acres burned, ranging from less than ¼ acre to greater than 5,000 acres (see box below). The US Forest Service’s surface fire behavior fire characteristics chart illustrates primary fire behavior values including the spread rate and the intensity of the fire, which can be used to compare predicted and observed fire behavior and to describe potential fire behavior.²⁵

The National Wildfire Coordinating Group (NWCG) defines the size of a wildfire as:

- Class A - one-fourth acre or less;
- Class B - more than one-fourth acre, but less than 10 acres;
- Class C - 10 acres or more, but less than 100 acres;
- Class D - 100 acres or more, but less than 300 acres;
- Class E - 300 acres or more, but less than 1,000 acres;
- Class F - 1,000 acres or more, but less than 5,000 acres;
- Class G - 5,000 acres or more.

Past Impacts and Events

Wildfires in New Hampshire historically have tended to run in 50-yr cycles, which can be observed starting from the 1800s. This 50-year cycle is partially based upon human activities and, therefore, may not prove to be accurate into the future.²⁶ The peak in wildfires in the late 1940's and early 1950's is thought to be related to the increased fuel load from trees downed in the 1938 hurricane. Here, 60 years later, New Hampshire officials are again concerned about the high fuel load created by the 1998 and 2008 ice storms that hit New Hampshire.

²⁵ How to Generate and Interpret Fire Characteristics Charts for Surface and Crown Fire Behavior. (https://www.fs.fed.us/rm/pubs/rmrs_gtr253.pdf)

²⁶ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

The NCDC Storm Events database lists 0 reported wildfires in Strafford County from January 1, 2008 to June 30, 2016 (the most current data available at the time this chapter was drafted in October 2016). The Committee reported no recent wildfires.

Table 5.18 Historic Hazard Identification

Hazard	Date	Location	Remarks	Source
Forest Fire	1826	Parker Mountain Fire		Smith 1882
Wild Fire	Early 1900s	Northeast of Bow Lake		2005 Hazard Committee
Forest Fire	1940s	Near "Perkins"		2005 Hazard Committee
Forest Fire	1999	Next to Wild Goose Pond		2005 Hazard Committee
Clear-cut	1990s	North of Bow Lake	High fire hazard due to a dirty clear-cut that left behind a lot of fuel debris.	2005 Hazard Committee
Forest Fire	1990s	Beach Island Fire	Collateral damage to house.	2005 Hazard Committee
Clear-cut	1990s	Western edge of Town.	High fire hazard due to a dirty clear-cut that left behind a lot of fuel debris.	2005 Hazard Committee
Brush Fire	1990s	Watkins Gravel Pit		2005 Hazard Committee
Forest Fire	1990s	Roberts Road Fire	Started by garbage pile burn (Glidden's)	2005 Hazard Committee
Fire	1990s	Cross Road and First Crown Point Rd		2005 Hazard Committee
Fire	1997	Wildlife Pond Rd	7 acre fire	2017 Committee
Fire	2000s	Roberts Rd	6 acre fire	2017 Committee

Potential Future Impacts on Community

The probability of occurrence of wildfires in the future is effectively impossible for the Hazard Mitigation Committee to predict due to the dependence of wildfire on the occurrence of the causal hazards and the variability of numerous factors that affect the severity of a wildland fire.

The Committee noted that access to forested areas on Class VI roads is a concern. Cross Road is of particular concern.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to wildfire is \$12,094,735 to \$24,189,470.

Hazardous Material

Table 5.19 Hazard Overview

Hazard Type	Hazardous Material
Location/Extent	Town-wide; NH Route 202A and Route 126 likely more vulnerable
Vulnerability	
Severity	Low
Probability	Low
Overall Threat	Low
Potential Loss	\$12,094,735 to \$24,189,470

Description of the Hazard

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines. Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Hazardous materials continue to evolve as new chemical formulas are created.

Extent of the Hazard

Incidents involving hazardous materials could potentially occur at any residence or business or along any road; however, it is more likely that a spill would occur along NH Route 202A and NH Route 126.

Past Impacts and Events

In 2015, an old truck tipped over in a driveway on Rollercoaster Road. Impacts were not widespread.

Potential Future Impacts on Community

Strafford does not have a major thoroughfare that is heavily traveled by vehicles carrying hazardous materials. There are small delivery trucks carrying materials to residents that use Routes 202A and Route 126, but speeds are often low and trucks rarely carry hazardous substances. There is no freight train that runs through the Town and there have been no major reports of significant hazardous spills in the area. The National Guard Center may have potentially hazardous material that could pose a threat to public and environmental health if spilled or otherwise released.

Estimated Loss

Based 2014 valuation and the hazard ranking, the estimated potential loss due to hazardous material is \$0 to \$2,418,947.

Hazards Not Included in this Plan

The State of New Hampshire identifies avalanches as a hazard in the State Multi-Hazard Mitigation Plan Update of 2013. Avalanches are not included in this Plan for the Town of Strafford. Avalanches were not identified by the present or past Planning Committee as a local hazard due to the fact that there are no significant mountains or topographical features where avalanches would be likely to occur. The Town will re-evaluate the need to include additional hazards to this Plan during subsequent updates of the Plan.

Chapter 6: Existing and New Mitigation Strategies

Existing Programs and Policies

Table 6.1 displays existing, ongoing mitigation programs and policies in Strafford. This matrix was updated by the Planning Committee during the preparation of this report. The matrix includes the type of existing protection (Column 1), a description of the existing protection (Column 2), the type of hazard (Column 3), the type of activity (Column 4), the area of town impacted (Column 5), enforcement (Column 6), effectiveness of the strategy (Column 7), and a status update in 2017 (Column 8).

Table 6.1 Ongoing Programs and Policies

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	2017 Update
Hazard Mitigation and Emergency Management Programs and Policies							
Burn Permits	State Regulation	Fire	Prevention	Town-wide	Chief Ranger of Concord appoints Fire Warden	Excellent	Warden determines whether permits can be issued. Fire department makes it easy to get a permit, but does rely on the honor system with regard to obtaining a permit. The program works very well.
Fire Pit Inspections	State Regulation	Fire	Prevention	Town-wide	Chief Ranger of Concord appoints Fire Warden	Excellent	170 – 230 inspections are conducted annually. There are restrictions in place for where you can have a pit. Category I permits are issued for campfires and small fires <2ft in diameter; Category II permits are for fires <4ft in diameter. Category III permits are issued for non-permanent brushfires. All permits are logged and tracked on a computer. Program relies on honor system, but works very well.
Fire Tower	A look out for fires	Fire	Emergency Preparedness	Strafford/Farmington Border	NH Department of Resources and Economic Development (DRED)	Poor	Funding is a major issue. Funding is based on fire danger weather. Strafford has really heavy fire loads and fire is a risk in all weather. The utilities need to be running consistently. The access road needs work to allow vehicle access. The area is used more for recreation; recreational use increased after improvements were made to the parking area (including lighting). Town needs people to commit to learning the system.

Table 6.1 Ongoing Programs and Policies

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	2017 Update
Mutual Aid	Dispatch out of Laconia	Multi-Hazard	Emergency Preparedness	Agreements with Lakes Region and other Towns	Fire Department	Excellent	System is in place and will continue to operate. Includes fire/ems. Limits confusion between agencies.
"Bad weather" 24-hour manning of fire station	Someone at the fire station during "bad weather" for emergency purposes	Multi-Hazard	Emergency Preparedness	Town-wide	Fire Chief and Captains	Good	The Town has to request access to use the National Guard generator at the Training Center. The National Guard Training Center has no fire suppression/fire station.
Winter Storm Plowing	Plowing of roads, parking lots, etc.	Winter Storm Events	Emergency Preparedness	Town-wide	Road Agent	Good	Town has adequate space for snow storage
Winter Storm Parking Ban	State Regulations	Multi-Hazard	Prevention	Town-wide	Road Agent	Good	The Town has a winter storm parking ban. Typically the road agent will call the Police Department if there are any issues with plowing. These instances are rare.
Agreement with Red Cross	Use of Town Buildings	Multi-Hazard	Emergency Preparedness	Town-wide	EMD	Poor	Have had an agreement in the past but haven't for last 10 years. Town has not heard back about an MOU. Town doesn't depend on Red Cross. Other organizations including Salvation Army have been helpful
Emergency Management Plan / Emergency Operations Plan (EOP)	Emergency Operations Plan, Evacuation Procedures, Acute illness or Injury Plan, Fire Aid and Emergency Care, Crisis Intervention Plan, Weather Emergency Procedures, Bomb Threat Procedures	Multi-Hazard	Emergency Preparedness	Strafford School	Superintendent of Schools, Principle, and other school and emergency personnel.	Poor	The EMP/EOP needs to be updated. The Town has started to work on the plan and anticipates completion in 2017.
Strafford School District: Emergency Procedures, Quick Reference Guide	Accidents, bomb threat, breach of security, earthquakes, electrical outage, evacuation/relocation, fire, hazardous material release, and tornado	Multi-Hazard	Emergency Preparedness	Strafford School	Strafford School Personnel and Police, Fire, and Ambulance	Excellent	The School is currently working on an update of the plan.

Table 6.1 Ongoing Programs and Policies

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	2017 Update
Zoning and Land Use Ordinances, Subdivision Regulations, Non-Residential Site Plan Regulations, and Building Regulations (last updated 2015)							
Wetlands Conservation Overlay District	Purpose is to Enhance and protect the quality and quantity of surface water and groundwater, prevent destruction of wetland areas which provide flood protection, protect people and property from hazards of flood inundation	Flooding, Hazardous Materials	Prevention	Town-wide	Planning Board	Excellent	Buffers and setbacks are more stringent than the state. Conservation Commission reviews applications. Planning Board/Code Enforcement Officer administer.
Water Protection Overlay District	Purpose is to protect quality and quantity of surface and groundwater from pollution	Flooding, Hazardous Materials	Prevention	Town-wide	Planning Board	Excellent	No changes required.
Regulations for Mobile Homes	Changes to the regulations require Town approval. Standards of the 1976 Federal Mobile Home Construction and Safety Standards, minimum foundation for a mobile home shall be a concrete slab at least equal in size to the mobile home being placed upon it, it shall be enclosed or skirted from its base to the concrete	Multi-Hazard	Prevention	Town-wide	Board of Selectmen, Planning Board, Building Inspector	Excellent	No changes required.
Growth Management Ordinance	Enacted to phase in the development of tracts of land and future subdivisions at a rate that is compatible with the orderly and gradual expansion of community services, including police and fire protection, road maintenance	Multi-Hazard	Prevention	Town-wide	Planning Board	N/A	Section 1.15 of the Zoning Book is a Growth Management Ordinance. The Committee was not certain that the Town had and/or enforced this ordinance, and this item should be reviewed.
Special Flood Hazard Areas	Developments must be located and designed to assure that all public utilities and facilities are located and constructed to minimize or eliminate flood or eliminate flood damage and adequate drainage is provided	Flooding	Prevention	Town-wide	Planning Board	Excellent	No changes required.

Table 6.1 Ongoing Programs and Policies

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	2017 Update
	to reduce exposure to flood hazards						
Character of Land for Subdivision	Prohibit or restrict subdivision of land which unsafe for development due to flooding, erosive action, unstabilized slope or fill, or otherwise located in a situation so that safe healthful development cannot be maintained on the land	Erosion, Landslide	Prevention	Town-wide	Planning Board	Excellent	No changes required.
Character of Land for Subdivision	Restrict subdivision of land that is unsuitable for development due to high water table, bed rock, or other impervious strata close to the surface, or excessive slope	Multi-Hazard	Prevention	Town-wide	Planning Board	Excellent	No changes required.
Character of Land for Subdivision and Non-Residential Site Plan	Stabilization according to NH Best Management Practices required for any disturbance of unprotected soils or creation of exposed soils on any slope 15% or greater	Erosion, Landslide	Prevention	Town-wide	Planning Board	Excellent	No changes required.
Subdivision Street Layout and Design Regulations	All subdivisions with frontage on bodies of water shall provide access to said bodies of water at suitable intervals for firefighting equipment. Cisterns may be required in any subdivision. Standards to ensure access for fire apparatus.	Fire	Prevention, Emergency Response	Town-wide	Planning Board, Fire Department	Excellent	No changes required. The Chief determines if a cistern is required and/or the best option for mitigating fire hazards.
Building Standards	Regulations to ensure minimization of fire hazards	Fire	Prevention	Town-wide	Building Inspector	Excellent	No changes required. Building Inspector and Fire Chief responsible for enforcement
Floodplain Development Regulations	Permit required for all proposed development in any special flood hazard area, standards for development in floodplain (See Chapter 4)	Flooding	Prevention	Town-wide	Code Enforcement Officer	Excellent	No changes required.

Table 6.1 Ongoing Programs and Policies

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	2017 Update
Stormwater Management Regulations	Maximum impervious cover of a lot shall not exceed 10% of a lot. LID encouraged. BMPs enforced.	Flooding	Prevention	Town-wide	Planning Board	Excellent	No changes required.
Street Drainage	Streets must have adequate drainage facilities. Construction must comply with Standard Specifications for Road and Bridge Construction and NHDOT.	Flooding	Prevention	Town-wide	Planning Board	Excellent	Roads are built to Town standards to minimize drainage issues.
Fire or other ruins cannot be left on property	An owner or occupant of land shall not permit fire or other ruins to be left, but shall remove the same within six months	Fire	Prevention	Town-wide	Code Enforcement Officer	Good	Enforcement is challenging. Need to sharpen this regulation. Code Enforcement Officer and Fire Chief responsible for enforcement.

Effectiveness:

Excellent – The existing program works as intended and is exceeding its goals

Good –The existing program works as intended and meets its goals

Average – The existing program does not work as intended and/or does not meet its goals

Poor – this existing program is negatively impacting the community

2017 Update:

Recommendations for improvement

Table 6.2 displays mitigation strategies identified during the development of Strafford’s Multi-Hazard Mitigation Plan in 2007 and 2012. The Committee provided a status update for each mitigation strategy during the preparation of the current Plan. The Planning Committee members then ranked past mitigation actions from prior plan as high, medium, and low priority.

Table 6.2 Accomplishments since Prior Plan(s) Approval

Rank	Strategy	2017 Update
High	Fix/Replace dry hydrants so that they are active hydrants and can be used for fighting fires.	Ongoing. 3 hydrants have been replaced. Town has had warrant article for dry hydrant repair for \$15k/yr. Fire ponds fill with sediment over time.
High	Maintain transportation infrastructure by identifying and assessing potential areas of concern in order to have a better assessment during emergency and evacuation situations.	Ongoing. State roads were repaved in 2016. Town maintains roads very well. Road agent has more money through summer funding so that the roads can be repaired. Town needs to address areas including: Little Niagara at the top of Cross, Cross Road and Scribner, and Whig Hill.
High	Set aside funds in order to purchase equipment cots, pillows, blankets, etc. for both emergency shelters.	Deferred. The Town required more time, resources, and identification of storage space to complete this strategy.
Medium	Open up Whig Hill for emergency personnel access and evacuation for residents.	Deferred action. Would cut in half emergency response time. Residents concerned with traffic increases. SRPC has traffic counts for Strafford. Town Planner may have information about population living in the neighborhood. Town will evaluate the need to increase access on this road.
Medium	Establish Town Website to contain emergency information.	Ongoing. Police Department Website has phone numbers, Hazard Mitigation Plan link on it.
Medium	Create pamphlet series with emergency information to distribute to residents.	Ongoing. Pamphlet series with emergency information: Town needs more NFIP brochures. Produce educational pamphlets.
Medium	Develop list of local people who could assist in disasters by operating their own or Town’s equipment.	Ongoing. List of emergency personnel and list of doctors and medical staff have been completed. List of citizens with equipment has not been completed. Strategy ongoing. Chief has requested a Citizen Emergency Response Team at Town Meeting. Lack of volunteers. Town needs a new strategy to increase awareness of this need and recruit more volunteers. Info could also be posted on the Town’s website.
Medium	Create library documents that can be referenced at the Town Hall.	Ongoing. Town has documents, including the Multi-Hazard Mitigation Plan, available at Town Hall and library. Town will continue to make documents related to the Hazard Mitigation Plan Update available at the Town Library and Town hall.
Medium	Encourage residents to get to know their neighbors and check in on each other in an emergency situation.	Ongoing. Town continues to encourage residents to get to know neighbors and check in in emergency situations.
Medium	Develop a list of residents who have an emergency back-up fuel supply (tanks) that would become available to the Town for use of emergency vehicles in an emergency situation. Also, develop a list of residents who own and can operate emergency equipment that would become available to the Town in an emergency situation.	Ongoing. The Committee is able to identify individuals who can assist in an emergency but no list has been compiled. A list of residents with back up fuel has not yet been completed.

Rank	Strategy	2017 Update
Medium	Continue to provide outreach assistance to elderly and special needs populations by organizing staff and coordinating within Town departments. Look into options such as "Meals on Wheels" for residents staying home.	Ongoing. Town has Ready Rides and Meals on Wheels. Fire Department gives directions and assists with implementing these programs.
Medium	Brainstorm and implement new ideas to address the Fire/EMS safety access challenges to the residents that live in the Bow Lake Estates. Address winter access roads and reach out to local camps to help maintain those roads.	Ongoing. This is challenging because not all people are in Strafford in winter.
Low	Locate all the underground storage tanks (both oil/gas) in the Town.	Ongoing. Work with SRPC and NHDES to locate tanks. Resident on Water Street has a tank. Isinglass Country Store has a tank.
Low	Obtain NFIP brochures from FEMA and have them available at the Town Offices for new developers and current homeowners.	Ongoing. Town needs more NFIP brochures
Low	Create evacuation plans so first responders know how and where to direct traffic.	Deferred. Evacuation plans: Strategy needs to be addressed. Not complete.
N/A	National Guard Training Center should have an on-site telephone number available for other emergency personnel, and have someone at the Nat. Guard Training Ctr. act as a "contact" for other emergency personnel.	National Guard Training Center has on-site phone available for other emergency personnel. Sargent First Class Haggett is currently acting as the contact at the Training Center.
N/A	Have alternative way to get in and out of island (only way currently is Kooauke Bridge).	Deleted. The Town is no longer pursuing strategy. Bridge has been rebuilt. Not economically feasible to create another way off the island.
N/A	Purchase and install back-up generator in Strafford Fire Station.	Complete. Town has 3 permanent generators and an additional portable generator.
N/A	Purchase a small generator and equipment for fuel pumps.	Completed. A generator has been purchased and is in the trailer at the Town Offices.

Status Update:

Completed Action – This program continues to be an implemented mitigation action item since the last updated plan was developed

Deferred Action – At the time of developing this plan, more time is required for completion

Removed Action – This existing program is no longer a priority to the Town

Ongoing Action – This program will occur throughout the life of the plan

Gaps in Existing Measures

During a review of existing mitigation strategies, the Committee identified the following gaps and needs:

- The Town does not have slope limit for driveways
- There is a need for improved coordination and communication with National Guard.
- The National Guard could use a portable, foam fire system
- There is a need to plan for the impacts of the Training Center becoming a Regional Training Center. There is concern with danger of helicopter crash. There are fire arms over at the Center.
- More communication between Selectmen and National Guard Training Center is needed.
- Fire Chief would like staff to attend training, including training at the National Guard Training Center, and needs more funds for training.
- Seasonal homes on lakes are vulnerable due to steep slopes.
- Fire roads are private driveways and access is poor.
- The Town doesn't have standards for private roads.
- Some residents of Whig Hill want it to be improved, others are concerned it would become a thoroughfare. Proposed Town Warrant to open Class VI road in the past. Suggestion that Town would maintain for emergency access and road would be gated.
- Town closed Class VI roads that washed out. One priority is Scribner to Cross Road. The 100 year storm and Mother's Day Floods (2006/2007) wiped out the road bed at Cross Road.
- List of emergency personnel and list of doctors and medical staff have been completed. List of citizens with equipment has not been completed. Chief has requested a Citizen Emergency Response Team at Town Meeting. Lack of volunteers. Town needs a new strategy to increase awareness of this need and recruit more volunteers. Info could also be posted on the Town's website.
- Pamphlet series with emergency information: Town needs more NFIP brochures and other educational material.
- Strategy for evacuation needs to be addressed.
- Town awaits new FEMA maps.

The Planning Committee's Understanding of Multi-Hazard Mitigation Strategies

The Committee determined that any strategy designed to reduce personal injury or damage to property that could be done prior to an actual disaster would be listed as a potential mitigation strategy. This decision was made even though not all projects listed in Table 6.3 are fundable under FEMA HMA grant programs. The Committee determined that this Plan was in large part a management document designed to assist the Select Board and other town officials in all aspects of managing and tracking potential emergency planning strategies. For instance, the Committee was aware that some of these strategies are more properly identified as readiness issues. The Planning Committee did not want to "lose" any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

The Planning Committee identified 15 new priority strategies to implement during the life of this Plan. These strategies are intended to supplement existing programs and the ongoing and not yet completed mitigation strategies identified in previous plan updates. When identifying new strategies, the Planning Committee balanced a number of factors including capacity to implement strategies, priority projects, existing strategies, policies, and programs, the hazard ranking, and whether a strategy will reduce risk associated with multiple hazards.

New Mitigation Strategies

The Committee identified several new mitigation strategies to reduce vulnerability to hazards during the review of existing strategies and the discussion of the hazards. The Committee focused on identifying the best appropriate strategies for the community and the hazards it is most vulnerable to based on the vulnerability assessment. Mitigation strategies were not identified for the following recognized hazards at this time:

- **Earthquake:** Significant earthquakes are not common in this region of the country and the Planning Committee ranked the community's vulnerability to this hazard as low.
- **Tornado/Downburst:** Tornadoes and downbursts have occurred in Strafford and surrounding communities but significant events are rare. The Planning Committee discussed the education and drills that occur at the school and determined that additional outreach activities were not necessary at this time. The Town Hall is a newer building that was constructed to withstand strong winds.
- **Hurricane:** A primary impact of hurricanes in Strafford is flooding, which the Planning Committee identified mitigation strategies for. Hurricanes are also major wind events that could cause power outages. The Planning Committee reported that many homeowners have their own generators. In addition, the Department of Public Works has historically been able to clean and maintain roads quickly in the event of a downed tree. As a result of these factors, hurricanes were not considered a high priority hazard for mitigation strategies.
- **Lightning:** Lightning is common but not typically severe in New Hampshire. The school has traditionally taught children about the dangers of lightning. The Planning Committee did not identify other strategies such as installation of lightning protection devices as having high feasibility of implementation at this time.

Some of the mitigation strategies are strategies for multiple hazards. The goal of each proposed mitigation strategy is reduction or prevention of damage from a multi-hazard event. New mitigation strategies are listed Table 6.3.

Feasibility & Prioritization

A technique known as a STAPLEE evaluation, which was developed by FEMA, was used to evaluate new mitigation strategies based on a set of criteria (see below). The STAPLEE method is commonly used by public administration officials and planners.

S	Social:	Is the proposed strategy socially acceptable to the community? Is there an equity issue involved that would result in one segment of the community being treated unfairly?
T	Technical:	Will the proposed strategy work? Will it create more problems than it solves?
A	Administrative:	Can the community implement the strategy? Is there someone to coordinate and lead the effort?
P	Political:	Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
L	Legal:	Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
E	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?
E	Environmental:	How will the strategy impact the environment? Will it need environmental regulatory approvals?

The Committee evaluated each mitigation strategy using the STAPLEE and ranked each of the criteria as poor, average, or good. These rankings were assigned the following scores: *Poor=1; Average=2; Good=3*.

The following questions were used to guide further prioritization and action:

- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?

The prioritization exercise helped the committee evaluate the new hazard mitigation strategies that they had brainstormed throughout the multi-hazard mitigation planning process. While all actions would help improve the Town's multi-hazard and responsiveness capability, funding availability will be a driving factor in determining which and when new and ongoing mitigation strategies are implemented. Table 6.3 displays the feasibility and prioritization of new mitigation as well as ongoing and deferred strategies that were carried over from the 2012 Plan. STAPLEE scores from the previous Plan were reaffirmed and included in Table 6.4 Implementation. The 2012 STAPLEE exercise is included in Appendix F of this Plan.

Table 6.3 New Mitigation Strategies

Strategy	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	En	Ec	Total
When new FEMA flood maps are available, update flood hazard overlay maps and evaluate the need to incorporate additional freeboard requirements to increase building height or otherwise amend the existing ordinance.	Flooding	Town-wide, areas adjacent to rivers, streams, and lakes	Regulatory	3	3	3	3	3	3	3	21
Upgrade bridge on Barn Door Gap Road over the Big River.	Flooding	Barn Door Gap Rd	Construction	3	3	3	3	3	3	3	21
Make FEMA NFIP Public Awareness materials available at the Town Offices for new and existing homeowners.	Flooding	Town-wide, areas adjacent to rivers, streams, and lakes	Education	3	3	3	3	3	3	3	21
Continue to provide salt and sand for residents at the Town Shed.	Severe Winter Weather	Town-wide	Preparedness	3	3	3	3	3	3	3	21
Distribute educational material about the dangers of carbon monoxide and winter storm survival to residents. Post material to website, Facebook, and make available in Town Hall and library.	Severe Winter Weather	Town-wide	Education	3	3	3	3	3	3	3	21
Provide educational brochure about drinking water, including well maintenance and testing, impacts of drought, and additional resources.	Multi-hazard	Town-wide	Education and Prevention	3	3	3	3	3	3	3	21

Strategy	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	En	Ec	Total
Manage town owned properties to limit accumulation of woody debris on forest floor and encourage property owners to implement NH Department of Resources (DRED) and Economic Development best management practices for wildfire prevention.	Wildfire	Heavily forested property	Prevention	3	3	3	3	3	1	1	17
									Wildfire management practice may conflict with wildlife management	It is anticipated that this strategy will be costly to implement	
Educate Town staff and officials about emergency response protocols in the event of a hazardous material spill. Provide materials for public at transfer station.	Hazardous Material	Town-wide	Preparedness	3	3	3	3	3	3	3	21
Improve communication and coordination with National Guard regarding the plan for the training center to become a regional training center.	Multi-hazard	Town-wide	Prevention	3	3	3	3	3	3	3	21
Encourage homeowners to stabilize slopes with rip-rap or vegetation to reduce vulnerability of seasonal lake homes to erosion.	Erosion	Areas of steep slopes	Prevention, Education, Construction	3	3	3	3	3	3	3	21
Develop standards for maintenance and repair of existing private roads. Develop slope limits for driveways that allow for improved emergency access for fire apparatus.	Multi-hazard	Town-wide	Regulatory	2	3	3	3	3	3	3	20
				Residents who live on private roads may not be accepting of this strategy							

Strategy	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	En	Ec	Total
Allocate funds for additional training for fire department staff.	Multi-hazard	Town-wide	Preparedness	3	3	3	2	3	3	3	20
							It is possible that there may not be strong political support for increasing funds, but typically the Town has been supportive of staff training				
Upgrade Scribner to Cross Road to reduce vulnerability to flooding.	Flooding	Scribber and Cross Roads	Construction	3	3	3	1	3	2	1	16
							The Town would need to approve the upgrade		Potential impacts to wildlife	High cost	
Develop strategy to increase awareness of the need for a Citizen Emergency Response Team and post information on Town's website.	Multi-hazard	Town-wide	Education and Preparedness	3	3	3	3	3	3	3	21
Revisit the need to open up Class VI roads to improve emergency access.	Multi-hazard	Town-wide	Planning, Preparedness and Construction	3	3	3	1	3	3	1	17
							Potential lack of support for upgrading roads to Class V.			High cost to maintain new roads	
Coordinate with the NH Department of Resources and Economic Development (DRED) and the Division of Parks and Recreation to conduct a GIS-based mapping exercise to identify potential access points and fire needs.	Multi-hazard, Wildfire	Town-wide	Preparedness	3	3	3	3	3	3	3	21

Implementation Schedule for Prioritized Strategies

After reviewing the finalized STAPLEE numerical ratings, the Planning Committee prepared to develop the Implementation Plan (Table 6.4). To do this, the Planning Committee developed an implementation plan that outlined the following:

- ∴ Type of hazard
- ∴ Affected location
- ∴ Type of Activity
- ∴ Responsibility
- ∴ Funding
- ∴ Cost Effectiveness; and
- ∴ Timeframe

The following questions were asked in order 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?

In addition to the prioritized mitigation projects, Table 6.4 Implementation Plan, includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

The Planning Committee determined that the EMD would be responsible for overseeing the implementation of the strategies and will coordinate with individuals and boards identified as responsible for the new mitigation strategies in Table 6.4

Table 6.4 Implementation Plan

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest= 21)
						<i>Low = <\$5,000</i>	<i>*ongoing/continuous</i>	
						<i>Medium = \$5,000-\$10,000</i>	<i>6 months – 1 year</i>	
						<i>High = > \$10,000</i>	<i>1-2 years</i>	
						<i>2-5 years</i>		
When new FEMA flood maps are available, update flood hazard overlay maps and evaluate the need to incorporate additional freeboard requirements to increase building height or otherwise amend the existing ordinance.	Flooding	Town-wide, areas adjacent to rivers, streams, and lakes	Regulatory	Planning Board	Town with support from NH Office of Energy and Planning (OEP)	Low	2-5 years	21
Upgrade bridge on Barn Door Gap Road over the Big River.	Flooding	Barn Door Gap Road	Construction	Road Agent	Town Road Budget; FEMA Flood Mitigation Assistance or Pre-Disaster Mitigation	High	2-5 years	21
Make FEMA NFIP Public Awareness materials available at the Town Offices for new and existing homeowners.	Flooding	Town-wide, areas adjacent to rivers, streams, and lakes	Education	Town Planner or Building Inspector	FEMA Resources available for no cost; Support from NHOEP	N/A	Ongoing/continuous	21
Continue to provide salt and sand for residents at the Town Shed.	Severe Winter Weather	Town-wide	Preparedness	Road Agent	Town Road Budget	Low	Ongoing/continuous	21
Distribute educational material about the dangers of carbon monoxide and winter storm survival to residents. Post material to website, Facebook, and make available in Town Hall and library.	Severe Winter Weather	Town-wide	Education	EMD	Material available from State	Low	Ongoing/continuous	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest= 21)
Provide educational brochure about drinking water, including well maintenance and testing, impacts of drought, and additional resources.	Public Health Threat, Multi-Hazard	Town-wide	Education and Prevention	EMD/public health officer	Support from SRPC and NHDES	Low	6 months - 1 year	21
Manage town owned properties to limit accumulation of woody debris on forest floor and encourage property owners to implement NH Department of Resources (DRED) and Economic Development best management practices for wildfire prevention.	Wildfire	Heavily forested property	Education and Prevention	Conservation Commission	NHDRED, In-Kind support from Conservation Commission and volunteers	Low	Ongoing/ Continuous	17
Educate Town staff and officials about emergency response protocols in the event of a hazardous material spill. Provide material at transfer station.	Hazardous Materials	Town-wide	Preparedness	Safety Committee	Support from NHHSEM and NHDES	Low	Ongoing/ continuous	21
Improve communication and coordination with National Guard regarding the plan for the training center to become a regional training center.	Multi-Hazard	Multi-hazard	Prevention	Board of Selectmen	N/A	N/A	Ongoing/ continuous	21
Encourage homeowners to stabilize slopes with rip-rap or vegetation to reduce vulnerability of seasonal lake homes to erosion.	Erosion and Landslide	Erosion	Prevention, Education, Construction	Conservation Commission or Building Inspector	Support and resources available from NHDES	Low	Ongoing/ continuous	21
Develop standards for maintenance and repair of existing private roads. Develop slope limits for driveways that allow for improved emergency access for fire apparatus.	Multi-Hazard	Multi-hazard	Regulatory	Planning Board, Road Agent, and Town Planner	Funding from Town Planning and/or Road Budget	Low	1-2 years	20

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest= 21)
Allocate funds for additional training for fire department staff.	Multi-Hazard	Multi-hazard	Preparedness	Board of Selectmen and Fire Chief	Town Budget	Medium	6 months -1 year, then ongoing/continuous	20
Upgrade Scribner to Cross Road to reduce vulnerability to flooding.	Flooding, Multi-Hazard	Flooding	Construction	Road Agent	Town, NHDOT (bridge), FEMA Flood Mitigation Assistance or Pre-Disaster Mitigation	High	2-5 years	16
Develop strategy to increase awareness of the need for a Citizen Emergency Response Team and post information on Town's website.	Multi-Hazard	Multi-hazard	Education and Preparedness	EMD/Fire Chief and Police Chief	Town Budget	Low	1-2 years, then ongoing/continuous	21
Revisit the need to open up Class VI roads to improve emergency access.	Multi-Hazard	Multi-hazard	Planning and Preparedness	Planning Board, Board of Selectmen with EMD/Fire Chief, Police Chief, and Road Agent	Town	Low	2-5 years	17
Coordinate with the NH Department of Resources and Economic Development (DRED) and the Division of Parks and Recreation to conduct a GIS-based mapping exercise to identify potential access points and fire needs.	Multi-Hazard, Wildfire	Wildfire	Planning and Preparedness	EMD/Fire Chief and Police Chief	Support from NHDRED and SRPC, funding from Town Budget, potential support from Eagle Scouts	Medium	1-2 years	21

2012 Ongoing and Deferred Mitigation Project	Type of Hazard	Affected Location	Type of Activity	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest= 21)
Maintain transportation infrastructure by identifying and assessing potential areas of concern in order to have a better assessment during emergency and evacuation situations.	Multi-Hazard	Town-wide	Prevention	EMD & Selectmen	Local & Grants	Medium	1-2 years	19
Set aside funds in order to purchase equipment cots, pillows, blankets, etc. for both emergency shelters.	Multi-Hazard	Emergency Shelters	Emergency Preparedness	EMD	Local & Grants	Low	6 months – 1 year	20
Make all documents relating to the Hazard Mitigation Update available at the Town Library and Town Hall.	Multi-Hazard	Library & Town Hall	Education & Awareness	EMD	Staff Support	N/A	Ongoing	21
Develop a list of residents who have an emergency back-up fuel supply (tanks) that would become available to the Town for use of emergency vehicles in an emergency situation. Also, develop a list of residents who own and can operate emergency equipment that would become available to the Town in an emergency situation.	Multi-Hazard	Town-wide	Emergency Preparedness & Prevention	Road Agent, Town Staff, EMD	Local	Medium	2-5 years	20
Continue to provide outreach assistance to elderly and special needs populations by organizing staff and coordinating within Town departments. Look into options such as “Meals on Wheels” for residents staying home.	Multi-Hazard	Town-wide	Education & Awareness	Joint effort with Fire, Police, other Town agencies	Local	Low	Ongoing	21

2012 Ongoing and Deferred Mitigation Project	Type of Hazard	Affected Location	Type of Activity	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest= 21)
Brainstorm and implement new ideas to address the Fire/EMS safety access challenges to the residents that live in the Bow Lake Estates. Address winter access roads and reach out to local camps to help maintain those roads.	Multi-Hazard	Bow Lake Estates & Town-wide	Emergency Preparedness	Joint effort with Town agencies	Local & Grants	High	2-5 years	18
Locate all the underground storage tanks (both oil/gas) in the Town.	Multi-Hazard	Town-wide	Prevention	Town Staff & SRPC	Local	Low	1-2 years	19

Chapter 7: Monitoring, Evaluation, Updating the Plan

Introduction

A good mitigation plan must allow for updates where and when necessary, particularly since communities may suffer budget cuts or experience personnel turnover during both the planning and implementation states. A good plan will incorporate periodic monitoring and evaluation mechanisms to allow for review of successes and failures or even just simple updates.

Multi-Hazard Plan Monitoring, Evaluation, and Updates

To track programs and update the mitigation strategies identified through this process, the Town will review the Plan annually and after a hazard event. Additionally, the Plan will undergo a formal review and update at least every five years and obtain FEMA approval for this update or any other major changes done in the Plan at any time. The Emergency Management Director is responsible for initiating the review and will consult with members of the Multi-Hazard Mitigation Planning Committee identified in this plan. The public will be encouraged to participate in any updates and will be given the opportunity to be engaged and provide feedback through such means as periodic presentations on the plan at town functions, annual questionnaires or surveys, and posting on social media/interactive websites. Public announcements will be made through advertisements in local papers, postings on the Town website, and posters disseminated throughout the Town. A formal public meeting will be held before reviews and updates are official.

Changes will 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 or funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of the plan to determine feasibility of future implementation. In keeping with the process of adopting this Multi-Hazard Mitigation Plan, a public meeting to receive public comment on plan maintenance and updating will be held during the annual review period and before the final product is adopted by the Board of Selectmen. Chapter 9 contains a representation of a draft resolution for Strafford to use once a conditional approval is received from FEMA.

Integration with Other Plans

The 2004 and 2012 Multi-Hazard Mitigation Plan was used during periodic updates to the Strafford Master Plan. Input on impacts to roads and other critical infrastructure from hazards was included in relevant master plan sections. Both plans were also used during capital improvements planning updates and prioritization of municipal culverts and stream crossings for repair and replacement schedules. Information from the Town's Zoning Ordinance was utilized in the development of this Plan.

This Plan will only enhance mitigation if integrated with all other town plans and activities. Strafford will take the necessary steps to incorporate the mitigation strategies and other information contained in this plan with other town activities, plans and mechanisms, such as comprehensive land use planning, capital improvements planning, site plan regulations, and building codes to guide and control development in the Town of Strafford, when appropriate. The local government will refer to this Plan and the strategies identified when updating the Town's Master Plan, Capital Improvements Program, Zoning Ordinances and Regulations, and Emergency Operations Plan. The Board of Selectmen and the Multi-Hazard Mitigation Planning Committee will work with Town officials to incorporate elements of this Plan into other planning mechanisms, when

appropriate. The Emergency Management Director along with other members of the Multi-Hazard Mitigation Planning Committee will work with the Planning Board to suggest including the updated Hazard Mitigation Plan as a chapter in the Town's Master Plan. In addition, the Town will review and make note of instances when this has been done and include it as part of their annual review of the Plan.

Chapter 8: Plan Adoption

Conditional Approval Letter from HSEM

Good afternoon!

The Department of Safety, Division of Homeland Security & Emergency Management (HSEM) has completed its review of the Strafford, NH Hazard Mitigation Plan and found it approvable pending adoption. Congratulations on a job well done!

With this approval, the jurisdiction meets the local mitigation planning requirements under 44 CFR 201 pending HSEM's receipt of electronic copies of the adoption documentation and the final plan.

Acceptable electronic formats include Word or PDF files and must be submitted to us via email at HazardMitigationPlanning@dos.nh.gov<<mailto:hazardmitigationplanning@dos.nh.gov>>. Upon HSEM's receipt of these documents, notification of formal approval will be issued, along with the final Checklist and Assessment.

The approved plan will be submitted to FEMA on the same day the community receives the formal approval notification from HSEM. FEMA will then issue a Letter of Formal Approval to HSEM for dissemination that will confirm the jurisdiction's eligibility to apply for mitigation grants administered by FEMA and identify related issues affecting eligibility, if any. If the plan is not adopted within one calendar year of HSEM's Approval Pending Adoption, the jurisdiction must update the entire plan and resubmit it for HSEM review. If you have questions or wish to discuss this determination further, please contact me at Whitney.Welch@dos.nh.gov<<mailto:Whitney.Welch@dos.nh.gov>> or 603-223-3667.

Thank you for submitting the Strafford, NH Hazard Mitigation Plan and again, congratulations on your successful community planning efforts.

Sincerely,

Whitney

Hazard Mitigation Planning
NH Homeland Security and Emergency Management
33 Hazen Drive
Concord, NH 03301
NEW: 603-223-3667
603-223-3609 (fax)

[Description: ReadyNH]<<http://www.readynh.gov/>>[Description: fb]<<http://www.facebook.com/NH.HSEM>>
[Description: twitter] <https://twitter.com/NH_HSEM> [Description: Description: nh_alerts_icon]
<<http://www.readynh.gov/alerts/index.htm>>

Signed Certificate of Adoption

CERTIFICATE OF ADOPTION

Town of Strafford, New Hampshire
Board of Selectmen

A Resolution Adopting the Strafford, NH Multi-Hazard Mitigation Plan Update 2017

Plan Dated: March 10, 2017

Conditionally Approved: March 13, 2017

WHEREAS, the Town of Strafford authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and received funding from the NH Office of Homeland Security and Emergency Management under a Flood Mitigation Assistance Project Grant and assistance from Strafford Regional Planning Commission in the preparation of the Strafford, NH Multi-Hazard Mitigation Plan Update 2017; and

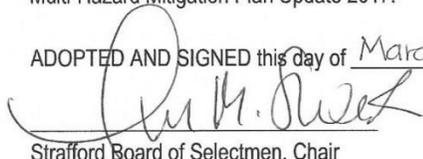
WHEREAS, several public planning meetings were held between November 30th, 2016 and February 8th, 2017 regarding the development and review of the Strafford, NH Multi-Hazard Mitigation Plan Update 2017; and

WHEREAS, the Strafford, NH Multi-Hazard Mitigation Plan Update 2017 contains several potential future projects to mitigate hazard damage in the Town of Strafford; and

WHEREAS, a duly-noticed public meeting was held by the Strafford Board of Selectmen on March 28, 2017 to formally approve and adopt the Strafford, NH Multi-Hazard Mitigation Plan Update 2017.

NOW, THEREFORE BE IT RESOLVED that the Strafford Board of Selectmen adopts the Strafford, NH Multi-Hazard Mitigation Plan Update 2017.

ADOPTED AND SIGNED this day of March 28, 2017



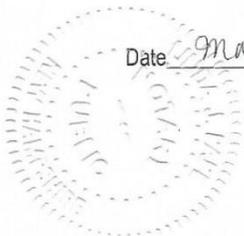
Strafford Board of Selectmen, Chair



Town Seal or Notary

LINDA J. PAPE
NOTARY PUBLIC
State of New Hampshire
My Commission Expires
October 21, 2020

Date March 28, 2017



Final Approval Letter from FEMA



U.S. Department of Homeland Security
FEMA Region I
99 High Street, Sixth Floor
Boston, MA 02110-2132

FEMA

APR 26 2017

Heather Dunkerley
Acting State Hazard Mitigation Officer
Homeland Security & Emergency Management
33 Hazen Drive
Concord, NH 03303

Dear Ms. Dunkerley:

We would like to congratulate the Town of Strafford and the State of New Hampshire for their dedication and commitment to mitigation planning. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I Mitigation Planning Team has completed its review of the Multi-Hazard Mitigation Plan Update 2017, Town of Strafford, NH and determined it meets the requirements of 44 C.F.R. Pt. 201.

With this plan approval, the Town of Strafford is eligible to apply to New Hampshire Homeland Security and Emergency Management for mitigation grants administered by FEMA. Requests for mitigation funding will be evaluated individually according to the specific eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in your community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Complete information regarding the CRS can be found at <http://www.fema.gov/national-flood-insurance-program-community-rating-system>, or through your local floodplain administrator.

The Multi-Hazard Mitigation Plan Update 2017, Town of Strafford, NH must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of April 14, 2017** in order to maintain eligibility for mitigation grant funding. We encourage the Town to continually update the plan's assessment of vulnerability, adhere to its maintenance schedule, and implement, 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 Melissa Surette at (617) 956-7559.

Sincerely,

Paul F. Ford
Acting Regional Administrator

PFF: ms

cc: Fallon Reed, Chief of Planning, New Hampshire
Whitney Welch, Hazard Mitigation Planner, New Hampshire
Jennifer Gilbert, New Hampshire State NFIP Coordinator

Enclosure

Appendices

Appendix A: Bibliography

Appendix B: Planning Committee 2017 Meeting Agendas, Sign-In Sheets, and Minutes

Appendix C: Summary of Possible Multi-Hazard Mitigation Strategies

Appendix D: Technical and Financial Assistance for Multi-Hazard Mitigation

Hazard Mitigation Grant Program (HMGP)

Pre-Disaster Mitigation (PDM)

Flood Mitigation Assistance (FMA)

Appendix E: Zoning Ordinance Section 4.4 Floodplain Ordinance

Appendix F: STAPLEE Exercise from Strafford's 2012 Multi-Hazard Mitigation Plan

Appendix G: Large Map Set

Printed copies of 36"x36" maps provided to Town

Appendix A: Bibliography

Documents

- Local Multi-Hazard Mitigation Planning Guide, FEMA, July 1, 2008
- Local Mitigation Plan Review Guide, FEMA, October 1, 2011
- Multi-Hazard Mitigation Plans
 - Town of Albany, 2010
 - Town of Goffstown, 2009
 - Town of New Durham, 2010
 - Town of Barrington, 2016
- Natural Hazard Mitigation Plan, 2004, State Hazard Mitigation Goals
http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/guide/APPENDIX_D.pdf
- Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2 and Section 322a
<http://www.fema.gov/library/viewRecord.do?id=1935>
- Economic & Labor Market Information Bureau, NH Employment Security, 2015; Census 2010 and Revenue Information
- NCDC [National Climatic Data Center, National Oceanic and Atmospheric Administration]. 2017. Storm Events

Appendix B: Planning Committee 2017 Meeting Agendas, Sign-In Sheets, and Minutes

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #1

December 6, 2016
9:00AM – 11:00AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Agenda

1. Introductions
2. Review update process
 - a. Responsibilities of committee
 - b. In-kind match documentation
 - c. Steps towards adoption
3. Committee input on 2012 plan
4. Review and update past mitigation programs, policies, and strategies
5. Review past development trends
6. Adjourn

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #1

December 6, 2016

9:00AM - ~~11:00AM~~ 11:15AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Sign In

Name	Position/Affiliation	Email Address	In-kind prior to meeting	Hourly Rate*
Lynn Sweet	Selectman	lynnsweet@metrocast.net	30 min	
Scott Whitehouse	FD / EMD	nitechitch@gmail.com	60 min	
Don J. Clifford	Planning Board	cliffyd@aol.com	30 min	
Irv Johnson	citizen	oliver@metrocast.net	30 min	
Bill Booth	Building Inspector	strafford.inspector@gmail.com	30 min	

*Volunteer rate = \$23.56

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #1

December 6, 2016
9:00AM – 11:15AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Meeting Minutes

Participants: Lynn Sweet, Selectmen; Scott Whitehouse, FD/EMD; Don J. Clifford, Planning Board; Irv Johnson, Citizen; Bill Booth, Building Inspector; Liz Durfee, SRPC

After introductions, Senior Regional Planner Liz Durfee provided the committee with an overview of the purpose of the plan and the update process. The Multi-Hazard Mitigation Plan is a resource for the community and a requirement for eligibility for federal pre-disaster mitigation funds. Strafford's plan was approved in May of 2012 and the plan must be updated every five years.

Planner Durfee discussed the responsibilities of the committee, including participation at approximately five meetings, review of meeting materials and minutes, and providing local knowledge, information, and expertise. Planner Durfee reviewed in-kind match documentation to track the committee's local match. The committee briefly discussed meeting schedules. Planner Durfee will contact the committee by email (and phone for individuals who do not use email) to schedule the next meeting. The committee determined that they would meet roughly every two-three weeks in order to maintain momentum and avoid a lapse plan approval. Planner Durfee discussed the fact that all meetings are public meetings and shared information about how the meeting was advertised. Residents, businesses, and other stakeholders or interested parties, including those from other communities, are welcome to attend the meetings. Planner Durfee will send out meeting minutes and provide updates about the local match accumulation.

The committee reviewed the process of updating the plan. Planner Durfee noted that Strafford Regional Planning Commission (SRPC) is working to make the process of updating the plans more efficient, effective, and engaging for participants. While efforts will be focused on compiling the information to meet FEMA's criteria for the plan, additional, non-required information that is useful to the community will also be included in the plan. Maps of critical facilities, for example, will be updated and included. The committee will

review past hazard mitigation programs and policies, discuss and rank hazards, identify vulnerable facilities, resources, and infrastructure, and develop new mitigation strategies to reduce vulnerability and risk. SRPC will collaborate with the committee to update the plan. Once a draft has been completed, the plan will be shared with NH Homeland Security and Emergency Management (HSEM), which will review and comment on the plan. HSEM will pass the draft plan to FEMA for review. After FEMA conditionally approves the plan, the Board of Selectmen will consider the plan for adoption. A signed certificate will be included in the plan and resubmitted to FEMA for final approval. The committee's goal is to complete the draft plan by the end of February.

The committee briefly discussed how the 2012 Hazard Mitigation Plan was used. The 2012 plan is available on the Town's website. The committee discussed that tables and short factsheets and similar materials that are more user friendly may be a useful supplement to the plan.

Planner Durfee then led the committee in a review of the Town's existing and past mitigation strategies and programs. In its past plans, Strafford identified a number of programs, policies, and regulations that are pertinent to hazard mitigation, including land use regulations. The committee reviewed 23 existing mitigation strategies. The committee rated the effectiveness of each strategy, provided an update of the status and any potential issues with the strategy, and provided a significant amount of information that will be incorporated into the table of existing strategies and other areas of the plan. A summary of this information is included below:

- Burn permits:
Warden determines whether permits can be issued. Fire department makes it easy to get a permit, but does rely on the honor system with regard to obtaining a permit. The program works very well.
- Fire Pit Inspections:
170 – 230 inspections are conducted annually. There are restrictions in place for where you can have a pit. Category I permits are issued for campfires and small fires <2ft in diameter; Category II permits are for fires <4ft in diameter. Category III permits are issued for non-permanent brushfires. All permits are logged and tracked on a computer. Program relies on honor system, but works very well.
- Fire Tower:
Effectiveness was ranked as poor. Funding is a major issue. Funding is based on fire danger weather. Strafford has really heavy fire loads and fire is a risk in all weather. The utilities need to be running consistently. The access road needs work to allow vehicle access. The area is used more for recreation; recreational use increased after improvements were made to the parking area (including lighting). Town needs people to commit to learning the system.
- Mutual Aid:
Excellent – includes fire/ems. Limits confusion between agencies.
- "Bad weather" 24-hour manning of fire station:

- Good. The Town has to request access to use the National Guard generator at the Training Center. The National Guard Training Center has no fire suppression/fire station.
- Winter Storm Plowing:
Good. Town has a snow barn. Potential other Town owned property may be suitable for snow.
REVIEW WITH ROAD AGENT.
 - Winter Storm Parking Ban:
The committee was not aware of a winter storm parking ban in Strafford. Typically the road agent will call the Police Department if there are any issues with plowing. These instances are rare. REVIEW WITH ROAD AGENT.
 - Agreement with Red Cross:
Poor. Have had an agreement in the past but haven't for last 10 years. Town has not heard back about an MOU. Town doesn't depend on Red Cross. Other organizations including Salvation Army have been helpful.
 - Emergency Management Plan
Poor. The EMP/EOP needs to be updated. The Town has started to work on the plan and anticipates completion in 2017.
 - Strafford School District: Emergency Procedures, Quick Reference Guide:
Excellent. The School is currently working on an update of the plan.
 - Wetlands Conservation Overlay District:
Excellent. Buffers and setbacks are more stringent than the state. Conservation Commission reviews applications. Planning Board/Code Enforcement Officer administer.
 - Water Protection Overlay District
Excellent. No changes required.
 - Regulations for Mobile Homes:
Excellent. Description to be modified to clarify that changes to the regulations require Town approval.
 - Growth Management Ordinance:
Section 1.15 of the Zoning Book is a Growth Management Ordinance. The Committee was not certain that the Town had and/or enforced this ordinance, and this item should be reviewed.
 - Special Flood Hazard Areas:
Excellent. No changes required.
 - Character of Land for Subdivision:
Excellent. No changes required.
 - Character of Land for Subdivision and Non-Residential Site Plan
Excellent.. No changes required.
 - Subdivision Street Layout and Design Regulations:
Excellent. The Chief determines if a cistern is required/the best option..
 - Building Standards

- Excellent. Building Inspector and Fire Chief responsible for enforcement
- Floodplain Development Regulations
 - To be completed when Committee reviews floodplain regulations and compliance
- Stormwater Management Regulations:
 - Excellent.
- Street Drainage
 - REVIEW WITH ROAD AGENT
- Fire or other ruins cannot be left on property:
 - Good. Enforcement is challenging. Need to sharpen this regulation. Code Enforcement Officer and Fire Chief responsible for enforcement.

During the process of reviewing these strategies, the committee identified several concerns and potential mitigation strategies. These strategies will be further discussed in subsequent Committee meetings:

- Fire Chief would like a slope limit for driveways
- Coordination and communication with National Guard.
 - Fire system (portable, foam) for National Guard.
 - The Training Center is to become a Regional Training Center.
 - More communication between Selectmen and National Guard Training Center is needed.
 - Concern with danger of helicopter crash
 - Fire arms over at the Center
- Fire Chief would like staff to attend training, including a training at the National Guard Training Center, and needs more funds for training
- Seasonal homes on lakes are vulnerable due to steep slopes
- Fire roads are private driveways and access is bad
- Town doesn't have standards for private roads
- Some residents of Whig Hill want it to be improved, others are concerned it would become a thoroughfare. Proposed Town Warrant to open Class VI road. Town would maintain for emergency access and road would be gated.
- Town closed Class VI roads that washed out. One priority is Scribner to Cross Road. The 100 year storm and Mother's Day Floods (2006/2007) wiped out the road bed at Cross Road.

The committee will bring meeting #2 with a review and update of mitigation strategies that were included in the 2012 plan.

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #2

December 20, 2016
9:00AM – 11:00AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Agenda

1. Introductions
2. Review minutes from Meeting#1
3. Review and update past mitigation strategies
4. Discuss past development trends and review community profile
5. Review Critical Facilities table and map
6. Adjourn

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #2

December 20, 2016
9:00AM – 11:00AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Sign In

Name	Position/Affiliation	Email Address	Time Spend Preparing for Meeting
Bill Booth	Building Inspector	strafford.inspector@gmail.com	
Jocann Brown	Conservation Committee		
IRVING JOHNSON	Conservation Committee	olive@nhcourts.net	
Don J. Clifford	Planning Board	Cliffyd@aol.com	30 minutes
Scott Whitehouse	Fire Chief EMO	nitchurch@gmail.com	

*Volunteer rate = \$23.56

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #2

December 20, 2016
9:00AM – 11:00AM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Meeting Minutes

Participants: Scott Whitehouse, FD/EMD; Don J. Clifford, Planning Board; Irv Johnson, Citizen; Bill Booth, Building Inspector; Joann Brown, Conservation Commission; Liz Durfee, SRPC

Senior Regional Planner Durfee reviewed the minutes from Meeting #1. The committee briefly discussed the minutes and made minor corrections, including clarifying the discussion about Whig Hill and gated access, and the closure of Class VI roads that had washed out.

The committee then completed a review and update of past mitigation strategies. A summary of this discussion is included below and will be incorporated into the existing strategies table in the Plan:

- National Guard Training Center has on-site phone available for other emergency personnel. Sargent First Class Haggett is currently acting as the contact at the Training Center.
- Whig Hill opening: Deferred action. Would cut in half emergency response time. Residents concerned with traffic increases. SRPC will look for traffic counts. Town Planner may have information about population living in the neighborhood
- Kooauke Island: Town is no longer pursuing strategy. Bridge has been rebuilt. Not economically feasible to create another way off the island.
- Back-up generator in Strafford School: Ongoing, high priority strategy to be completed by 2018. Town needs a performance grant and to do an environmental study.
- Back-up generator at Fire Station: Complete. Town has 3 permanent generators and an additional portable generator.
- Emergency fuel station has already been constructed on Roller Coaster Road.
- Police Department Website has phone numbers, Hazard Mitigation Plan link on it. Additional information needed from Police Department.

- Pamphlet series with emergency information: Town needs more NFIP brochures. Produce educational pamphlets.
- Evacuation plans: Strategy needs to be addressed. Not complete.
- List of local people to provide assistance during disaster events: List of emergency personnel and list of doctors and medical staff have been completed. List of citizens with equipment has not been completed. Strategy ongoing. Chief has requested a Citizen Emergency Response Team at Town Meeting. Lack of volunteers. Town needs a new strategy to increase awareness of this need and recruit more volunteers. Info could also be posted on the Town's website.
- Town has documents, including the HazMit plan, available at Town Hall and library. Ongoing.
- Strategy to encourage residents to get to know neighbors and check in in emergency situations is ongoing.
- Fix/replace dry hydrants: Completed and ongoing. 3 hydrants have been replaced. Town has had warrant article for dry hydrant repair for \$15k/yr. Fire ponds fill with sediment over time.

2012 Strategies:

- Maintain transportation infrastructure and assess potential areas of concern for evaluation planning and implementation: State roads were repaved in 2016. Town maintains roads very well. Road agent has more money through summer funding so that the roads can be repaired. Town needs to address areas including: Little Niagara at the top of Cross, Cross Road and Scribner, and Whig Hill.
- A generator has been purchased and is in the trailer.
- Develop list of residents who have an emergency back-up fuel supply: To be Completed.
- Develop list of residents who own and can operate equipment in an emergency situation: Committee is able to identify individuals but no list has been compiled.
- Locate all underground storage tanks: Ongoing. Work with SRPC and NHDES to locate tanks. Resident on Water Street has a tank. Isinglass Country Store has a tank.
- Town will continue to make documents related to the HazMit Plan Update available at the Town Library and Town hall.
- Town has Ready Rides and Meals on Wheels. Fire Departments gives directions and assists with implementing these programs. To be continued.
- Brainstorm and implement new ideas to address the Fire/EMS safety access challenges to the residents that live in the Bow Lake Estates: Financially not feasible to create alternative access off Kooauke Island.
- Address winter access roads and reach out to local camps to help maintain roads: Challenging because not all people are in Strafford in winter.

Planner Durfee led the committee in a review of the Community Profile Chapter. The Committee will continue the discussion of development trends at Meeting #3. The Committee will also review the Critical Facilities table and map at Meeting 3.

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #3

January 11, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Agenda

1. Introductions
2. Review minutes from Meeting#2 (5 mins)
3. Discuss past development trends and review community profile (15 mins)
4. Review Critical Facilities table and map (15 mins)
5. Review Declared Disasters and Emergency Declarations (pg 28-30) (15 mins)
6. Begin Review of Hazards (60 mins)
 - a. Discuss Hazard
 - b. Complete Vulnerability Assessment
 - c. Brainstorm Mitigation Strategies
7. Adjourn

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #3

January 11, 2017

3:30-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Sign In

Name	Position/Affiliation	Email Address	Time Spent Preparing for Meeting
Jo Ann Breen	Conservation Commission		2 hr
Greg Messenger	Road Agent	gmessenger@netcast.net	
Dow Clifford	Planning Board	cliffyd@aol.com	1 hr
Scott Whitehouse	FD - EMD	nitchitch@gmail.com	1 Hr.
Wynn Sweet	Selectman	wynnsweet@tchard.com	1 Hr.
IRVING Johnson	Conservation Comm.	oliver@networld.net	1 Hr.
Michael Richard	Chief of Police	mrichard@StraffordPolice.org	1 hr
Bill Booth	Building Inspector	building.inspector@straffordnh.org	1/2 hr
Liz Evans	Planning/Zoning	eevans.strafford.nh@gmail.com	1

*Volunteer rate = \$23.56

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #3

January 11, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Meeting Minutes

Participants: Scott Whitehouse, FD/EMD; Don J. Clifford, Planning Board; Irv Johnson, Citizen; Bill Booth, Building Inspector; Joann Brown, Conservation Commission; Lynn Sweet, Selectman; Greg Messenger, Road Agent; Michael Richard, Chief of Police; Liz Evans, Planning/Zoning; Liz Durfee, SRPC

Planner Durfee reviewed the meeting minutes from Meeting #2 and provided new Committee Members with a brief overview of the Hazard Mitigation Plan and process.

The Committee then reviewed and discussed the past development trends and community profile chapter. There has been very little change in development and development trends over the last five years in Strafford. The Committee found that much of the information describing future development is still accurate. Two areas have experienced some growth include the campground, which has more facilities now, and Crown Point Road.

Planner Durfee provided the committee with two small, generalized land use maps depicting land use in 2010 and 2015. The Committee noted that a large tract of land had been reclassified as 'non-vegetated' in the 2015 map; however, the land use in this area of Town had not changed in the last five years. Planner Durfee reviewed the land use mapping process. Planner Durfee will review the land use data with mapping staff at SRPC and bring a large, revised map to the next meeting that breaks down the land use data to more classifications. Chief Richards indicated that it may be helpful to bring a projector to the next meeting. The Committee also discussed the commercial land use. There was some concern that home businesses were classified as commercial land use, and apprehension that residents may interpret this classification as meaning that the area was zoned for commercial use.

The Committee reviewed and commented on the map of Critical Facilities and Key Resources (CF/KR) and the associated table of assets. Several edits were made to the map to identify additional areas that had flooded in the

past. The committee identified a bridge out at Weber Road. The path of a small tornado was also added to the map. Planner Durfee will revise the map and incorporate this information in the Plan.

The Committee provided feedback on the table of CR/KR. The following corrections were made:

- Address of Center Fire Station should be 1187 Parker Mountain Road in Strafford (603-664-2915)
- Omit Bow Haven Campground
- Huckins and Stiles Centennial Farms should not be classified as *Historical Society*
- Omit "YMCA" from building/structure time for the Boy Scout Camp
- Crown Point Campground is a KOA campground
- Omit the Ballfields on Parker Mountain Road
- Add dry hydrant at 444 1st Crown Point Road
- Add dry hydrant at Crown Point Road at Berry River
- Add dry hydrant at Huckins Road at Huckins Brook
- Add dry hydrant at 1st Crown Point Road at Peasley River (aka Big River)
- Add river access at Strafford Road at Mohawk River
- Add river access at Roller Coaster Road at Isinglass
- Add river access at Twombly Road at Mohawk River
- School is a backup shelter

The Committee informed Planner Durfee that the school can be a backup shelter. About 70% of the town has generators, so in a power outage residents are likely to shelter in place. The school has an evaluation plan to move up the street to the Guard. There are a number of state highways that traverse the town that residents would be likely to use to evacuate. There is no locally recognized evaluation route, and the Committee commented that the direction residents would evacuate would vary depending on the hazard. During the tornado, for instance, people were locked in due to road closures.

Planner Durfee asked the Committee about problem areas for fire/wildfire. The town is heavily forested so there is risk of hazard. Areas where slash remained from timber cuts and tornado damage are at greater risk to wildfire.

The Committee discussed potential roads to re-open:

- Scribner Road to Cross Road – would increase access for emergency personnel
- Webber
- Huckins and Old Ridge
- Whig Hill
- Reservoir
- Bar Door Gap

Planner Durfee reviewed the following pending items from previous meetings with the Road Agent:

- The Road Agent can use shed for snow storage, but snow storage has not typically been an issue and is not a priority at this time.
- There is a parking ban in town. The Road Agent calls the Police Department if necessary. There have been no major issues.
- New roads are built to town standards with adequate street drainage.

The following items were tabled to Meeting #4:

- Review Declared Disasters and Emergency Declarations
- Begin Review of Hazards
 - a. Discuss Hazard
 - b. Complete Vulnerability Assessment
 - c. Brainstorm Mitigation Strategies

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #4

February 1, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Agenda

1. Introductions
2. Review minutes from Meeting#3 (5 mins)
3. Brief review of revised land use and critical facilities maps (10 mins)
4. Review new Declared Disasters and Emergency Declarations (15 mins)
5. Discuss compliance with National Flood Insurance Program (NFIP)(15 mins)
6. Review of Hazards (75 mins)
 - a. Discuss Hazard
 - b. Complete Vulnerability Assessment
 - c. Brainstorm Mitigation Strategies
7. Adjourn

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #4

February 1, 2017
3:30-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Sign In

Name	Position/Affiliation	Email Address	Time Spend Preparing for Meeting
IRVING JOHNSON	Conservation comm.	olc.vpr@metwest.net	
Jo Ann Brun	Conservation comm. Former Select		1 hr.
Greg Messer	Road Agent		
SCOTT Whitehouse	Fire Chief EMD	nitchitch@gmail.com	8 hrs
Michael Richard	Police Chief	mrichard@StraffordPolice.org	1 hrs
Liz Evans	Planning; Zoning	eevans.strafford.nh@gmail.com	1

*Volunteer rate = \$23.56

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #4

February 1, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Meeting Minutes

Participants: Scott Whitehouse, FD/EMD; Irv Johnson, Conservation Commission; Joann Brown, Conservation Commission; Greg Messenger, Road Agent; Michael Richard, Chief of Police; Liz Evans, Planning/Zoning; Liz Durfee, SRPC

The Planning Committee briefly reviewed the minutes from Meeting #3. The meeting then continued with a review of the revised land use and critical facilities maps. The Committee provided input on the location of the Town Offices, outdoor recreational uses, dry hydrants, and past flooded areas. The maps will be revised and included in the plan.

Senior Regional Planner Liz Durfee inquired about the last time the Town had updated its floodplain ordinance and discussed NFIP compliance. FEMA flyers were provided to the Town for outreach purposes. The Committee discussed updating the floodplain ordinance when revised FEMA maps are available in a few years.

The Committee decided to discuss Declared Disasters and Emergency Declarations that had occurred during the last 5 years while reviewing the hazards. After describing the vulnerability ranking table, Planner Durfee led the Committee in a review of each hazard. The Committee discussed what the hazard was, the extent of the hazard, past impacts, and potential future impacts on the community. Then the Committee completed the vulnerability assessment for the hazard. Finally, mitigation strategies for the hazard were identified. This process was repeated for each hazard.

Preliminary mitigation strategies were identified based on the mitigation strategy gaps and needs identified in previous meetings and the vulnerability ranking. These strategies were incorporated into Table 6.3 of the Plan. Committee will refine these strategies and complete the implementation table in the next meeting.

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #5

February 22, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Agenda

1. Introductions
2. Review minutes from Meeting #4
3. Review Draft Mitigation Strategies and Prepare Implementation Plan
 - a. Table 6.3
 - b. Table 6.4
 - c. Discuss the Plan wrap-up, adoption, and approval process
4. Adjourn

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #5

February 22, 2017
3:30-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Sign In

Name	Position/Affiliation	Email Address	Time Spent Preparing for Meeting
Lynn Sweet	Selecmen.	lynn.sweet@nh.gov	1 hr
Jo Ann Brown	conservation comm		1 hr
Irving Johnson	conservation comm	oliver@mtelocast.net	1/2 hr
Scott Whitcomb	Fire Chief EMD	nitchitch@gmail.com	10
Michael Richard	Police Chief	mrichard@straffordpolice.org	1/2
Doug Mearns	Road Agent		
Liz Evans	Planning + Zoning	eevans.strafford.nh@gmail.com	1 hr

*Volunteer rate = \$23.56

Town of Strafford, New Hampshire

Hazard Mitigation Committee Meeting #5

February 22, 2017
3:30PM-5:30PM

Strafford Town Hall
12 Mountain Drive
Strafford, NH 03884

Minutes

Participants: Scott Whitehouse, FD/EMD; Irv Johnson, Conservation Commission; Joann Brown, Conservation Commission; Greg Messenger, Road Agent; Michael Richard, Chief of Police; Liz Evans, Planning/Zoning; Lynn Sweet, Board of Selectmen; Liz Durfee, SRPC

The Planning Committee briefly reviewed the minutes from the fourth meeting.

The Planning Committee continued with a review of the mitigation strategies that the group has drafted in Meeting 4 and throughout the update process. Several strategies in Table 6.3 were modified. The updated strategies will be inserted into Table 6.3 and 6.4 of the Plan. During the process of refining mitigation strategies, the Planning Committee completed the STAPLEE feasibility and prioritization exercise. The Committee determined that there would not likely be significant barriers to overcome when implementing most of the strategies. When the feasibility was ranked as low or moderate under any of the STAPLEE categories, the Planning Committee provided a short explanation of what the challenge may be.

After completing the STAPLEE, the Planning Committee moved on to the Implementation Table. For each strategy, the Planning Committee reviewed the extent of the strategy; who was responsible for implementation; funding, resources, or support for implementation; a timeline for implementation; and the estimated cost: high, medium, or low.

Planner Durfee concluded the meeting by reviewing the final edit, HSEM and FEMA review, approval, and adoption process.

Appendix C: Summary of Possible Multi-Hazard Mitigation Strategies

I. RIVERINE MITIGATION

A. Prevention

Prevention measures are intended to keep the problem from occurring in the first place, and/or keep it from getting worse. Future development should not increase flood damage. Building, zoning, planning, and/or code enforcement personnel usually administer preventative measures.

1. **Planning and Zoning**²⁷ - Land use plans are put in place to guide future development, recommending where - and where not - development should occur and where it should not. Sensitive and vulnerable lands can be designated for uses that would not be incompatible with occasional flood events - such as parks or wildlife refuges. A Capital Improvements Program (CIP) can recommend the setting aside of funds for public acquisition of these designated lands. The zoning ordinance can regulate development in these sensitive areas by limiting or preventing some or all development - for example, by designating floodplain overlay, conservation, or agricultural districts.
2. **Open Space Preservation** - Preserving open space is the best way to prevent flooding and flood damage. Open space preservation should not, however, be limited to the floodplain, since other areas within the watershed may contribute to controlling the runoff that exacerbates flooding. Land Use and Capital Improvement Plans should identify areas to be preserved by acquisition and other means, such as purchasing easements. Aside from outright purchase, open space can also be protected through maintenance agreements with the landowners, or by requiring developers to dedicate land for flood flow, drainage and storage.
3. **Floodplain Development Regulations** - Floodplain development regulations typically do not prohibit development in the special flood hazard area, but they do impose construction standards on what is built there. The intent is to protect roads and structures from flood damage and to prevent the development from aggravating the flood potential. Floodplain development regulations are generally incorporated into subdivision regulations, building codes, and floodplain ordinances.
 - a. **Subdivision Regulations:** These regulations govern how land will be divided into separate lots or sites. They should require that any flood hazard areas be shown on the plat, and that every lot has a buildable area that is above the base flood elevation.
 - b. **Building Codes:** Standards can be incorporated into building codes that address flood proofing for all new and improved or repaired buildings.
 - c. **Floodplain Ordinances:** Communities that participate in the National Flood Insurance Program are required to adopt the minimum floodplain management regulations, as developed by FEMA. The regulations set minimum standards for subdivision regulations and building codes. Communities may adopt more stringent standards than those set forth by FEMA.
4. **Stormwater Management** - Development outside of a floodplain can contribute significantly to flooding by covering impervious surfaces, which increases storm water runoff. Storm water management is usually addressed in subdivision regulations. Developers are typically required to build retention or detention basins to minimize any

²⁷ All zoning should be carefully reviewed on a consistent basis by municipal officials to make sure guidelines are up-to-date and towns are acting in accordance with best management practices.

increase in runoff caused by new or expanded impervious surfaces, or new drainage systems. Generally, there is a prohibition against storm water leaving the site at a rate higher than it did before the development. One technique is to use wet basins as part of the landscaping plan of a development. It might even be possible to site these basins based on a watershed analysis. Since detention only controls the runoff rates and not volumes, other measures must be employed for storm water infiltration - for example, swales, infiltration trenches, vegetative filter strips, and permeable paving blocks.

5. **Drainage System Maintenance** - Ongoing maintenance of channel and detention basins is necessary if these facilities are to function effectively and efficiently over time. A maintenance program should include regulations that prevent dumping in or altering water courses or storage basins; regrading and filling should also be regulated. Any maintenance program should include a public education component, so that the public becomes aware of the reasons for the regulations. Many people do not realize the consequences of filling in a ditch or wetland, or regrading.

B. Property Protection

Property protection measures are used to modify buildings subject to flood damage, rather than to keep floodwaters away. These may be less expensive to implement, as they are often carried out on a cost-sharing basis. In addition, many of these measures do not affect a building's appearance or use, which makes them particularly suitable for historical sites and landmarks.

1. **Relocation** - Moving structures out of the floodplain is the surest and safest way to protect against damage. Relocation is expensive, however, so this approach will probably not be used except in extreme circumstances. Communities that have areas subject to severe storm surges, ice jams, etc. might want to consider establishing a relocation program, incorporating available assistance.
2. **Acquisition** - Acquisition by a governmental entity of land in a floodplain serves two main purposes: 1) it ensures that the problem of structures in the floodplain will be addressed; and 2) it has the potential to convert problem areas into community assets, with accompanying environmental benefits. Acquisition is more cost effective than relocation in those areas that are subject to storm surges, ice jams, or flash flooding. Acquisition, followed by demolition, is the most appropriate strategy for those buildings that are simply too expensive to move, as well as for dilapidated structures that are not worth saving or protecting. Acquisition and subsequent relocation can be expensive, however, there are government grants and loans that can be applied toward such efforts.
3. **Building Elevation** - Elevating a building above the base flood elevation is the best on-site protection strategy. The building could be raised to allow water to run underneath it, or fill could be brought in to elevate the site on which the building sits. This approach is cheaper than relocation, and tends to be less disruptive to a neighborhood. Elevation is required by law for new and substantially improved residences in a floodplain, and is commonly practiced in flood hazard areas nationwide.
4. **Floodproofing** - If a building cannot be relocated or elevated, it may be floodproofed. This approach works well in areas of low flood threat. Floodproofing can be accomplished through barriers to flooding, or by treatment to the structure itself.

- a. **Barriers:** Levees, floodwalls and berms can keep floodwaters from reaching a building. These are useful, however, only in areas subject to shallow flooding.
 - b. **Dry Floodproofing:** This method seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such as doors, windows, etc. are closed either permanently with removable shields or with sandbags.
 - c. **Wet Floodproofing:** This technique is usually considered a last resort measure, since water is intentionally allowed into the building in order to minimize pressure on the structure. Approaches range from moving valuable items to higher floors to rebuilding the floodable area. An advantage over other approaches is that simply by moving household goods out of the range of floodwaters, thousands of dollars can be saved in damages.
5. **Sewer Backup Protection** - Storm water overloads can cause backup into basements through sanitary sewer lines. Houses that have any kind of connection to a sanitary sewer system - whether it is downspouts, footing drain tile, and/or sump pumps, can be flooded during a heavy rain event. To prevent this, there should be no such connections to the system, and all rain and ground water should be directed onto the ground, away from the building. Other protections include:
- a. Floor drain plugs and floor drain standpipe, which keep water from flowing out of the lowest opening in the house.
 - b. Overhead sewer - keeps water in the sewer line during a backup.
 - c. Backup valve - allows sewage to flow out while preventing backups from flowing into the house.
6. **Insurance** - Above and beyond standard homeowner insurance, there is other coverage a homeowner can purchase to protect against flood hazard. Two of the most common are National Flood Insurance and basement backup insurance.
- a. **National Flood Insurance:** When a community participates in the National Flood Insurance Program, any local insurance agent is able to sell separate flood insurance policies under rules and rates set by FEMA. Rates do not change after claims are paid because they are set on a national basis.
 - b. **Basement Backup Insurance:** National Flood Insurance offers an additional deductible for seepage and sewer backup, provided there is a general condition of flooding in the area that was the proximate cause of the basement getting wet. Most exclude damage from surface flooding that would be covered by the NFIP.

C. Natural Resource Protection

Preserving or restoring natural areas or the natural functions of floodplain and watershed areas provide the benefits of eliminating or minimizing losses from floods, as well as improving water quality and wildlife habitats. Parks, recreation, or conservation agencies usually implement such activities. Protection can also be provided through various zoning measures that are specifically designed to protect natural resources.

- 1. **Wetlands Protection** - Wetlands are capable of storing large amounts of floodwaters, slowing and reducing downstream flows, and filtering the water. Any development that is proposed in a wetland is regulated by either federal and/or state agencies. Depending on the location, the project might fall under the jurisdiction of the U.S. Army Corps of Engineers, which in turn, calls upon several other agencies to review the proposal. In New

Hampshire, the N.H. Wetlands Board must approve any project that impacts a wetland. Many communities in New Hampshire also have local wetland ordinances.

Generally, the goal is to protect wetlands by preventing development that would adversely affect them. Mitigation techniques are often employed, which might consist of creating a wetland on another site to replace what would be lost through the development. This is not an ideal practice since it takes many years for a new wetland to achieve the same level of quality as an existing one, if it can at all.

2. **Erosion and Sedimentation Control** - Controlling erosion and sediment runoff during construction and on farmland is important, since eroding soil will typically end up in downstream waterways. Because sediment tends to settle where the water flow is slower, it will gradually fill in channels and lakes, reducing their ability to carry or store floodwaters.
3. **Best Management Practices** - Best Management Practices (BMPs) are measures that reduce non-point source pollutants that enter waterways. Non-point source pollutants are carried by storm water to waterways, and include such things as lawn fertilizers, pesticides, farm chemicals, and oils from street surfaces and industrial sites. BMPs can be incorporated into many aspects of new developments and ongoing land use practices. In New Hampshire, the Department of Environmental Services has developed Best Management Practices for a range of activities, from farming to earth excavations.

D. Emergency Services

Emergency services protect people during and after a flood. Many communities in New Hampshire have emergency management programs in place, administered by an emergency management director (very often the local police or fire chief).

1. **Flood Warning** - On large rivers, the National Weather Service handles early recognition. Communities on smaller rivers must develop their own warning systems. Warnings may be disseminated in a variety of ways, such as sirens, radio, television, mobile public address systems, or door-to-door contact. It seems that multiple or redundant systems are the most effective, giving people more than one opportunity to be warned.
2. **Flood Response** - Flood response refers to actions that are designed to prevent or reduce damage or injury, once a flood threat is recognized. Such actions and the appropriate parties include:
 - a. Activating the emergency operations center (emergency director)
 - b. Sandbagging designated areas (Highway Department)
 - c. Closing streets and bridges (police department)
 - d. Shutting off power to threatened areas (public service)
 - e. Releasing children from school (school district)
 - f. Ordering an evacuation (Board of Selectmen/emergency director)
 - g. Opening evacuation shelters (churches, schools, Red Cross, municipal facilities)

These actions should be part of a flood response plan, which should be developed in coordination with the persons and agencies that share the responsibilities. Drills and exercises should be conducted so that the key participants know what they are supposed to do.

3. **Critical Facilities Protection** - Protecting critical facilities is vital, since expending efforts on these facilities can draw workers and resources away from protecting other parts of town. Critical facilities fall into two categories:
 - a. **Buildings or locations vital to the flood response effort:**
 - i. Emergency operations centers
 - ii. Police and fire stations
 - iii. Highway garages
 - iv. Selected roads and bridges
 - v. Evacuation routes
 - b. **Buildings or locations that, if flooded, would create disasters:**
 - i. Hazardous materials facilities
 - ii. Schools

All such facilities should have their own flood response plan that is coordinated with the community's plan. Schools will typically be required by the state to have emergency response plans in place.

4. **Health and Safety Maintenance** - The flood response plan should identify appropriate measures to prevent danger to health and safety. Such measures include:
 - a. Patrolling evacuated areas to prevent looting
 - b. Vaccinating residents for tetanus
 - c. Clearing streets
 - d. Cleaning up debris

The Plan should also identify which agencies will be responsible for carrying out the identified measures. A public information program can be helpful to educate residents on the benefits of taking health and safety precautions.

E. Structural Projects

Structural projects are used to prevent floodwaters from reaching properties. These are all man-made structures, and can be grouped into the six types discussed below. The shortcomings of structural approaches are:

- Can be very expensive
- Disturb the land, disrupt natural water flows, & destroy natural habitats.
- Are built to an anticipated flood event, and may be exceeded by a greater-than expected flood
- Can create a false sense of security.

1. **Diversions** - A diversion is simply a new channel that sends floodwater to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the stream spills over the diversion channel or tunnel, which carries the excess water to the receiving lake or river. Diversions are limited by topography; they won't work everywhere. Unless the receiving water body is relatively close to the flood prone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive. Where topography and land use are not favorable, a more expensive tunnel is needed. In either case, care must be taken to ensure that the diversion does not create a flooding problem somewhere else.

2. **Levees/Floodwalls** - Probably the best known structural flood control measure is either a levee (a barrier of earth) or a floodwall made of steel or concrete erected between the watercourse and the land. If space is a consideration, floodwalls are typically used, since levees need more space. Levees and floodwalls should be set back out of the floodway, so that they will not divert floodwater onto other properties.
3. **Reservoirs** - Reservoirs control flooding by holding water behind dams or in storage basins. After a flood peaks, water is released or pumped out slowly at a rate the river downstream can handle. Reservoirs are suitable for protecting existing development, and they may be the only flood control measure that can protect development close to a watercourse. They are most efficient in deeper valleys or on smaller rivers where there is less water to store. Reservoirs might consist of man-made holes dug to hold the approximate amount of floodwaters, or even abandoned quarries. As with other structural projects, reservoirs:
 - a. are expensive
 - b. occupy a lot of land
 - c. require periodic maintenance
 - d. may fail to prevent damage from floods that exceed their design levels
 - e. may eliminate the natural and beneficial functions of the floodplain.
4. **Channel Modifications** - Channel modifications include making a channel wider, deeper, smoother, or straighter. These techniques will result in more water being carried away, but, as with other techniques mentioned, it is important to ensure that the modifications do not create or increase a flooding problem downstream.
5. **Dredging**: Dredging is often cost-prohibitive because the dredged material must be disposed of in another location; the stream will usually fill back in with sediment. Dredging is usually undertaken only on larger rivers, and then only to maintain a navigation channel.
6. **Drainage Modifications**: These include man-made ditches and storm sewers that help drain areas where the surface drainage system is inadequate or where underground drainage ways may be safer or more attractive. These approaches are usually designed to carry the runoff from smaller, more frequent storms.
7. **Storm Sewers** - Mitigation techniques for storm sewers include installing new sewers, enlarging small pipes, street improvements, and preventing back flow. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving body of water can absorb the increased flows without increased flooding. In many developments, streets are used as part of the drainage system, to carry or hold water from larger, less frequent storms. The streets collect runoff and convey it to a receiving sewer, ditch, or stream. Allowing water to stand in the streets and then draining it slowly can be a more effective and less expensive measure than enlarging sewers and ditches.

F. Public Information

Public information activities are intended to advise property owners, potential property owners, and visitors about the particular hazards associated with a property, ways to protect people and property from these hazards, and the natural and beneficial functions of a floodplain.

1. **Map Information** - Flood maps developed by FEMA outline the boundaries of the flood hazard areas. These maps can be used by anyone interested in a particular property to determine if it is flood-prone. These maps are available from FEMA, the NH Homeland Security and Emergency Management (HSEM), the NH Office of Energy and Planning (OEP), or your regional planning commission.
2. **Outreach Projects** - Outreach projects are proactive; they give the public information even if they have not asked for it. Outreach projects are designed to encourage people to seek out more information and take steps to protect themselves and their properties. Examples of outreach activities include:
 - a. Presentations at meetings of neighborhood groups
 - b. Mass mailings or newsletters to all residents
 - c. Notices directed to floodplain residents
 - d. Displays in public buildings, malls, etc.
 - e. Newspaper articles and special sections
 - f. Radio and TV news releases and interview shows
 - g. A local flood proofing video for cable TV programs and to loan to organizations
 - h. A detailed property owner handbook tailored for local conditions. Research has shown that outreach programs work, although awareness is not enough. People need to know what they can do about the hazards, so projects should include information on protection measures. Research also shows that locally designed and run programs are much more effective than national advertising.
3. **Real Estate Disclosure** - Disclosure of information regarding flood-prone properties is important if potential buyers are to be in a position to mitigate damage. Federally regulated lending institutions are required to advise applicants that a property is in the floodplain. However, this requirement needs to be met only five days prior to closing, and by that time, the applicant is typically committed to the purchase. State laws and local real estate practice can help by making this information available to prospective buyers early in the process.
4. **Library** - Your local library can serve as a repository for pertinent information on flooding and flood protection. Some libraries also maintain their own public information campaigns, augmenting the activities of the various governmental agencies involved in flood mitigation.
5. **Technical Assistance** - Certain types of technical assistance are available from the NFIP Coordinator, FEMA, and the Natural Resources Conservation District. Community officials can also set up a service delivery program to provide one-on-one sessions with property owners. An example of technical assistance is the *flood audit*, in which a specialist visits a property. Following the visit, the owner is provided with a written report detailing the past and potential flood depths and recommending alternative protection measures.
6. **Environmental Education** - Education can be a great mitigating tool if people can learn what not to do before damage occurs. The sooner the education begins the better. Environmental education programs for children can be taught in the schools, park and recreation departments, conservation associations, or youth organizations. An activity can be as involved as course curriculum development or as simple as an explanatory sign near a river. Education programs do not have to be limited to children. Adults can benefit from knowledge of flooding and mitigation measures; decision makers, armed with this knowledge, can make a difference in their communities

II. EARTHQUAKES

A. Preventive

1. Planning/zoning to keep critical facilities away from fault lines
2. Planning, zoning and building codes to avoid areas below steep slopes or soils subject to liquefaction
3. Building codes to prohibit loose masonry overhangs, etc.

B. Property Protection

1. Acquire and clear hazard areas
2. Retrofitting to add braces, remove overhangs
3. Apply Mylar to windows and glass surfaces to protect from shattering glass
4. Tie down major appliances, provide flexible utility connections
5. Earthquake insurance riders

C. Emergency Services

1. Earthquake response plans to account for secondary problems, such as fires and hazardous material spills

D. Structural Projects

1. Slope stabilization

III. DAM FAILURE

A. Preventive

1. Dam failure inundation maps
2. Planning/zoning/open space preservation to keep area clear
3. Building codes with flood elevation based on dam failure
4. Dam safety inspections
5. Draining the reservoir when conditions appear unsafe

B. Property Protection

1. Acquisition of buildings in the path of a dam breach flood
2. Flood insurance

C. Emergency Services

1. Dam condition monitoring
2. Warning and evacuation plans based on dam failure

D. Structural Projects

1. Dam improvements, spillway enlargements
2. Remove unsafe dams

IV. WILDFIRES

A. Preventive

1. Zoning districts to reflect fire risk zones
2. Planning and zoning to restrict development in areas near fire protection and water resources
3. Requiring new subdivisions to space buildings, provide firebreaks, on-site water storage, wide roads, multiple accesses
4. Building code standards for roof materials and spark arrestors
5. Maintenance programs to clear dead and dry brush, trees
6. Regulation on open fires

B. Property Protection

1. Retrofitting of roofs and adding spark arrestors
2. Landscaping to keep bushes and trees away from structures
3. Insurance rates based on distance from fire protection

C. Natural Resource Protection

1. Prohibit development in high-risk areas

D. Emergency Services

1. Fire Fighting

V. WINTER STORMS

A. Prevention

1. Building code standards for light frame construction, especially for wind-resistant roofs

B. Property Protection

1. Storm shutters and windows
2. Hurricane straps on roofs and overhangs
3. Seal outside and inside of storm windows and check seals in spring and fall
4. Family and/or company severe weather action plan & drills:
 - a. include a NOAA Weather Radio
 - b. designate a shelter area or location
 - c. keep a disaster supply kit, including stored food and water
 - d. keep snow removal equipment in good repair; have extra shovels, sand, rock, salt and gas
 - e. know how to turn off water, gas, and electricity at home or work

C. Natural Resource Protection

1. Maintenance program for trimming trees and shrubs

D. Emergency Services

1. Early warning systems/NOAA Weather Radio
2. Evacuation plans

Appendix D: Technical and Financial Assistance for All-Hazard Mitigation

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs²⁸:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)

FEMA's HMA grants are provided to eligible Applicants (States/Tribes/Territories) that, in turn, provide sub-grants to local governments and communities. The Applicant selects and prioritizes subapplications developed and submitted to them by subapplicants. These subapplications are submitted to FEMA for consideration of funding. Prospective subapplicants should consult the office designated as their Applicant for further information regarding specific program and application requirements. Contact information for the FEMA Regional Offices and State Hazard Mitigation Officers is available on the FEMA website, www.fema.gov.

HMA Grant Programs

The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to Natural Hazards. Brief descriptions of the HMA grant programs can be found below. For more information on the individual programs, or to see information related to a specific Fiscal Year, please click on one of the program links.

A. Hazard Mitigation Grant Program (HMGP)

HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.

What is the Hazard Mitigation Grant Program?

The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Authorized under Section 404 of the Stafford Act and administered by FEMA, HMGP was created to reduce the loss of life and property due to natural disasters. The program enables mitigation measures to be implemented during the immediate recovery from a disaster.

Who is eligible to apply?

Hazard Mitigation Grant Program funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are:

- State and local governments
- Indian tribes or other tribal organizations

²⁸ Information in Appendix E is taken from the following website and links to specific programs unless otherwise noted; <http://www.fema.gov/government/grant/hma/index.shtm>

- Certain non-profit organizations

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf.

How are potential projects selected and identified?

The State's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects are part of an overall mitigation strategy for the disaster area.

The State prioritizes and selects project applications developed and submitted by local jurisdictions. The State forwards applications consistent with State mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and States and local communities must make difficult decisions as to the most effective use of grant funds.

For more information on the **Hazard Mitigation Grant Program (HMGP)**, go to:

<http://www.fema.gov/government/grant/hmgrp/index.shtm>

B. Pre-Disaster Mitigation (PDM)

PDM provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on Federal funding from actual disaster declarations.

Program Overview

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

C. Flood Mitigation Assistance (FMA)

FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program.

Program Overview

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program.

Types of FMA Grants

Three types of FMA grants are available to States and communities:

- Planning Grants to prepare Flood Mitigation Plans. Only NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project grants
- Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. States are encouraged to prioritize FMA funds for applications that include repetitive loss properties; these include structures with 2 or more losses each with a claim of at least \$1,000 within any ten-year period since 1978.
- Technical Assistance Grants for the State to help administer the FMA program and activities. Up to ten percent (10%) of Project grants may be awarded to States for Technical Assistance Grants

Appendix E: Zoning Ordinance Section 4.4 Floodplain Ordinance

TOWN OF STRAFFORD ORDINANCES AND REGULATIONS

4) Any person who receives a building permit to construct an in-ground swimming pool shall either erect and maintain an adequate enclosure surrounding either the property or the pool area, sufficient to make the pool inaccessible to small children, or they shall maintain an approved safety pool cover. The pool fence must comply with the requirements of this section. (effective 3-10-2015)

4.2 Motion by Albert Leighton that anyone wishing to build a dock or pier be required to obtain a permit from the Selectmen. Seconded and voted in the affirmative (March 9, 1965). Anyone anticipating building or repairing a dock or pier shall also be required to obtain a permit for dredge and fill in wetlands from the New Hampshire Wetlands Board pursuant to NH RSA 483-A: 1. (amended 3-8-1988)

4.3 Motion made by George Foss that the Selectmen be authorized to appoint a Building Inspector to hold office for the term of one year, and by vote fix and regulate his compensation as authorized by Section I, Chapter 156, NH Revised Statutes Annotated, 1955. Motion seconded and vote carried in the affirmative (March 10, 1959)

4.4 Floodplain Development Regulations.

The following regulations adopted pursuant to the authority of NH RSA 674: 16 shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency in its "Flood Insurance Study for the Town of Strafford, N.H." together with the associated Flood Insurance Rate Maps and Flood Boundary and Floodway maps of the Town of Strafford, dated April 2, 1986 (Reference Revised County of Strafford Maps, effective date May 17, 2005), or later revisions, which are declared to be a part of this ordinance. (amended 3-8-2005)

4.4.1 All proposed development in any special flood hazard areas shall require a permit. The term 'development' is defined to mean "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations."

4.4.2 The Building Inspector shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction and substantial improvements shall (i) be designed (or modified) and adequately anchored to prevent flotation collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with materials resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

4.4.3 Where new and replacement water and sewer systems (including on-site systems) are proposed in floodprone areas the applicant shall provide the Building Inspector with assurance that new and replacement sanitary sewage systems will be designed to minimize or eliminate

- b. In unnumbered A zones the Building Inspector shall obtain, review, and reasonably utilize any 100-year flood elevation data available from any federal, state, development proposals submitted to the community (example subdivisions, site approvals, etc.) or other source.
 - c. In Zone AO the 100 year flood elevation is determined by adding the elevation of the highest adjacent grade to the depth number specified on the FIRM or if no depth number is specified on the FIRM, at least two feet. (amended 3-12-2002)
2. The Building Inspector's 100 year flood elevation determination will be used as criteria for requiring in Zones A 1-30, AE, AH, AO and A that:
- a. all new construction and substantial improvements of residential structures have the lowest floor (including basement) elevated to or above the 100 year flood level;
 - b. that all new construction and substantial improvements of non-residential structures have the lowest floor (including basement) elevated to or above the 100 year flood level; or together with attendant utility and sanitary facilities, shall:
 - i. be floodproofed so that below the 100 year flood elevation the structure is watertight with walls substantially impermeable to the passage of water;
 - ii. have structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy; and
 - iii. be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of this section;
 - c. Recreational vehicles placed on sites within Zones A1-30, AH, and AE shall either (i) be on the site for fewer than 180 consecutive days or (ii) be fully licensed and ready for highway use, or (iii) meet all standards of Section 60.3 (b) (1) and (e) (2-7) of the National Flood Insurance Program Regulations and the elevation and anchoring requirements for "manufactured homes" in Paragraph (c) (6) of Section 60.3. (effective 3-8-94)
 - d. All manufactured homes to be placed or substantially improved within special flood hazard areas shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at or above the base flood level; and be securely anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state and local anchoring requirements for resisting wind forces,
 - e. for all new construction and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding are permitted providing the enclosed areas meet the following requirements:

1. the enclosed area is unfinished or flood resistant, usable solely for parking of vehicles, building access or storage;
 2. the area is not a basement;
 3. shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters;
- f. proposed structures to be located on slopes in Special Flood Hazard Areas, Zones AH and AO shall include adequate drainage paths to guide flood waters around and away from the proposed structures.

4.4.8 Definition of Terms:

"Area of shallow flooding" means a designated AO or AH zone on a community's Flood Insurance Rate Map (FIRM) with a one percent or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow,

"Area of special flood hazard" is the land in the flood plain within the community subject to a one percent or greater chance of flooding in any given year. The area may be designated as Zone A on the FHBM. After detailed ratemaking has been completed in preparation for publication of the FIRM, Zone A usually is refined into Zones A, AO, AH, A 1-30, AE or A 99. (amended 3-12-2002)

"Base flood" means the flood having a one percent chance of being equaled or exceeded in any given year.

"Basement" means any area of the building having its floor subgrade (below ground level) on all sides.

"Building"--see structure.

"Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

"FEMA" means the Federal emergency Management Agency.

"Flood" or "Flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters,

infiltration of flood waters into the systems and discharges from the systems into flood waters, and on-site waste disposal systems will be located to avoid impairment to them or contamination from them during periods of flooding.

4.4.4 The Building Inspector shall maintain for public inspection, and furnish upon request, any certification of flood-proofing and the as-built elevation (in relation to mean sea level) of the lowest floor (including basement) of all new or substantially improved structures, and include whether or not such structures contain a basement. If the structure has been floodproofed, the as-built elevation (in relation to mean sea level) to which the structure was floodproofed. This information must be furnished by the applicant.

4.4.5 The Building Inspector shall review proposed developments to assure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act, Amendments of 1972, 33 U.S.C. 1334. It shall be the responsibility of the applicant to certify these assurances to the Building Inspector.

4.4.6 In riverine situations, prior to the alteration or relocation of a watercourse, the applicant for such authorization shall notify the Wetlands Bureau of the New Hampshire Department of Environmental Services and submit copies of such notification to the Building Inspector. Further, the applicant shall be required to submit copies of said notification to those adjacent communities as determined by the Building Inspector.

Within the altered or relocated portion of any watercourse, the applicant shall submit to the Building Inspector, certification provided by a registered professional engineer assuring that the flood carrying capacity of the watercourse has been maintained.

Along watercourses that have a designated Regulatory Floodway, no encroachments, including fill, new construction, substantial improvements, and other development are allowed within the designated Regulatory Floodway that would result in any increase in flood levels within the community during the base flood discharge. In Zone A the Building Inspector shall obtain, review, and reasonably utilize any floodway data available from Federal, State, or other sources as criteria for requiring that development meet the floodway requirements of this section.

Along watercourses that have not had a regulatory floodway designated, no new construction, substantial improvements or other development (including fill) shall be permitted within Zones A 1-30 on the FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point in the community. (amended 3-12-2002)

4.4.7 100 Year Flood Elevation Determination:

1. In special flood hazard areas the Building Inspector shall determine the 100 year flood elevation in the following order of precedence according to the data available:
 - a. In Zones A 1-30, and AH, refer to the elevation provided in the community's Flood Insurance Study and accompanying FIRM or FHBM.

and (2) the unusual and rapid accumulation of runoff of surface water^{4s} from any source.

"Flood Boundary and Floodway Map" (FLOODWAY) is an official map of the community, on which the Federal Emergency Management Agency has delineated the "Regulatory Floodway". This map should not be used to determine the correct flood hazard zone or base flood elevation, the Flood Insurance Rate Map (FIRM) will be used to make determinations of flood hazard zones and base flood elevations.

"Flood elevation study" means an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e. mudflow) and/or flood-related erosion hazards.

"Flood Hazard Boundary Map" (FHBM) means an official map of a community, issued by the Federal Emergency Management Agency, where the boundaries of the flood, mudslide (i.e. mudflow), related erosion areas having special hazards have been designated as Zone A.

"Flood Insurance Rate Map" (FIRM) means an official map incorporated with this ordinance on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to the Town of Strafford.

"Flood Insurance Study"-see "flood elevation study"

"Flood plain" or "flood-prone area" means any land area susceptible to being inundated by water from any source.

"Flood proofing" means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

"Floodway"-see "regulatory floodway"

"Functionally dependent use" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking and port facilities that are necessary for the loading /unloading of cargo or passengers, and ship building/repair facilities but does not include long-term storage or related manufacturing facilities. (effective 3-10-1998)Highest adjacent grade" means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

"Historic Structure" means any structure that is

- a. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

- b. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- c. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior: or
- d. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - 1. By an approved state program as determined by the Secretary of the Interior, or
 - 2. Directly by the Secretary of the Interior in states without approved programs.(effective 3-10-1998)

"Lowest Floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor: Provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

"Mean sea level" means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

"Manufactured home" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For flood plain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.

"Manufactured home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"100 year flood"-see "base flood"

"Recreational Vehicle" means a vehicle which is (a) built on a single chassis; (b) 400 square feet or less when measured at the largest horizontal projection; (c) designed to be self propelled or permanently towable by a light duty truck; and (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use. (effective 3-8-94)

"Regulatory floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without increasing the water surface elevation. These areas are designated as floodways on the Flood Boundary and Floodway Map. (effective 3-10-98)

"Riverine" means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

"Special flood hazard area" means an area having special flood, mudslide (i.e. mudflow) and/or flood-related erosion hazards, and shown on an FHBM or FIRM as Zone A, AO, A 1-30, AE, A99, and AH. (see Area of Special Flood Hazard)

"Structure" means for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home.

"Start of Construction" includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; or does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

"Substantial damage" means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. (effective 3-10-1998)

"Substantial improvement" means any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds fifty percent of the market value of the structure. The market value of the structure should be (1) the appraised value of the structure prior to the start of the initial repair or improvement, or (2) in the case of damage, the value of the structure prior to the damage occurring. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. This term includes structures which have incurred substantial damage regardless of actual repair work performed. The term does not, however, include any project for improvement of a structure required to comply with existing health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions or any alteration of a 'historic structure', provided that the alteration will not preclude the structure's continued designation as a 'historic structure'.

"Water surface elevation" means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas.

4.4.9 Variances and Appeals:

1. Any order, requirement, decision or determination of the Building Inspector made under this ordinance may be appealed to the Zoning Board of Adjustment as set forth in RSA 676: 5.
2. If the applicant, upon appeal, requests a variance as authorized by RSA 674: 33 I (b), the applicant shall have the burden of showing, in addition to the usual variance standards under state law, that the variance will not result in increased flood heights, additional threats to public safety; or extraordinary public expense; that if the requested variance is for activity within a designated regulatory floodway no increase in flood levels during base flood discharge will result; that the variance is the minimum necessary, considering the flood hazard, to afford relief.
3. The Zoning Board of Adjustment shall notify the applicant in writing that (i) the issuance of a variance to construct below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage and (ii) such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variances.
4. The community shall (i) maintain a record of all variance actions, including their justification for their issuance and (ii) report such variances issued in its annual or biennial report submitted to FEMA' s Federal Insurance Administrator. (effective 3-10-1998)

4.5 The Zoning Board of Adjustment shall act as the Building Code Board of Appeals pursuant to NH RSA 673:1 v. (effective 3-8-1994)

4.6 The Selectmen are empowered to adopt and amend, from time to time, a schedule of fees to be charged for building permits, inspections, and certificates of occupancy. To do so, the Selectmen shall first hold a public hearing on the same, with notice to the public by posting and publication at least two weeks prior to the hearing (exclusive of the day of posting/publication and the day of hearing) and then post the new or amended schedule of fees at least two weeks prior to its taking effect. The fees presently charged for such items and services shall continue in effect until amended or superseded in this manner. (effective 3-8-1994)

Appendix F: STAPLEE Exercise from Strafford's 2012 Multi-Hazard Mitigation Plan

2012 Multi-Hazard Mitigation Plan - Table 8.1: Potential Mitigation Strategies & STAPLEE

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
(1) Obtain NFIP brochures from FEMA and have them available at the Town Offices for new developers and current homeowners.	Flood	Town-wide	Education & Awareness	3	3	3	3	3	3	3	21
(2) Purchase and install a generator to power the Strafford School.	Multi-Hazard	Strafford School	Emergency Preparedness	3	3	3	3	3	2	3	20
									Budget Constraints		
(3) Maintain transportation infrastructure by identifying and assessing potential areas of concern in order to have a better assessment during emergency and evacuation situations.	Multi-Hazard	Town-wide	Prevention	3	3	3	2	3	2	3	19
							Change is difficult		Budget Constraints		
(4) Set aside funds in order to purchase equipment cots, pillows, blankets, etc. for both emergency shelters.	Multi-Hazard	Emergency Shelters	Emergency Preparedness	3	3	3	3	3	2	3	20
									Budget Constraints		
(5) Purchase a small generator and equipment for fuel pumps.	Multi-Hazard	Town Fuel Depot	Emergency Preparedness	3	3	3	3	3	3	3	21
(6) Develop a list of residents who have an emergency back-up fuel supply (tanks) that would become available to the Town for use of emergency vehicles in an emergency situation. Also, develop a list of residents who own and can operate emergency equipment that would become available to the Town in an emergency situation.	Multi-Hazard	Town-wide	Emergency Preparedness & Prevention	2	3	2	3	3	3	3	19
				Some community members may not want to participate			Relying on volunteers				

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
(7) Locate all the underground storage tanks (both oil/gas) in the Town.	Multi-Hazard	Town-wide	Prevention	2	3	2	3	3	3	3	19
				Residents might not want this information public		Relying on volunteers					
(9) Make all documents relating to the Hazard Mitigation Update available at the Town Library and Town Hall.	Multi-Hazard	Library & Town Hall	Education & Awareness	3	3	3	3	3	3	3	21
(10) Continue to provide outreach assistance to elderly and special needs populations by organizing staff and coordinating within Town departments. Look into options such as "Meals on Wheels" for residents staying home.	Multi-Hazard	Town-wide	Education & Awareness	3	3	3	3	3	3	3	21
(11) Brainstorm and implement new ideas to address the Fire/EMS safety access challenges to the residents that live in the Bow Lake Estates. Address winter access roads and reach out to local camps to help maintain those roads.	Multi-Hazard	Bow Lake Estates & Town-wide	Emergency Preparedness	3	3	2	3	3	1	3	18
						Relying on volunteers					

*Red Cross visited the Town of Strafford in August 2011 to survey their Town facilities and offered a few action items of their own to be added to the Plan.

Appendix F: Large Map Set

Printed copies of 36"x36" maps provided to Town