

# **Town of Washington, New Hampshire Hazard Mitigation Plan**

**Town of Washington  
Hazard Mitigation  
Committee**



**Upper Valley Lake Sunapee  
Regional Planning  
Commission**

Mill Street culvert October 2005 flood

**Final Approved Plan Update – June 10, 2010**



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## I. INTRODUCTION

### A. BACKGROUND

The New Hampshire Homeland Security and Emergency Management (NH HSEM) has a goal for all communities within the State of New Hampshire to establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. The NH HSEM has provided funding to the Town of Washington, to update their local Hazard Mitigation Plan. UVLSRPC began updating January 2004 Hazard Mitigation Plan for the Town of Washington in July 2009. The *Washington Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Washington in its efforts to reduce future losses from natural and/or man-made hazard events before they occur. This *Plan* does *not* constitute a section of the Master Plan.

The Washington Hazard Mitigation Committee updated the *Washington Hazard Mitigation Plan* with the assistance and professional services of the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). After a public meeting held in the Washington Town Offices, the Washington Select Board adopted the updated plan as shown in Appendix E.

### B. PURPOSE

The Washington Hazard Mitigation Plan is a planning tool for use by the Town of Washington in its efforts to reduce future losses from natural and/or man-made hazards. This plan does not constitute a section of the Town Master Plan, nor is it adopted as part of the Zoning Ordinance.

### C. HISTORY

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA 2000). The ultimate purpose of DMA 2000 is to:

- Establish a national disaster mitigation program that will reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from disasters, and
- Provide a source of pre-disaster mitigation funding that will assist States and local governments in accomplishing that purpose.

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section: 322 – Mitigation Planning. This places new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving Hazard Mitigation Grant Program (HMGP) project grants. Local governments must review and if necessary, update the mitigation plan annually to continue program eligibility.

*Why develop a Mitigation Plan?*

Planning ahead to lessen or prevent a disaster will reduce the human, economic, and environmental costs. The State of NH is vulnerable to many types of hazards, including floods, hurricanes, winter storms, wildfires, wind events, and earthquakes. All of these types of events can have significant economic, environmental, and social impacts. The full cost of the damage resulting from the impact of natural hazards – personal suffering, loss of lives, disruption of the economy, and loss of tax base – is difficult to quantify and measure.

**D. SCOPE OF THE PLAN**

The scope of the *Washington Hazard Mitigation Plan* includes the identification of natural hazards affecting the Town, as identified by the Washington Hazard Mitigation Committee. The hazards were reviewed under the following categories as outlined in the State of New Hampshire Hazard Mitigation Plan:

- Dam Failure
- Flooding
- Hurricane
- Tornado & Downburst
- Thunderstorm/Lightning/Hail
- Severe Winter Weather
- Earthquake
- Landslide
- Drought
- Extreme Heat
- Erosion
- Wildfire
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

**E. METHODOLOGY**

Using the *Guide to Hazard Mitigation Planning for New Hampshire Communities* (2002), as developed by the Southwest Regional Planning Commission (SWRPC), the Washington Hazard Mitigation Committee, in conjunction with the UVLSRPC, developed the content of the *Washington Hazard Mitigation Plan* by tailoring the nine-step process set forth in the guidebook appropriate for the Town of Washington. Many FEMA resources and multiple State and Federal websites were also used as well. The Committee held a total of three posted meetings in July 2009. All meetings were posted inviting the general public and notices were sent to the Town Offices of neighboring towns to invite town officials. The public will continue to be involved in future revisions at meetings posted publicly. The Washington Board of Selectmen adopted the Plan after FEMA conditional approval as shown in Appendix E. Prior to



the Town of Washington approving the updated Plan, a public meeting was held to gain additional input from the citizens of Washington and to raise awareness of the ongoing hazard mitigation planning process.

The following hazard mitigation meetings were vital to the development of this Plan:

July 16, 2009  
July 21, 2009  
August 5, 2009

To complete this updated Plan, the Hazard Mitigation Committee followed the following planning steps:

**Step 1: Identify and Map the Hazards (July 2009)**

Committee members identified areas where damage from natural disasters had previously occurred, areas of potential damage, and human-made facilities and infrastructure that were at risk for property damage and other risk factors. A GIS-generated base map provided by the UVLSRPC was used in the process.

**Step 2: Determine Potential Damage (July 2009)**

Committee members identified facilities that were considered to be of value to the Town for emergency management purposes, for provision of utilities and services, and for historic, cultural and social value. A GIS-generated map was prepared to show critical facilities identified by the Washington Hazard Mitigation Committee. A summary listing of “Critical Facilities” is presented in Chapter IV. Costs were determined for losses for each type of hazard.

**Step 3: Identify Mitigation Plans/Policies Already in Place (July 2009)**

Using information and activities in the handbook, the Committee and UVLSRPC staff identified existing mitigation strategies which are already implemented in the Town related to relevant hazards. A summary chart and the results of this activity are presented in Chapter VI.

**Step 4: Identify the Gaps in Protection/Mitigation (July 2009)**

Existing strategies were then reviewed for coverage, effectiveness and implementation, as well as need for improvement. Some strategies are contained in the Emergency Action Plan and were reviewed as part of this step. The result of these activities is presented in Chapter VI.

**Step 5: Determine Actions to be Taken (July 2009)**

During an open brainstorming session, the Hazard Mitigation Committee developed a list of other possible hazard mitigation actions and strategies for the Town of Washington. Ideas proposed included policies, planning, and public information. A list of potential mitigation strategies can be found in Chapter VII.

**Step 6: Evaluate Feasible Options (July 2009)**

The Hazard Mitigation Committee selected mitigation strategies from their list of potential strategies, and evaluated the strategies based on eight criteria derived from the criteria listed in the evaluation chart found on page 27 of the *Guide to Hazard Mitigation Planning for New Hampshire Communities*. The eight criteria used for evaluation of potential mitigation strategies are listed in Chapter VII. Each strategy was rated (high (3), average (2), or low (1)) for its effectiveness in meeting each of the eight criteria (e.g., Does the mitigation strategy reduce disaster damage?). Strategies were ranked by overall score for preliminary prioritization then reviewed again under step eight. The ratings of the potential mitigation strategies can be found in Chapter VII.

**Step 7: Coordinate with other Agencies/Entities (Ongoing)**

UVLSRPC staff reviewed the Washington Master Plan. This was done in order to determine if any conflicts existed or if there were any potential areas for cooperation. Town staff that was involved in preparing the Emergency Operations Plan participated in the hazard mitigation meetings, to avoid duplication and to share information.

**Step 8: Determine Priorities (July 2009)**

The Committee reviewed the preliminary prioritization list in order to make changes and determine a final prioritization for new hazard mitigation actions and existing protection strategy improvements identified in previous steps. UVLSRPC also presented recommendations for the Committee to review and prioritize. These are provided in Chapter VIII.

**Step 9: Develop Implementation Strategy (July 2009)**

Using the chart provided under step nine of the *Guide to Hazard Mitigation Planning for New Hampshire Communities*, the Committee created an implementation strategy which included person(s) responsible for implementation (who), a schedule for completion (when), and a funding source and/or technical assistance source (how) for each identified hazard mitigation actions. The prioritized implementation schedule can be found in Chapter VIII.

**Step 10: Adopt and Monitor the Plan**

UVLSRPC staff compiled the results of steps one through nine in a draft document, as well as helpful and informative materials from the *State of New Hampshire Natural Hazard Mitigation Plan (2004)*, which served as a resource for the *Washington Hazard Mitigation Plan*. The process for monitoring and updating the Plan can be found in Chapter IX.

## **F. HAZARD MITIGATION GOALS**

The Town of Washington Hazard Mitigation Committee reviewed the hazard mitigation goals for the State of New Hampshire, and revised them for Washington. The goals were reviewed again during the update of the plan and determined to remain valid.

They are as follows:

1. To improve upon the protection of the general population, the citizens of the Town of Washington and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Washington's Emergency Response Services.
3. To reduce the potential impact of natural and man-made disasters on the Critical Facilities in the Town of Washington.
4. To reduce the potential impact of natural and man-made disasters on the Town of Washington's infrastructure.
5. To improve the Town of Washington's Emergency Preparedness and Disaster Response and Recovery Capability.
6. To reduce the potential impact of natural and man-made disasters on private property in the Town of Washington.
7. To reduce the potential impact of natural and man-made disasters on the Town of Washington's economy.
8. To reduce the potential impact of natural and man-made disasters on the Town of Washington's natural environment.
9. To reduce the Town of Washington's liability with respect to natural and man-made hazards through a community education program.
10. To reduce the potential impact of natural and man-made disasters on the Town of Washington's specific historic treasures.
11. To identify, introduce and implement cost-effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.
12. The Town of Washington will work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals.

**G. ACKNOWLEDGEMENTS**

The following people participated in the development the update of this plan as the Hazard Mitigation Committee:

- Ed Thayer, DPW Director/Road Agent/Emergency Management Director
- Richard Cook, Selectman
- Jim Berry, Health Officer
- Janice Philbrick, Fire Auxiliary & Tax Collector
- Robert Wright, Rescue Captain
- Larry Gaskell, Highway Department Foreman
- John Pasioka, Forest Fire Warden
- Steven Marshall, Police Chief
- Tom Burt, Forestry Committee
- Steve Hanssen, Parks & Recreation Commission
- Jim Russell, Lake Ashuelot Estates
- Carolyn Russell, Welfare Director
- Carol Andrews, Conservation Commission
- Brian P. Moser, Fire Chief
- Bob Hofstetter, Zoning Board of Adjustment
- Paul Hatch, NH Homeland Security and Emergency Management
- Victoria Davis, UVLSRPC

The Hazard Mitigation Committee was composed of local officials, citizens of Washington and a staff representative of the UVLSRPC for meeting facilitation and plan development. Neighboring communities, agencies, businesses, academia, non-profits and other interested parties were invited to participate through the public posting of meeting times and agendas or through invitation. Historical information, relevant data and potential future mitigation strategies were contributed by all parties involved in the planning process. For a record of all meeting topics see Appendix C: Meeting Documentation. The staff representative of the UVLSRPC gathered all information from local officials, agency representatives and public input and compiled the information to develop the Plan.

## **II. COMMUNITY PROFILE**

### **A. INTRODUCTION<sup>1</sup>**

Washington, a town of about 53 sq. mi., lies in the southeast corner of Sullivan County some twenty miles west of Concord. Its rugged hills form two watersheds: via the Ashuelot River, the west slopes drain to the Connecticut, while drainage on the east flows to the Merrimack via the north branch of the Contoocook. The largest of Washington's 26 lakes and ponds are Ashuelot Pond (about 430 acres), Island Pond (200), Highland Lake (190 in Washington, the remainder in Stoddard), Millen Pond (150) and Halfmoon Pond (80).

Washington includes two villages: The town center has an elevation of 1507 feet, while East Washington is at 939 feet. The highest summit is Lovell Mountain, at 2496 feet, but several others reach to about 2000 feet. It is a rocky town, with many large boulders, outcrops and areas of ledge underlying stony loam. Maple, beech, birch, red oak, ash, red spruce, hemlock and scattered stands of white pine cover some 90% of the town. The mix of forest, farms, fields, ponds and wetlands is much admired by both residents and visitors.

Wildlife is both indigenous and migratory, but poorly planned development threatens the habitat. In Pillsbury State Park is a small rookery of Great Blue Herons, and other habitats could be protected by better forestry and agricultural management. The forest is one of the town's major assets. It stabilizes the soil, retards runoff, provides habitat, buffers sound and wind, enhances the scenery, and is a wood source for both industry and fuel, but it is gradually disappearing as land ownership becomes more fragmented. Two thirds of the taxable land (about 23,800 acres) is forest, capable of repeated crops of wood. State (8000 acres) and town (500 acres) forests continue to be managed in ways that are compatible with town goals, but smaller tracts are vulnerable to growth pressures.

The town's largest landowner is the State. Pillsbury State Park, about 5000 acres, is largely in Washington, and the State also owns the 500 acre Max Israel tract about half a mile east of the park. Other public lands include the commons in the two villages, the town garage and transfer station, the roadways, and the 138 acre lakeshore recreation area known as Camp Morgan.

The town has fifteen owners of tracts of more than 200 acres, four of whom are organizations rather than individuals; about 200 owners of 10 – 200-acre tracts; and 100 owners of tracts between 2 and 10 acres. Smaller lots number some 1200, many in lakeside

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<sup>1</sup> Town of Washington Master Plan (2006)

communities planned for summer cottages that are gradually being winterized. Maps have been prepared by the Upper Valley Lake Sunapee Regional Planning Commission showing a variety of natural features. Incorporated in this Master Plan by reference, these maps may be seen in the Town Hall, or on the Town web site ([www.washingtonnh.org](http://www.washingtonnh.org)). One of them addresses soil types that are suitable for agriculture; only 5% of the total town area, these soils are largely in the two villages and the Faxon Hill area.

Only ten to fifteen percent of the town is suitable for industrial or commercial development,. They are defined by their slopes (less than 9%), good drainage, lack of ledge and the fact that they are not subject to flooding. Approximately 30-35%, of the land in town is suitable for houses with basements. This land has a slope of less than 16%, is not in a flood plain and is not poorly drained.

Steeper slopes, up to 50%, cover about a quarter of the town, including much of Lovewell Mountain, the northern corners of the town, Oak Hill and a line running northeast from Ames Hill to the town line.

Washington has more than 75 streams, evenly distributed except for Lovewell Mountain and part of Pillsbury, where streams are fewer. The maps show which of these streams are subject to overflow and land that is typically moist – about 10% of the town.

Another result of the County's analysis of soil types was the finding of eight possible gravel pits, leading to a potential supply of road gravel.

Route 31 runs through the Town of Washington and is the major thoroughfare, connecting to Route 10 to the north in Goshen and to Route 9 to the south in Hillsborough. In addition, Lempster Mountain Road and East Washington Road connect Washington to surrounding towns.

A three-member Board of Selectmen governs the Town of Washington. There is a volunteer Fire Department, full-time Police Department, volunteer Rescue Squad, paid Health Officer and a full-time Road Agent and Department. The Planning Board has elected members and the Conservation Commission is appointed by the Select Board. The Concord Hospital in Concord is the most used hospital from Washington and is about 34 miles from Washington. There are no central water or sewage collection systems; the residents rely on individual wells and septic systems.

## **B. DEVELOPMENT TRENDS <sup>2</sup>**

Development in Washington is primarily residential, split between year round and seasonal use. The 2000 Census data show that 53% of the homes are seasonal. The majority of those are clustered on relatively small lots around five of the town's twenty-some ponds - Ashuelot Pond, Island Pond, Highland Lake, Millen Pond and Halfmoon Pond.

Lake Ashuelot Estates (LAE), on the eastern shore of Ashuelot Pond, was developed in the late 1960s, prior to any land use regulations in Washington. With an original total of 482 lots, this is by far the largest single development in town. It is serviced by eleven miles of private roads, which are maintained by the homeowners' association. As the year round population in this area increases, there is pressure to have the town take over the roads. LAE is accessible via a paved town road and a dirt road with their junction at the entrance to the development.

The average lot size in Lake Ashuelot Estates is approximately one acre. To date, 153 lots have been built on. The main section of development, which abuts the pond, consists of lots averaging about 3/4 of an acre and is 80% built out. Another section that is further away from the pond for the most part can not be developed due to high incidence of ledge. The northern section, along the east bank of the Ashuelot River, has many open lots which range from one to two acres. While the lots within this development are generally undersized, most of the homes are substantial – not just small summer “camps.” Many people have built homes to be used as summer residences for a time, with the intention of eventually using them as their retirement homes. Lately there has been a trend toward construction of year round homes on available lots. Obviously, as the population continues to age, there is potential for this trend to continue. The town has taken ownership of a number of lots for non-payment of back taxes, in some cases because the owner couldn't build due to unsuitability for sewage disposal purposes. In recent years, the town has sold most of these non buildable lots to abutters who have merged them to their properties, making them unavailable as potential building lots.

Island Pond was also developed in the late 1960s and consists of water front lots of less than one acre and off shore lots of three acres or more. Many of the homes are substantial but for the most part are for seasonal use. There are currently about 150 lots on the east side of the pond, but there is potential for future subdivision on the west side, greatly increasing the size of the overall developed area around the pond.

The west side of Highland Lake was subdivided into some 50 lots in the 1930s, and consists mostly of summer camps which are winterized, although a few houses built there during the last twenty years are substantial, year round homes. There are many trailers in the area, which due to recent changes in State Law and the Land Use Ordinance must each have its own septic disposal system. This is

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<sup>2</sup> Town of Washington Master Plan (2006)

a heavily populated area in the summer and the town was forced in the early 1990s to take over the main access road, Valley Road, which was formerly private, due in part to the number of properties that it serves Highland Haven, a development on the east side of Highland Lake contains some 75 lots, most of them not built on. There are about 10 lots on the shore of the lake which are small (1/2 acre or less) the remainder being two acres or more. Just south of this there is another 10-lot subdivision, approved in the early 1990s, while further south along the lake there is Highland Forest, a subdivision of some 40 ten-acre lots, which is actually close to if not south of the Washington/Stoddard town line. Most of these lots are not yet built on.

Millen Pond has many homes around it, many dating from early in the last century, some seasonal and some year round, on a total of 55 lots. Camp Morgan, a town-owned recreational facility, occupies a good deal of the northeastern shore of the pond. There are few remaining developable lots around the pond.

Halfmoon Pond has a few older summer cottages along the south eastern shore, but there is potential for a future sizable development along the western shore. A subdivision around Freezeland Pond was approved in 1990, consisting of 26 lots, ranging in size from 5 to 20 acres, but none has been built on. South of this, around Smith Pond, a subdivision of 10 to 15 lots has been created, with only about one half of the lots being developed to date with substantial homes on them and only a few occupied year round.

There are three major subdivisions in town which are not located on or near a body of water: Washington Heights, Martin Road and Sandy Knolls Road. These subdivisions all have larger lots (5 to 10 acres) and are geared toward year round residences. Washington Heights has 28 lots off Lempster Mountain Road, with an additional eight lots on Route 31. About one half of the lots in this subdivision have been built on, including a few seasonal homes. The Martin Road subdivision is on the western side of Lovell Mountain; there are a few houses, occupied year round, and also a couple of summer camps. The potential is there for this subdivision to be improved and fully occupied by year round residents. Sandy Knolls Road, off Mountain Road in East Washington, consists of 18 lots, 5 of which have year round homes; the remainder is as yet undeveloped. The status of these three developments has not substantially changed in the last ten years. A new subdivision was recently approved between Mill Street and East Washington Road consisting of 13 lots of approximately five acres.

There is still a lot of potential for future subdivisions in Washington, totaling perhaps as much as 1000 seasonal or year round homes, which eventually could more than double the town's present population. However, because of the minimum requirements of the present Land Use Ordinance and septic disposal designs it would appear that there can no longer be a summer cottage type development. The earliest projects in town were designed for purely summer use and did not have regulations to control them. There are no public water or sewer services in Washington, with all lots depending on individual wells and septic systems, and it is conceivable that a higher density of homes could lead to future groundwater pollution problems. A recent rise in the number of building permit applications, should the trend continue, could be cause for concern that the next ten or twenty years could bring on



problems influencing the safety and quality of life in sections of Washington. On the other hand, with so many empty lots in subdivisions already approved, it is unlikely that additional major subdivisions would be easily marketable, unless they had some amenity not found in existing developments. With so few available water front lots there may, however, be a certain amount of pressure on land near other as yet undeveloped ponds.

Commercial or industrial land use is presently limited to the general store, the post office and a few small businesses scattered throughout the town. There are no industrial businesses in town.

**Table II-1: AREA POPULATION TRENDS**

Area	1970	1980	Avg. Annual Growth 70-80	1990	Avg. Annual Growth 80-90	2000	Avg. Annual Growth 90-00	30 Yr. Avg. Annual Rate
Washington	248	411	6.6%	628	5.28%	895	4.25%	8.70%
Lempster	360	637	7.7%	947	4.87%	971	0.25%	5.66%
Goshen	395	549	3.9%	742	3.52%	741	-0.01%	2.92%
Bradford	679	1115	6.4%	1,405	2.60%	1454	0.35%	3.80%
Hillsborough	709	1092	5.4%	4,498	31.19%	4928	0.96%	19.84%
Marlow	390	543	3.9%	650	1.97%	747	1.49%	3.05%
Newbury	509	961	8.9%	1,347	4.02%	1,702	2.64%	7.81%
Stoddard	242	482	9.9%	622	2.90%	928	4.92%	9.45%
Windsor	43	71	6.5%	107	5.07%	201	8.79%	12.25%
Sullivan County	30,949	36,063	1.7%	38,592	0.70%	40,458	0.48%	1.02%
New Hampshire	737,578	920,475	2.5%	1,109,252	2.05%	1,235,786	1.14%	2.25%

Source: US Census; NH OEP

**Table II-2: POPULATION PROJECTIONS FOR WASHINGTON**

	1970	1980	1990	2000	2010	2020	2030
Population	248	411	628	895	1240	1420	1570
Decade Change in Population		65.7%	52.8%	42.5%	38.5%	14.5%	10.6%

Source: 1970 – 2000 US Census & 2010 – 2030 NH Office of Energy & Planning

### III. HAZARD IDENTIFICATION

The Washington Hazard Mitigation Committee reviewed the list of hazards provided in the *State of New Hampshire Hazard Mitigation Plan*, and some hazard history for the State of New Hampshire and Sullivan County in particular. A list of past hazard events in Washington, Sullivan County, and the State of New Hampshire can be found in the following discussion and tables. After reviewing this information and the Emergency Operations Plan, the Committee conducted a Risk Assessment. The resulting risk designations are provided in the heading of each hazard table below as well as a more detailed discussion further into this chapter.

#### A. WHAT ARE THE HAZARDS IN WASHINGTON?

Washington is prone to a variety of natural and human-made hazards. The hazards that Washington is most vulnerable to were determined through gathering historical knowledge of long time residents and town officials; research into the CRREL Ice Jam Database, FEMA and NOAA documented disasters, and local land use restrictions; and from the input of representatives from state agencies (NH HSEM). The hazards affecting the Town of Washington are dam failure, flooding, hurricane, tornado, thunderstorm (including lightning and hail), severe wind, extreme winter weather (including extreme cold and ice storms), snow avalanche, earthquake, landslide, erosion, drought, extreme heat, wildfire, radon, and hazardous materials spills. Each of these hazards and the past occurrences of these hazards are described in the following sections. Hazards that were eliminated from assessment are those that have not had a direct impact on the Town of Washington and are not anticipated to have an impact as determined by the Hazard Mitigation Planning Committee, representatives from state agencies and citizens of the Town of Washington. Eliminated hazards include Land Subsidence, Expansive Soils, Landslides, and Snow Avalanches.

#### B. DESCRIPTIONS OF HAZARDS

An assessment of each hazard relevant to Washington is provided below. An inventory of previous and potential hazards is provided. Past events are shown in the following tables and the potential for future events is then discussed. The “risk” designation for each hazard was determined after evaluations discussed later in this chapter.

- Dam Failure
- Flooding
- Hurricane
- Tornado & Downburst
- Thunderstorm/Lightning/Hail
- Severe Winter Weather
- Earthquake
- Landslide
- Drought
- Extreme Heat
- Erosion
- Wildfire
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

**Dam Failure**

Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods pose a significant threat to both life and property. Appendix D shows the location of active dams in Washington.

*Past Dam Failure Events*

Three dams are designated as “significant hazard potential.” This means there is a significant hazard potential because the dam is in a location and of a size that failure or mis-operation of the dam would result in any of the following: Major economic loss to structures or property; structural damage roads; major environmental or public health losses. Three dams are designated by the State as “low hazard potential” which means because of its location and size, a dam failure would result in no possible loss of life, low economic loss to structures or property; possible structural damage to public roads; the release of liquid industrial, agricultural, or commercial wastes under certain conditions; and reversible losses to environmentally-sensitive areas. Twelve dams were designated as “non-menace” which means because of its location and size, a dam failure would not result in probable loss of life or loss to property.

**Table III-1: DAMS**

Dam #	Class	Dam Name	Water Body	Owner (now or formerly)	Status	Type	Impoundment Area in Acres	Height of Dam (Ft)	Drainage Area in Acres
245.25	NM	Saunders Dam	Ashuelot River	Bradford Saunders	active	earth	1.200	6.00	0.42
245.17	NM	Recreation Pond	Tr Woodward Brook	Donald McGranahan	active	earth	0.500	8.00	0.89
245.16	NM	Ulrich Dam	unnamed brook	Dave McGranahan	active	earth	0.250	13.00	0.09
245.12	-	Pine Brook Dam	Pine Brook	Eccardt Farms, Inc.	removed	timber/stone	0.000	3.00	0.67
245.10	-	Woodward Brook Dam	Woodward Brook	Joseph Perez	breached	stone/earth	0.000	8.00	10.20
245.11	L	East Washington Dam	Beards Brook	NH Water Res Council	active	concrete	3.200	10.00	3.00
245.22	NM	Wildlife Pond	unnamed swamp	unknown	active	earth	0.840	5.00	0.00
245.02	-	Halfmoon Pond Dam	Bog Brook	Christine Zipper	ruins	stone/earth	130.000	3.00	0.00
245.26	NM	Fonda Dam	unnamed stream	Robert Hamill	active	earth	0.300	4.00	0.30
245.15	NM	Cemetery Brook	Cemetery Brook	Harry Drew	active	earth	1.000	5.00	0.00
245.18	NM	Cemetery Brook II	Cemetery Brook	Katherine Onnela	active	earth	1.000	9.00	0.00
245.08	-	Morey Dam	Halfmoon Pond Brook	David E. Vibber	ruins	timber/stone	0.000	0.00	8.00
245.09	L	Robinson Pond Dam	Island Pond Brook	Sandra I. Poole	active	concrete	1.000	10.00	3.10
245.03	L	Island Pond Dam	Tr Beards Brook	Washington Lake Assoc	active	concrete	192.000	12.50	2.76

Dam #	Class	Dam Name	Water Body	Owner (now or formerly)	Status	Type	Impoundment Area in Acres	Height of Dam (Ft)	Drainage Area in Acres
245.23	-	Woodbury Dam	natural swale	Bruce Woodbury	exempt	earth	0.010	2.00	0.00
245.04	S	Millen Lake Dam	Tr Ashuelot River	Millen Lake Association	active	earth	156.000	23.00	1.23
245.19	NM	Farm Pond	Fool Brook	Crane Farm, Inc.	active	earth	0.200	8.00	0.07
245.05	S	Ashuelot Pond Dam	Ashuelot River	Ashuelot P Dam Vill Dist	active	earth	360.000	13.00	25.30
245.06	NM	Ashuelot River	Ashuelot River	L Harry Mason	active	-	9.600	0.00	0.00
245.27	NM	Detention Pond	Shedd Brook	Joseph Carrafa	active	stone/earth	0.530	9.00	1.42
245.20	-	Wildlife Pond Dam	Shedd Brook	Cameron K. Wehringer	not built	earth/stone	3.000	3.00	2.42
245.24	NM	Howe Recreation Dam	natural swale	John Howe	active	earth	1.000	6.00	0.00
245.07	-	Highland Lake Dike	Shedd Brook	NH Water Res Council	ruins	earth	711.000	8.00	29.70
245.14	-	North Pond Dam	Ashuelot River	NH DRED	ruins	stone/earth	53.000	2.50	0.00
245.13	NM	Mill Pond Dam	Ashuelot River	NH DRED	active	timber/stone	21.000	6.00	4.30
245.01	S	May Pond Dam	Ashuelot River	NH DRED	active	earth	158.000	14.00	6.84

*Class of potential hazard: NM – non-menace; L-low; S-significant*

### *Potential Future Dam Failure Damage*

Although there are 26 dams in Washington, there are only three “significant” hazard dams in Washington: Millen Lake Dam, Ashuelot Pond Dam, and May Pond Dam. An emergency action plan is required for any of these dams to delineate inundation areas. The map of critical facilities and hazard areas (Appendix D) includes the inundation areas for these water bodies from their associated Emergency Action Plans. There is one building within the Millen Lake Dam inundation area, one building within the Ashuelot Pond Dam inundation area, and 96 buildings within the May Pond Dam inundation area. The value of these buildings is provided later in this plan.

The dam at Island Pond is supported by a large culvert which is weakening. A slip liner in the existing culvert would strengthen the dam to prevent a potential failure. The Committee determined that dam failure is a low risk in Washington.

## **Flooding**

Flooding is the temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination, and can disrupt travel routes on roads and bridges.

Floods in the Washington area are most likely to occur in the spring due to the increase in rainfall and snowmelt; however, floods can occur at any time of the year. A sudden winter thaw or a major summer downpour can cause flooding. Floodplains indicate areas potentially affected by flooding. There are several types of flooding.

100-Year Floods The term “100-year flood” does not mean that flooding will occur once every 100 years, but is a statement of probability to describe how one flood compares to others that are likely to occur. What it actually means is that there is a one percent chance of a flood in any given year. These areas were mapped for all towns in New Hampshire by FEMA. Appendix D displays the “Special Flood Hazards Areas.”

River Ice Jams Ice forming in riverbeds and against structures presents significant hazardous conditions storm waters encounter these ice formations which may create temporary dams. These dams may create flooding conditions where none previously existed (i.e., as a consequence of elevation in relation to normal floodplains). Additionally, there is the impact of the ice itself on structures such as highway and railroad bridges. Large masses of ice may push on structures laterally and/or may lift structures not designed for such impacts. A search on the Cold Regions Research and Environmental Laboratory (CRREL) and discussion with the Washington Committee revealed that there is no history of ice jam related events in the Town.

Rapid Snow Pack Melt Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

Severe Storms Flooding associated with severe storms can inflict heavy damage to property. Heavy rains during severe storms are a common cause of inland flooding.

Beaver Dams and Lodging Flooding associated with beaver dams and lodging can cause road flooding or damage to property.

Bank Erosion and Failure As development increases, changes occur that increase the rate and volume of runoff, and accelerate the natural geologic erosion process. Erosion typically occurs at the outside of river bends and sediment deposits in low velocity areas at

the insides of bends. Resistance to erosion is dependent on the riverbank’s protective cover, such as vegetation or rock riprap, or its soils and stability. Roads and bridges are also susceptible to erosion.

*Past Flooding Events*

In 2006 several roads which are not designated areas of 100-year flood were washed out. In addition, the Committee delineated areas where flooding has occurred in recent years. Appendix D is a map which shows the locally identified flood areas. Appendix D also shows the Flood Insurance Rate Map of Special Flood Hazard Areas. The following tables provide a list of floods in the State, County, and Washington.

**Table III-2: FLOODING – FEMA DISASTER DECLARATIONS**

<b>FLOODING – FEMA DISASTER DECLARATIONS</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Flood	March 11-21, 1936	NH State	Damage to Road Network. Flooding caused by simultaneous heavy snowfall totals, heavy rains and warm weather. Run-off from melting snow with rain overflowed the rivers	Unknown
Flood / Severe Storm	April 16, 1987	Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties	FEMA Disaster Declaration # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain.	\$4,888,889 in damage.
Flood	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties, NH	FEMA Disaster Declaration # 876. Flooding caused by a series of storm events with moderate to heavy rains.	\$2,297,777 in damage.
Flood	October 29, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties, NH	FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains.	\$2,341,273 in damage.
Flood	October 7-18, 2005	Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding.	\$3,000,000 in damages.
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144- NH	Unknown
Flood	April 16, 2007	All counties, NH	FEMA Disaster Declaration # 1695. Severe storms and flooding; 2,005 home owners and renters applied for assistance in NH.	\$27,000,000 in damages

**Table III-3: FEMA FLOOD INSURANCE RATE MAP SPECIAL FLOOD HAZARD AREAS**

Location of Special Flood Hazard Area	Number of Lots with Structures in the Area	Comments
Ashuelot Pond	43	Assessed value - \$5 million
Ashuelot River	None	N/A
Bog Brook (N of Halfmoon Pond)	None	N/A
Woodward Brook	None	N/A
South of Island Pond	1	Assessed value - \$100,000
Beards Brook	1	Assessed value - \$114,000
Windsor town line	None	N/A
East Highland Lake	4	Assessed value - \$374,000
North Highland Lake	12	Assessed value - \$1.3 million

Washington became a participating member of the National Flood Insurance Program on July 28, 2008. Updated maps for all towns within Sullivan County were finalized in May 2006. There are currently only three policies in the town with \$880,000 of insurance. Two of these policies are considered “preferred risk” or not in the flood plain. However, flood insurance purchase is not a reflection of the number of structures within the flood plain. No losses have been paid, and there are no repetitive flood loss properties in the Town. All 100-Year Special Flood Areas in the town fall within the A Zone, with no base flood elevations determined. See Appendix D for a map showing all Special Flood Hazard Areas.

*Potential Future Flooding Events*

Future flooding is likely as noted in the above table based upon local knowledge of past flood events. There are 61 lots with buildings located within the FEMA determined flood areas. According to the State’s Mitigation Plan, Sullivan County has a high hazard risk for flooding. The Committee determined flooding is a low/medium risk in Washington.

**Hurricane**

A hurricane is an intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles. As a hurricane nears land, it can bring torrential rains, high winds, and storm surges. A single hurricane can last for more than 2 weeks over open waters and can run a path across the entire length of the eastern seaboard. August and September are peak months during the hurricane season that lasts from June 1 through November 30.

Damage resulting from winds of this force can be substantial, especially considering the duration of the event, which may last for many hours (NH Hazard Mitigation Plan; FEMA website).

*Past Hurricane Events*

There have been several hurricanes over the years which have impacted New England and New Hampshire. These are listed below. The 1938 hurricane directly impacted Washington according to the Committee member recollections.

**Table III-4: HURRICANES & TROPICAL STORMS**

<b>HURRICANES AND TROPICAL STORMS</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Hurricane	August, 1635	n/a		Unknown
Hurricane	October 18-19, 1778	n/a	Winds 40-75 mph	Unknown
Hurricane	October 9, 1804	n/a		Unknown
Gale	September 23, 1815	n/a	Winds > 50mph	Unknown
Hurricane	September 8, 1869	n/a		Unknown
Hurricane	September 21, 1938	Southern New England	Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Total storm losses of \$12,337,643 (1938 dollars). 186 mph maximum winds.	Unknown
Hurricane (Carol)	August 31, 1954	Southern New England	Category 3, winds 111-130 mph. Extensive tree and crop damage in NH, localized flooding	Unknown
Hurricane (Edna)	September 11, 1954	Southern New England	Category 3 in Massachusetts. This Hurricane moved off shore but still cost 21 lives and \$40.5 million in damages throughout New England. Following so close to Carol it made recovery difficult for some areas. Heavy rain in NH	Unknown
Hurricane (Donna)	September 12, 1960	Southern and Central NH	Category 3 (Category 1 in NH). Heavy flooding in some parts of the State.	Unknown



<b>HURRICANES AND TROPICAL STORMS</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast	Unknown
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds	Unknown
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1	Unknown
Hurricane (Gloria)	September, 1985	Southern New England	Category 2, winds 96-110 mph. Electric structures damaged; tree damages. This Hurricane fell apart upon striking Long Island with heavy rains, localized flooding, and minor wind damage in NH	Unknown
Hurricane (Bob)	August 19, 1991	Southern New England; caused flooding in Washington	Structural and electrical damage in region from fallen trees. 3 persons were killed and \$2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR	Unknown
Hurricane (Edouard)	September 1, 1996	Southern New England	Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged	Unknown
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains	Unknown
Hurricane (Katrina)	August 29, 2005 & continuing	East Coast of US and more	FEMA-3258-EM. Heavy rains and flooding devastating SE US	Unknown
Tropical Storm (Tammy)	October 5-13, 2005	East Coast of US	Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH.	Unknown

*Potential Future Hurricane Damage*

Hurricane events will affect the entire town. It is impossible to predict into the future what damage will occur in the town. According to the State’s mitigation plan, Sullivan County has a medium/high risk for hurricanes. The Committee determined the hurricane risk to be medium in Washington.

**Tornado & Downburst**

“A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. These events are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction.” (*NH Hazard Mitigation Plan*). The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. Most tornadoes are in the F0 to F2 Class. Building to modern wind standards provides significant property protection from these hazard events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which suggests that buildings should be built to withstand 160 mph winds.

Significantly high winds occur especially during tornadoes, hurricanes, winter storms, and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during severe wind occurrences. 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: 1. Microburst, which covers an area less than 2.5 miles in diameter, and 2. Macrobust, which covers an area at least 2.5 miles in diameter. Most downbursts occur with thunderstorms, but they can be associated with showers too weak to produce thunder.

*Past Tornado & Downburst Events*

The following table displays tornadoes occurring in Sullivan County between 1950 and 1995 as provided by the “Tornado Project” ([www.tornadoproject.com](http://www.tornadoproject.com)) and the *NH Natural Hazard Mitigation Plan*. The Committee recalled that three to four years ago a severe microburst knocked down stands of trees in Washington.

**Table III-5: TORNADOES IN SULLIVAN COUNTY**

<b>TORNADOS Sullivan County</b>		
<b>Date</b>	<b>Fujita Scale</b>	<b>Damages</b>
October 24, 1955	F0	No deaths or injuries; costs unknown
July 9, 1962	F0	No deaths or injuries; costs unknown
July 9, 1962	F1	No deaths or injuries; costs unknown
July 18, 1963	F1	No deaths or injuries; costs unknown

### *Potential Future Tornado and Downburst Damage*

It is impossible to predict where a tornado or downburst will occur or what damage it will inflict. The Washington Committee does not recall tornadoes in Washington. The FEMA website places the State of NH in the Zone II Wind Zone which provides that a community shelter should be built to a 160 mph “design wind speed.” According to the State’s mitigation plan, Sullivan County has a medium risk for tornadoes. The Committee determined there is a medium/high risk for tornadoes and downbursts in Washington.

### **Thunderstorms**

A thunderstorm is a rain shower during which you hear thunder. Since thunder comes from lightning, all thunderstorms have lightning. A thunderstorm is classified as "severe" when it contains one or more of the following: hail three-quarter inch or greater, winds gusting in excess of 50 knots (57.5 mph), tornado. Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. When the hail particle becomes heavy enough to resist the updraft, it falls to the ground. The resulting wind and hail can cause death, injury, and property damage.

An average thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Winter thunderstorms are rare because the air is more stable, strong updrafts cannot form because the surface temperatures during the winter are colder.

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Fires are a likely result of lightning strikes, and lightning strikes can cause death, injury, and property damage. It is impossible to predict where lightning will strike. There have probably been lightning strikes throughout Washington, but there is no record of damage.

### *Past Thunderstorm Events*

There have been lightning strikes in Washington, but there is no record of damage. A thunderstorm with lightning or hail could impact the entire town. The cupola of the Town Offices has been struck more than once.

### *Potential Future Thunderstorm Damage*

It is inevitable that thunderstorms will occur in Washington's future. Lightning, hail, or wind from a thunderstorm could impact the entire town. It is not possible to estimate possible damage. According to the State's mitigation plan, Sullivan County has a medium risk of a lightning hazard. The risk for future thunderstorm damage was determined by the Committee to be low/medium risk in Washington.

### **Severe Winter Weather**

Ice and snow events typically occur during the winter months and can cause loss of life, property damage, and tree damage.

Heavy Snow Storms A heavy snowstorm is generally considered to be one which deposits four or more inches of snow in a twelve-hour period... A blizzard is a winter storm characterized by high winds, low temperatures, and driving snow- according to the official definition given in 1958 by the U.S. Weather Bureau, the winds must exceed 35 miles per hour and the temperatures must drop to 20°F (-7°C) or lower. Therefore, intense Nor'easters, which occur in the winter months, are often referred to as blizzards. The definition includes the conditions under which dry snow, which has previously fallen, is whipped into the air and diminishes visual range. Such conditions, when extreme enough, are called "white outs."

Ice Storms Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. When these liquid water drops fall through another thin layer of freezing air just above the surface, they don't have enough time to refreeze before reaching the ground. Because they are "supercooled," they instantly refreeze upon contact with anything that that is at or below 0 degrees C, creating a glaze of ice on the ground, trees, power lines, or other objects. A significant accumulation of freezing rain lasting several hours or more is called an ice storm. This condition may strain branches of trees, power lines and even transmission towers to the breaking point and often creates treacherous conditions for highway travel and aviation. Debris impacted roads make emergency access, repair and cleanup extremely difficult.

"Nor'easters" Nor'easters can occur in the eastern United States any time between October and April, when moisture and cold air are plentiful. They are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surfs that cause severe beach erosion and coastal flooding. A Nor'easter is named for the winds that blow in from the northeast and drive the storm up the east coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast.

There are two main components to a Nor'easter: Gulf Stream low-pressure system (counter-clockwise winds) generate off the coast of Florida. The air above the Gulf Stream warms and spawns a low-pressure system. This low circulates off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic. Strong northeasterly winds at the leading edge of the storm pull it up the east

coast. As the strong northeasterly winds pull the storm up the east coast, it meets with cold Arctic high-pressure system (clockwise winds) blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation.

Winter conditions make Nor'easters a normal occurrence, but only a handful actually gather the force and power to cause problems inland. The resulting precipitation depends on how close you are to the converging point of the two storms. Nor'easter events which occur toward the end of a winter season may exacerbate the spring flooding conditions by depositing significant snow pack at a time of the season when spring rains are poised to initiate rapid snow pack melting.

*Past Extreme Winter Weather Events*

The following table provides a list of past extreme winter weather events in New Hampshire and Washington.

**Table III-6: SEVERE WINTER WEATHER**

<b>SEVERE WINTER WEATHER/ICE STORMS</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Ice Storm	December 17-20, 1929	New Hampshire	Unprecedented disruption and damage to telephone, telegraph and power system. Comparable to 1998 Ice Storm (see below)	Unknown
Blizzard	February 14-17, 1958	New Hampshire	20-30 inches of snow in parts of New Hampshire	Unknown
Snow Storm	March 18-21, 1958	New Hampshire	Up to 22 inches of snow in south central NH	Unknown
Snow Storm	December 10-13, 1960	New Hampshire	Up to 17 inches of snow in southern NH	Unknown
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH	Unknown
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH	Unknown
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH	Unknown
Blizzard	January 29-31, 1966	New Hampshire	Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH	Unknown
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH	Unknown

<b>SEVERE WINTER WEATHER/ICE STORMS</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH	Unknown
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH	Unknown
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH	Unknown
Snow Storm	February, 1979	New Hampshire	President's Day storm	Unknown
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation	Unknown
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH	Unknown
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 yrs in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London NH	Unknown
Extreme Cold	November-December, 1988	New Hampshire	Temperature was below 0 degrees F for a month	Unknown
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH	Unknown
Snow Storm	1997	New Hampshire	Power outages throughout Washington due to heavy snowfall	Unknown
Ice Storm	January 15, 1998	New Hampshire; Substantial power outages in Washington	Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, \$17+ million in damages to Public Service of NH alone	Unknown
Snow Storm	2000	Regional; entire town of Washington	Heavy snow	Unknown
Ice Storm	2004	Regional	Ice storm resulted in many trees down and loss of power.	Unknown
Ice Storm	2008	Regional	Ice storm resulted in many trees down and loss of power.	\$135,000

*Potential Future Severe Winter Damage:*

There is the potential for severe winter damage every year. The event would affect the entire town. According to the State’s mitigation plan, Sullivan County has a high risk for severe winter weather. The Committee determined severe winter weather to be a low/medium risk in Washington.

**Earthquake**

The following is a list of earthquakes which have impacted New England, New Hampshire, and potentially Washington.

**Table III-7: EARTHQUAKES**

<b>EARTHQUAKES</b>			
<b>Date</b>	<b>Location</b>	<b>Magnitude</b>	<b>Damage</b>
1638	Central NH	6.5-7	
October 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown
December 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown
November 18, 1755	Cape Ann, MA	6.0	Much damage: cost unknown
1800s	Statewide	83 felt earthquake in NH	Unknown
1900s	Statewide	200 felt earthquake in NH	Unknown
March 18, 1926	Manchester, NH	Felt in Hillsborough Co	Unknown
Dec 20, 1940	Ossipee, NH	Both earthquakes 5.5	Damage to homes, water main rupture: cost unknown.
December 24, 1940	Ossipee, NH	NA	Unknown
December 28, 1947	Dover-Foxcroft, ME	4.5	Unknown
June 10, 1951	Kingston, RI	4.6	Unknown
April 26, 1957	Portland, ME	4.7	Unknown
April 10, 1962	Middlebury, VT	4.2	Unknown
June 15, 1973	Near Quebec Border	4.8	Unknown
January 19, 1982	West of Laconia	4.5	Structure damage 15 miles away in Concord: cost unknown
October 20, 1988	Near Berlin, NH	4	Unknown

*Potential Future Earthquake Damage:*

A United States Geographic Survey mapping tool on the web ([geohazards.cr.usgs.gov/projects](http://geohazards.cr.usgs.gov/projects)) projects a 5 – 6 peak ground acceleration (pga) with 10% probability of exceedance in 50 years for the Town of Washington. This pga rating is equivalent to a Modified Mercalli Intensity of “V” with moderate perceived shaking and very light potential damage. An earthquake event would impact the entire town. According to the State’s mitigation plan, Sullivan County has a medium risk for earthquakes. The Committee determined the risk to be medium/high in Washington.

**Landslide**

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity, including mudslides, debris flows, and rockslides. Formations of sedimentary deposits along rivers also create potential landslide conditions. Landslides can damage or destroy roads, railroads, electrical and phone lines, and other structures.

*Past Landslide Events:*

There have been no known landslides in Washington.

*Potential Future Landslide Events:*

The best predictor of future landslides is past landslides. If any landslide events were to occur, they would be most likely in areas of very steep slope. There is little development in these areas, so no future structural damage cost due to this natural hazard is anticipated although there could be road or utility pole damage. The Committee delineated an area where a landslide could potentially occur along Route 31 north of Pillsbury State Park. There is very thin soil over ledge on a steep slope. Although there are no buildings here, a landslide could block the road. The Committee determined there is a low risk for landslide damage.

**Drought**

A drought is defined as a long period of abnormally low precipitation. The effects of drought are indicated through measurements of soil moisture, groundwater levels and stream flow; however, not all of these indicators will be low during a drought. Costs can include loss of agricultural crops and livestock.

*Past Drought Events*



In 2001-2002, several private wells dried up in Washington. Although there may have been other droughts, the Committee members do not recall any.

**Table III-8: DROUGHT**

<b>Date</b>	<b>Location</b>	<b>Description</b>	<b>Damages</b>
1929-1936	Statewide	Regional. Recurrence Interval 10 to > 25 years	Unknown
1939-1944	Statewide	Severe in southeast and moderate elsewhere. Recurrence Interval 10 to > 25 years	Unknown
1947-1950	Statewide	Moderate. Recurrence Interval 10 to > 25 years	Unknown
1960-1969	Statewide	Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years	Unknown
2001-2002	Statewide	Affected residential wells and agricultural water sources	Unknown

*Potential Future Drought Damage*

Drought will affect the entire town. The damage will depend upon the crops being grown at the time of the drought. No cost has been assigned to residential wells going dry though new wells may have to be dug or drilled. According to the State’s mitigation plan, Sullivan County has a medium risk for drought. The Committee determined that drought is a low/medium risk in Washington.

**Extreme Heat**

Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures. These event conditions may impact the health of both humans and livestock.

*Past Extreme Heat Events*

In the summer of 2008, Rescue personnel assisted several residents having breathing difficulties due to extreme heat. The following table lists the extreme heat events in the past which included the Northeast and New Hampshire.

**Table III-9: EXTREME HEAT**

<b>Date</b>	<b>Location</b>	<b>Description</b>	<b>Damage</b>
July, 1911	New England	11-day heat wave in New Hampshire	Unknown
Late June to September, 1936	North America	Temps to mid 90s in the northeast	Unknown
Late July, 1999	Northeast	13+ days of 90+ degree heat	Unknown
Early August, 2001	New Hampshire	Mid 90s and high humidity	Unknown
August 2-4, 2006	New Hampshire	Regional heat wave and severe storms	Unknown

*Potential Future Extreme Heat Events*

Extreme heat would impact the entire town though those with air conditioning in their homes would have less impact. The costs of extreme heat are most likely to be in human life. The elderly are especially susceptible to extreme heat. The State did not develop a county risk factor for extreme heat in its *NH Hazard Mitigation Plan*. The Committee determined extreme heat to be a low/medium risk in Washington.

**Erosion**

Soil erosion, although a natural process, can be greatly accelerated by improper construction practices. Because of the climate in New Hampshire and the general nature of our topography, eroded soils can be quickly transported to a wetland, stream, or lake. The New Hampshire Department of Environmental Services (DES) regulates major construction activities to minimize impacts upon these resources. A properly conducted construction project should not cause significant soil erosion.

Soil becomes vulnerable to erosion when construction activity removes or disturbs the vegetative cover. Vegetative cover and its root system play an extremely important role in preventing erosion by: (1) Shielding the soil surface from the impact of falling rain drops; (2) Reducing the velocity of runoff; (3) Maintaining the soil's capacity to absorb water, and (4) Holding soil particles in place.

Because of the vegetation's ability to minimize erosion, limiting its removal can significantly reduce soil erosion. In addition, decreasing the area and duration of exposure of disturbed soils is also effective in limiting soil erosion. The designer must give special consideration to the phasing of a project so that only those areas actively under construction have exposed soils. Other factors influencing soil erosion are: (1) Soil types, (2) Land slope, (3) Amount of water flowing onto the site from up-slope, and (4) Time of year of disturbance.

Past Erosion Events

There have been several erosion events in Washington. There also several town road washes associated with major storms, most recently in April 2007 and October 2005. There have also been many problems with private roads throughout town.

**Table III-10: EROSION AREAS**

Location	Description	Proposed Improvement
Mill Street Bridge	Road washes during high water or excessive rain	Replace culvert inadequate for water flow with larger culvert
Faxon Hill Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert at northern intersection with Millen Pond Road
Bailey Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert at Beaver Bog
East Washington Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert; improve roadway alignment for culvert flow at Freezeland Pond outlet
Valley Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert at intersection with Cove Road and Beech Way
Lovell Mountain Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road
Millen Pond Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance
Millen Pond Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert at Rochfords' camp
Halfmoon Pond Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert by Hamsons'
Valley Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert by Jane Kelly's
Valley Road	Road washes during excessive rain	Replace culvert inadequate for water flow with larger culvert by Bob & Rita Joys'
Ayers Pond Road	Road washes during excessive rain	Improve drainage work by Marshalls
Bear Hill Road	Road washes during excessive rain	Improve drainage with ditches and blasting
Halfmoon Pond Road	Road washes during excessive rain	Improve drainage with ditch work; tree work; and pavement to prevent drainage clogging on very steep grade near Jagers'
Old Marlow Road	Road washes during excessive rain	Improve drainage and pave to prevent drainage clogging on very steep grade
Farnsworth Hill Road	Road washes during excessive rain	Pave road to prevent clogging of drainage on very steep grade
Bailey Road	Road washes during excessive rain	Improve drainage and pave road to prevent drainage clogging
Halfmoon Pond Road	Road washes during excessive rain	Improve drainage on gradual slope over ledge north of Lovell Mn Road

### *Potential Erosion Events*

Due to the topography of the town, there is always potential for erosion. As properties are developed there will be less vegetative buffer to protect the town from erosion during rainstorms. Several roads need improvement as shown above to mitigate erosion from future rainstorms. The Committee determined that erosion is a low/medium risk in Washington.

### **Wildfire**

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

Increased severity over recent years has decreased capability to extinguish wildfires. Wildfires are unpredictable and usually destructive, causing both personal property damage and damage to community infrastructure, cultural and economic resources. Negative short term effects of wildfires include destruction of timber, forage, wildlife habitats, scenic vistas and watersheds. Some long term effects include erosion and lowered water quality.

There are many types and causes of fires. Wildfires, arson, accidental fires and others all pose a unique danger to communities and individuals. Since 1985, approximately 9,000 homes have been lost to urban/wild land interface fires across the United States (Northeast States Emergency Consortium: [www.nesec.org](http://www.nesec.org)). The majority of wildfires usually occur in April and May, when home owners are cleaning up from the winter months, and when the majority of vegetation is void of any appreciable moisture making them highly flammable.

The threat of wildland fires for people living near wildland areas or using recreational facilities in wilderness areas is real. Dry conditions at various times of the year and in various parts of the United States greatly increase the potential for wildland fires. Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wildland fire. To reduce the risk to wildfire, it is necessary to consider the fire resistance of structures, the topography of property and the nature of the vegetation in the area.

### *Past Wildfire Events*

There have been few wildfire events in Washington.

### *Potential Future Wildfire Events*

There are many large, contiguous forest tracts in Washington. Where development interfaces with the forested areas is called the “urban interface.” These are the areas where structures could be impacted by a wildfire; these areas are scattered throughout the town. According to the State’s mitigation plan, Sullivan County has substantial debris to fuel a wildfire remaining from the ice storm of 1998 and 2008 and heavy forest cover. The plan gives the county a high risk of wildfire. The Committee determined that the risk of wildfire in Washington is medium/high.

### **Natural Water & Air Contaminants**

Radium, radon and uranium are grouped together because they are radionuclides, unstable elements that emit ionizing radiation. These three particular substances are a health risk only if taken into the body by ingestion or inhalation. They occur naturally in the environment, uranium and radium as solids in rock while radon exists as a gas. Radionuclides are undetectable by taste, odor, or color, so only analytical testing can determine if they are present in water. Because they are associated with rock, wells drilled into bedrock are more likely to contain elevated levels of radionuclides than shallow or dug wells.

Radon gas can also be found in the soil. Openings between the soil and buildings, such as foundation cracks and where pipes enter, provide conduits for radon to move into structures. The difference in air pressure, caused by heated indoor air moving up and out of buildings, results in a flow of soil gas toward the indoors, allowing radon to potentially accumulate in structures. Air quality in a home can also be tested for radon.

There are many other natural contaminants which can render drinking water unsafe such as arsenic. The Drinking Water and Groundwater Bureau of the NH Department of Environmental Services has several fact sheets available to address these natural materials and suggests which materials to be included in testing. See their list of fact sheets at <http://www.des.state.nh.us/dwg.htm>.

### *Past Natural Water & Air Contaminant Events*

There have been no known events related to natural water and air contamination in Washington although uranium is a known water contaminant in neighboring towns. Concentrated amounts of uranium were also found during the construction of I-89 north of Washington.

**Table III-11: RADON – LOW/MEDIUM RISK**

<b>RADON</b>					
<b>Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)</b>					
<b>County</b>	<b># Tests</b>	<b>G. Mean</b>	<b>Maximum</b>	<b>% &gt; 4.0 pCi/l</b>	<b>% &gt; 12.0 pCi/l</b>
Belknap	744	1.3	22.3	14.4	1.3
Carroll	1042	3.5	478.9	45.4	18
Cheshire	964	1.3	131.2	15.6	2.3
Coos	1072	3.2	261.5	41	17
Grafton	1286	2.0	174.3	23.2	5.2
Hillsborough	2741	2.1	202.3	29.6	6.8
Merrimack	1961	2.0	152.8	25.2	6
Rockingham	3909	3.0	155.3	40	9.5
Strafford	1645	3.4	122.8	44	13
<b>Sullivan</b>	<b>466</b>	<b>1.4</b>	<b>29.4</b>	<b>15.7</b>	<b>2.1</b>
<b>STATEWIDE</b>	<b>15860</b>	<b>2.4 pCi/L</b>	<b>478.9 pCi/L</b>	<b>32.4</b>	<b>8.6</b>

*Potential Future Natural Air & Water Contaminant Damage:*

Although there are no known records of illness that can be attributed to radium, radon, or uranium or other contaminants in Washington, residents should be aware that they are present. Houses with granite and dirt cellars are at increased risk to radon gas infiltration. According to the table above, Sullivan County radon levels are below average for the State. According to the State’s mitigation plan, Sullivan County has a medium probability of a radon related hazard.

In addition radium, radon, and uranium as well as other natural materials can be present in drinking water. Residents, especially with bedrock wells, should be aware of the possibility of water contamination and the availability of testing and remediation. The Committee determined that the risk of natural contaminants is low/medium.

**Hazardous Materials Spills**

Hazardous materials spills or releases can cause loss of life and damage to property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident.

### *Past Hazardous Waste Spill Events*

No known significant spills have occurred in Washington though they are possible in transportation as there is substantial through traffic on Route 31. In addition, heating fuel is delivered to homes on many of the town's roads. The only active hazardous waste generation site in Washington is the Town's highway storage facility. The only above ground storage tanks listed on the NH Department of Environmental Services list belonged to the Town of Washington and are no longer in service and appear to have been dismantled. Spills could also occur at underground storage tanks during the filling of the tanks, but above-ground tanks are more susceptible to hazards such as earthquakes and wind events. There are also smaller above-ground tanks under 660 gallons in town at small businesses.

### *Potential Future Hazardous Waste Spill Damage*

There conceivably could be spills near any home in Washington due to home heating fuel delivery. The property owner is responsible for clean-up. The State oversees these reported spills. Larger spills are possible from non-residential fuel tanks as shown above in Washington. There is also a potential for hazardous materials spills on all roads, especially the highly traveled NH Route 31. The cost for clean-up would be assigned to the transporter. However, there should be an emergency plan to immediately respond to the site to minimize water and ground contamination. The State did not determine county risk for hazardous waste spills in the *NH Hazard Mitigation Plan*. The Committee determined a hazardous waste spill is a low/medium risk.

## **Terrorism**

Terrorism has been defined in many ways. The word terrorism is derived from the Latin term "terrere" which means to frighten. Under current United States law, set forth in the US Patriot Act, acts of domestic terrorism are those which: "(A) involve acts dangerous to human life that are a violation of the criminal laws of the United States or of any State; (B) appear to be intended— (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and (C) occur primarily within the territorial jurisdiction of the United States." The Town of Washington's Emergency Operations Plan provides greater detail of terrorism threats.

### *Past Terrorism Events*

There have been no terrorism events within Washington in the past.

*Future Terrorism Events*

Although not considered a major risk, there are two sites in Washington that could conceivably be vulnerable to an act of domestic terrorism: Washington Elementary School and Washington Town Hall and Offices.

The Committee determined that the risk of terrorism is a low risk in Washington.

**C. HAZARD RISK RATINGS**

The Town of Washington Hazard Mitigation Committee reviewed each potential hazard and rated the probability of occurrence and vulnerability (cost if the hazard actually occurs) to come up with an overall risk rating. The ratings were based on past occurrences of hazards affecting the State of New Hampshire, Sullivan County, and the Town of Washington. Although several hazards were determined to fall in the medium/high risk range rather than the high range, hurricanes, tornado & downbursts, earthquakes, and wildfire were ranked numerically as the highest risks in Washington.

**Assessing Probability**

The process involved assigning a number to each hazard type based on its potential of occurring determined using the committee’s knowledge of past events:

- 1 – Unlikely: may occur after 25 years
- 2 – Possible: may occur within 10-25 years
- 3 – Likely: may occur within 10 years

An n/a score was given if there was insufficient evidence to make a decision. For comparative purposes ratings were given as shown above, the Low rating was given a designation of “1,” the Medium rating a designation of “2,” and the High rating a designation of “3.” Finally, the Committee determined a probability ranking. These figures are shown in III-14. Table III-12 is provided for comparison for the County as provided in the State’s plan.



**Table III-12: PROBABILITY OF HAZARD**

Probability of Hazard Occurring in Sullivan County from State Plan											
Flood	Dam Failure	Drought	Wildfire	Earthquake	Land-slide	Radon	Tornado	Hurricane	Lightning	Severe Winter	Avalanche
H	L	M	H	M	M	M	M	M	M	H	L

**Assessing Vulnerability**

A relative scale of 1 to 3 was used to determine the impact and cost for human death and injury, property losses and damages, and business/agricultural impact: 1 – limited damage and cost; 2 - moderate amount of damage and cost, and 3 – high damage and cost.

The Committee determined vulnerabilities were then averaged with the “low” vulnerability determined for Sullivan County in the *NH Natural Hazard Mitigation Plan*.

**Table III-13: VULNERABILITY OF EXISTING DEVELOPED AREAS**

Committee Assessment of Vulnerability	Human Impact	Property Impact	Economic Impact	Vulnerability
	Probability of death or injury	Physical losses and damages	Cottage businesses & agriculture	Avg. of human/property/ business impact
Dam Failure	1	1	1	1.0
Flooding	1	2	1	1.3
Hurricane	2	3	2	2.3
Tornado & Downburst	3	3	1	2.3
Thunderstorm/Lightning/Hail	1	1	1	1.0
Severe Winter/Ice Storms	1	2	1	1.3
Earthquake	3	3	3	3.0
Landslide	1	1	1	1.0
Drought	1	1	1	1.0
Extreme Heat	1	1	1	1.0
Erosion	1	2	1	1.3
Wildfire	1	3	2	2.0
Natural Contaminants	1	1	1	1.0

Committee Assessment of Vulnerability	Human Impact	Property Impact	Economic Impact	Vulnerability
	Probability of death or injury	Physical losses and damages	Cottage businesses & agriculture	Avg. of human/property/ business impact
HazMat Spills	1	1	1	1.0
Terrorism	3	1	1	1.7

**Assessing Risk**

The averages of each vulnerability and probability were multiplied to arrive at the overall risk the hazard has on the community. The overall risk or threat posed by a hazard over the next 25 years was determined to be high, medium, or low. Table III-14 provides the result of this evaluation.

**HIGH:** (1) There is strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town’s emergency management training and exercise program.

**MEDIUM:** There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate this hazard. This hazard should be included in the town’s emergency management training and exercise program.

**LOW:** There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate this hazard. This hazard need not be specifically addressed in the town’s emergency management training and exercise program except as generally dealt with during hazard awareness training.

**Table III-14: RISK ASSESSMENT**

<b>Risk Assessment</b>				
0-1.9 Low    2-3.9 Low/Med    4-5.9 Med    6-7.9 Med-High    8-9 High				
<b>Hazards</b>	<b>Probability based on Committee Review</b>	<b>Vulnerability based on Committee Review</b>	<b>Risk Rating (Probability x Vulnerability)</b>	<b>Risk</b>
Dam Failure	1	1.0	1.0	Low
Flooding	3	1.3	3.9	Low/Medium
Hurricane	3	2.3	7.5	Medium/High
Tornado & Downburst	3	2.3	7.5	Medium/High
Thunderstorm/Lightning/Hail	3	1.0	3.0	Low/Medium
Severe Winter	3	1.3	3.9	Low/Medium
Earthquake	2	3.0	6.0	Medium/High
Landslide	1	1.0	1.0	Low
Drought	2	1.0	2.0	Low/Medium
Extreme Heat	2	1.0	2.0	Low/Medium
Erosion	3	1.3	3.9	Low/Medium
Wildfire	3	2.0	6.0	Medium/High
Natural Contaminants	3	1.0	3.0	Low/Med
HazMat	3	1.0	3.0	Low/Med
Terrorism	1	1.7	1.67	Low

#### IV. CRITICAL FACILITIES/LOCATIONS

The Critical Facilities list, identified by the Washington Hazard Mitigation Committee, is divided into three categories. The first category contains facilities needed for emergency response in the event of a disaster. The second category contains non-emergency response facilities that are not required in an event, but that are considered essential for the everyday operation of the Town of Washington. The third category contains facilities/populations that the Committee wishes to protect in the event of a disaster. Values for all buildings in this document were obtained from town tax records for main structures plus assessed value for accessory structures for 2008. The equalization to current values is very close to 100%. A list of bridges with State condition designation follows.

**Table IV-1: EMERGENCY RESPONSE FACILITIES, SERVICES & STRUCTURES**

<b>Critical Facility</b>	<b>Hazard Vulnerability</b>	<b>Value</b>
Public Works Garage (full service backup shelter)	Winter storms; hurricanes, tornado/downburst, earthquake	\$191,200
Police Station	Winter storms; hurricanes, tornado/downburst, earthquake	\$175,600
Center Fire & Rescue Station (EOC)	Winter storms; hurricanes, tornado/downburst, earthquake	\$129,200
East Washington Fire Station	Winter storms; hurricanes, tornado/downburst, earthquake	\$17,300
Evacuation Routes & Bridges: Route 31, East Washington Road, Lempster Mt. Road, Ashuelot Lake (via boat or snowmobile)	Winter storms; hurricanes, tornado/downburst, earthquake	Unknown
Camp Morgan Lodge (full service primary shelter)	Winter storms; hurricanes, tornado/downburst, earthquake (truss roof difficult to access)	\$307,800
Elementary School (full service secondary shelter)	Winter storms; hurricanes, tornado/downburst, earthquake, Terrorism	\$1,013,600
Town Hall (shelter only) & Town Offices	Winter storms; hurricanes, tornado/downburst, earthquake, terrorism	\$447,100
Three aquifers, public well for Camp Morgan and Elementary School	HazMat spills; Natural contaminants	Unknown
Granite State Telephone Switch Station	Winter storms; hurricanes, tornado/downburst, earthquake	\$88,800
Radio Tower on Faxon Hill	Winter storms; hurricanes, tornado/downburst, earthquake	Unknown
Beach House (LAE)	Winter storms; hurricanes, tornado/downburst, earthquake	\$93,700

**Table IV-2: NON-EMERGENCY RESPONSE FACILITIES & STRUCTURES**

<b>Critical Facility</b>	<b>Hazard Vulnerability</b>	<b>Value</b>
Roads & Bridges (non-evacuation)	Dam Failure, Flooding, Erosion, Earthquake, Severe Winter	Unknown
Washington General Store (food & gas)	Winter storms; hurricanes, tornado/downburst, earthquake	\$123,800

**Table IV-3: FACILITIES & POPULATIONS TO PROTECT**

<b>Critical Facility</b>	<b>Hazard Vulnerability</b>	<b>Value</b>
Camp Morgan beach & recreation area	Winter storms; hurricanes, tornado/downburst, earthquake, flooding	See above
Pillsbury State Park	Winter storms; hurricanes, tornado/downburst, earthquake	No bldgs
Idle Times Campground	Winter storms; hurricanes, tornado/downburst, earthquake	\$198,800
Sunapee-Monadnock Greenway	Winter storms; hurricanes, tornado/downburst, earthquake	No bldgs
Shedd Library (brick)	Winter storms; hurricanes, tornado/downburst, earthquake	\$200,300
Congregational Church	Winter storms; hurricanes, tornado/downburst, earthquake	\$203,600
Seventh Day Adventist Church	Winter storms; hurricanes, tornado/downburst, earthquake	\$83,400
Purling Beck Grange	Winter storms; hurricanes, tornado/downburst, earthquake	\$55,000
East Washington Baptist Church	Winter storms; hurricanes, tornado/downburst, earthquake	\$160,000
Montfort Retreat	Winter storms; hurricanes, tornado/downburst, earthquake	\$994,200
All non-residential	All Hazards	\$1.4 M
All homes	All Hazards	\$116 M

**Table IV-4: BRIDGES**

<b>Bridge #</b>	<b>Owner</b>	<b>Road</b>	<b>Feature</b>	<b>Location</b>	<b>Year Built/ Reconstructed</b>	<b>Recom- mended Posting</b>	<b>Bridge Condition</b>
050/043	Town	Marlow Road	Ashuelot River	Town road .54 mile Marlow T/L	1920/2001	NPR	Green
128/073	State	NH Route 31	Halfmoon Pond Outlet	3.7 mi. NW Windsor T/L	1924/1993	NPR	Green
127/075	State	NH Route 31	brook	3.75 mi. N Windsor T/L	1933/1980	E2	Green
193/104	Other	Purling Beck Road	Island Pond Outlet	.3 mi. from town road	1998	NPR	Green
195/109	Other	East Washington Road	Woodward Brook	.13 mi. from E Wash Road	2002	NPR	Green
093/152	State	NH Route 31	Ashuelot River	1.85 mi. S Goshen T/L	1935/1983	E2	Green
177/046	State	NH Route 31	Shedd Brook	.7 mi W Windsor T/L	1928/1980	NPR	Green
131/083	Other	Halfmoon Pond Road	Halfmoon Pond Outlet	.55 mi. NH Route 31	1920/1960	NPR	Yellow
198/106	Other	Purling Beck Road	Beards Brook	.04 mi. from E Wash Road	1920/1954	E2	Green
165/041	Other	Dole School House Road	Highland Lake Outlet	.09 mi. NH Route 31	1987	107	Red
180/046	Other	Smith Pond Road	Shedd Brook	Adjacent NH Route 31	1980	E2	Red
131/075	Other	Mill Street	Halfmoon Pond Outlet	.23 mi. NH Route 31	1987	06	Red
186/126	Other	Ayers Pond Road	Woodward Brook	.7 mi. from E. Wash. Road	1980	NPR	Red

*State Bridge Condition Category: Red – Red List priority for repair; Pink – Close to priority list; Yellow – Needs repair, non-priority; Green – Does not need repair; The E-2 designation is to exclude all combination and single unit certified (weights per NH RSA 266-18-b) vehicles from crossing a specific bridge. NPR = No Posting Required; Bridges 117/156 and 119/151 assumed to be removed from red and pink list as repaired*

## V. DETERMINING HOW MUCH WILL BE AFFECTED

### A. IDENTIFYING VULNERABLE FACILITIES

It is important to determine which critical facilities and other structures are the most vulnerable and to estimate potential losses. The first step is to identify the facilities most likely to be damaged in a hazard event. To do this, the locations of critical facilities were compared to the location of past and potential hazard events. Facilities and structures located in federally and locally determined flood areas, wildfire prone areas, etc. were identified and included in the analysis. There is neither large land areas slated for potential development nor large development projects in the works, so vulnerability of undeveloped land was not analyzed. There are however several vacant lots around the lakes. These will either be merged with existing developed lots or built upon most likely in the flood or dam inundation hazard areas.

**Table V-1: VULNERABILITY OF EXISTING DEVELOPED AREAS**

Area	Hazard	Critical Facilities	Buildings	Infrastructure	Natural Resources	Total Known Building Value
Inundation Areas	Dam Failure	None	98	Four dams; two bridges	Riparian ways	\$11.5 Million
FEMA zones	Flooding	None	61	One dam, six bridges, roads	Riparian ways	\$7 Million
Village	Thunderstorm/Lightning/Hail	Town Hall	1	N/A	N/A	\$447,100
Route 31 North	Landslide	Evacuation Route	None	Route 31	Vegetation	Unknown
Entire Town	Hurricane, Tornado/Downburst, Severe Winter/Ice Storms; Hurricane, Earthquake, Wildfire	All	All buildings in town	All	All	N/A

**Table V-2: VULNERABILITY OF POTENTIAL DEVELOPMENT**

Area	Hazard	Critical Facilities	Projected Buildings	Projected Infrastructure	Projected Value
Around lakes	Flooding & Dam Failure Inundation	None	Unknown	Unknown	Unknown

## **B. IDENTIFYING VULNERABLE SPECIAL POPULATIONS**

Other than the school, Pillsbury State Park, Idle Times Campground, Montfort Retreat, and Camp Morgan, there are no centers of special populations in Washington such as elderly housing. The elderly and physically or mentally impaired residents are located within the community, but scattered throughout the town in their homes. The Health Officer, Welfare Officer and Rescue Squad have a list of people with special needs in case of an emergency.

Most of Washington’s population is located along the maintained roads throughout town.

## **C. POTENTIAL LOSS ESTIMATES**

This section identifies areas in town that are most vulnerable to hazard events and estimates potential losses from these events. It is difficult to ascertain the amount of damage caused by a natural hazard because the damage will depend on the hazard’s extent and severity, making each hazard event quite unique. In addition, human loss of life was not included in the potential loss estimates, but could be expected to occur. FEMA’s *Understanding Your Risks: Identifying Hazards and Estimating Losses* (August 2001) was used in estimating loss evaluations. The value of structures was determined by using town records. The Town’s tax maps were used to determine number of units within each hazard area. The land damage cost, structure content loss costs, and function loss cost were not determined.

### **Dam Failure – Low Risk - \$3 Million Estimated Cost**

Three dams are designated as “significant hazard potential”: May Pond Dam, Millen Lake Dam, and Ashuelot Pond Dam. If any of these dams failed, major economic loss to structures or property, structural damage roads, major environmental or public health losses would likely occur. It is estimated that there are 98 lots with buildings within these three dam inundation areas—most within the Ashuelot Pond Dam inundation area. The total value of these buildings is approximately \$11.5 million. Assuming a 28% structural damage to the buildings, the damage would be over \$3 million.

### **Flooding – Low/Medium Risk - \$2 Million Estimated Cost**

There are approximately 61 residential houses in Washington that are located within the FEMA designated Special Flood Hazard areas. These areas are all “Zone A” meaning they have no base flood elevation. The total value of the buildings is about 7 million. Assuming a 28 % structural damage to the buildings, the damage would total close to \$2 million. There are not a significant number of mobile homes in the flood zones which would receive more substantial damage than buildings. There are no critical facilities within the determined flood areas. The only portion of major road within a flood zone is South Main Street (State Route 31). There are six bridges in these flood areas.



**Hurricane – Medium/High Risk – No Recorded or Estimated Cost**

Damage caused by hurricanes can be severe and expensive. Washington has been impacted in the past by both wind and flooding damage as a result of hurricanes. The total assessed value of all structures within Washington is approximately \$120.4 million. It is random which structures would be impacted and how much. There is no standard loss estimation available and no record of past costs.

**Tornado & Downburst –Medium/High Risk – No Recorded or Estimated Cost**

Tornadoes, downbursts, and microbursts are relatively uncommon natural hazards in New Hampshire, although microbursts in 2007 caused substantial damage. On average, about six tornado events strike each year. In the State of NH, the average annual cost of tornadoes between 1950 and 1995 was \$197,000 (The Disaster Center). These wind events occur in specific areas, so calculating potential town-wide losses is not possible. There is no standard loss estimation model available for tornadoes due to their random nature.

**Thunderstorm/Lightning/Hail – Low/Medium Risk – No Recorded or Estimated Cost**

According to the Federal Alliance for Safe Homes, in an average year, hail causes more than \$1.6 billion worth of damage to residential roofs in the United States, making it, year in and year out, one of the most costly natural disasters. Lightning is one of the most underrated severe weather hazards, yet it ranks as the second-leading weather killer in the United States. More deadly than hurricanes or tornadoes, lightning strikes in America each year killing an average of 73 people and injuring 300 others, according to the National Weather Service. There is no cost estimation model for thunderstorms due to their random nature.

**Severe Winter Weather – Low/Medium Risk – No Recorded or Estimated Cost**

Ice storms often cause widespread power outages by downing power lines, and these storms can also cause severe damage to trees. New England usually experiences at least one or two severe snowstorms, with varying degrees of severity, each year. All of these impacts are a risk to the community and put all residents, especially the elderly, at risk.

According to a study done for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business and Home Safety (U.S.), the 1998 Ice Storm inflicted \$1.2 billion (U.S.) worth of damage in the U.S. and Canada. In New Hampshire alone, over 67,000 people were without power ([http://www.meteo.mcgill.ca/extreme/Research\\_Paper\\_No\\_1.pdf](http://www.meteo.mcgill.ca/extreme/Research_Paper_No_1.pdf)). In 2008, the ice storm caused \$135,000 in Washington. The U.S. average insurance claim was \$1,325 for personal property, \$1,980 for commercial property, and \$1,371 for automobiles.

**Earthquake –Medium/High Risk - \$12 million Estimated Cost**

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and precipitate landslide and flash flood events. Four earthquakes in NH between 1924 and 1989 had a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border. Buildings have not been subject to any seismic design level requirement for construction and would be susceptible to structural damage. The dams, bridges, and roads would be vulnerable to a sizable earthquake event.

FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Costs*, August 2001 provides that an earthquake with a 5% peak ground acceleration (as determined by the US Geologic Survey for the area) could cause damage to single family residences by around 10% of the structural value. If all buildings in Washington were impacted by an earthquake, the estimated damage could be around \$12 million.

**Landslide – Low Risk – No Recorded or Estimated Cost**

The Committee delineated an area where a landslide could potentially occur along Route 31 north of Pillsbury State Park. There is very thin soil over ledge on a steep slope. Although there are no buildings here, a landslide could block the road.

**Drought – Low/Medium Risk – No Recorded or Estimated Cost**

A long drought would cause damage to crops and dry up wells. There is no cost estimate for this hazard in Washington.

**Extreme Heat – Low/Medium Risk – No Recorded or Estimated Cost**

Excessive heat kills more people in the U.S. than tornadoes, hurricanes, floods, and lightning combined. The elderly, very young, obese and those who work outdoors or have substance abuse problems are most at risk from succumbing to heat. Additionally, people in urban areas are more susceptible as asphalt and cement tend to hold in heat throughout the night (Federal Alliance of Safe Homes website). The costs for this hazard are in terms of human suffering. It is not anticipated that there would be any structural or infrastructure costs.

**Erosion – Low/Medium Risk – No Recorded or Estimated Cost**

Development on steep slopes can cause substantial erosion in the adjacent area. This can impact the adjacent roads in the area by making them more susceptible to erosion and washout. Construction itself can cause erosion if best management practices are not used to control run-off from disturbed soils, and the rooftops of buildings displace water which would have gone into the ground. This is then exacerbated by the steep slopes where the run-off moves more quickly and can cause more damage. Since the land use ordinance restricts development on slopes of 25% or greater, it is anticipated that some erosion issues will be avoided.

**Wildfire – Medium/High Risk – No Recorded or Estimated Cost**

The risk of fire is difficult to predict based on location. Forest fires are more likely to occur during drought years. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. Fire danger is generally universal, however, and can occur practically at any time. Dollar damage would depend on the extent of the fire and the number and type of buildings burned. Since the entire developed area of Washington interfaces with forest, all structures are potentially vulnerable to wildfire. The estimated value of all structures is approximately \$120.4 million.

According to the Grafton County Forester, there are no reliable figures for the value of timber in New Hampshire; and excluding the last big fires of the early 1940s, the acres and timber values affected by fires would not be supportive of major investment in fire prevention in this region (v. fire-prone western regions). (The Sullivan County Forester was not available at the time of researching this issue.)

**Natural Contaminants – Low/Medium Risk – No Recorded or Estimated Cost**

The cost of a radon hazard would be the health of individuals exposed to radon. No cost estimate is provided for this hazard.

**Hazardous Material Spills – Low/Medium Risk – No Recorded or Estimated Cost**

The cost of a hazardous material spill would depend upon the extent of the spill, the location of the spill in relation to population, structures, infrastructure, and natural resources, as well as the type of hazardous material. The cost of any clean-up would be imposed upon the owner of the material. However, other less tangible costs such as loss of water quality might be borne by the community. No cost estimate has been provided for this possible hazard. There are no significant hazardous waste generators in Washington—so any spills would likely be from heating fuel delivery or transport of materials through the town on Route 31.

**Terrorism - Low Risk – No Recorded or Estimated Cost**

The cost of any terrorism event is unpredictable and not estimated in this document.

## VI. EXISTING MITIGATION ACTIONS

The next step involves identifying existing mitigation actions for the hazards most likely to affect the Town and evaluating their effectiveness. Table IV-1 is a list of current policies, regulations, and programs in the Town of Washington that protect people and property from natural and human-made hazards as well as current effectiveness and proposed improvements.

**Table VI-1: EXISTING MITIGATION ACTIONS**

Existing Mitigation Action	Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Proposed Improvements/Changes from Previous Hazard Mitigation Plan
Town Master Plan	Most recent version is 2006	All Hazards/Entire Town	Planning Board	Average	Incorporate hazard mitigation information and more in-depth water resources section/Added water resources section as proposed
Emergency Management Plan	Describes the preparation and response necessary for the Town to address emergency situations	All Hazards/Entire Town	EMD & EM Committee	High	More training/Revised in 2008 (added haz materials response plan as recommended as proposed action)
Haz/Mat Program	Provides emergency response to hazardous materials spills	HazMat Spills/Entire Town	Fire Chief	High	Purchase more personal protection equipment and water recovery equipment; more training/ Purchased some clothing & equipment since last plan (moved from proposed actions)
National Flood Insurance Program	Provides insurance program for homes in or near the FEMA determined flood zones	Flooding/Entire Town	Select Board	High	More public awareness through web site and notices to property owners in flood zones/Adopted NFIP in 2008 (moved from proposed actions)
Dam emergency plans and maintenance	NH DES inspects dams; dam owners maintain	Dam Failure/Dam Inundation Areas (See map in Appendix D)	State and individual property owners of dam sites	High	More public awareness through web site and notices to property owners in inundation areas/ Started an education program
State building code	<i>Eliminating from plan this year as Committee felt irrelevant to hazard mitigation.</i>				
Mutual Aid – Police	Agreements for assistance with surrounding towns	All hazards/Entire town	Police Chief	High	Obtain written agreements/None

Existing Mitigation Action	Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Proposed Improvements/ Changes from Previous Hazard Mitigation Plan
Mutual Aid – Fire	Agreements for assistance with surrounding towns	All hazards/Entire town	Fire Chief	High	Obtain inventory of neighboring towns' equipment; Purchase new equipment /None
Mutual Aid – Public Works	Agreements for assistance with surrounding towns	All hazards/Entire town	DPW Director	High	None/Joined since last plan
Land Use Ordinance	Restricts development of wetlands and slopes of 25% or greater	Flooding, Erosion/Entire Town	Planning Board; Select Board	High	Add water body buffers and add driveway standards/ Updated in 2009 (was a proposed action)
State Wetland Regulations	Protects wetlands from damage and development	Flooding/Entire Town	Select Board	Average	Add water body buffers/Updated
Electrical Back-up Generators	Applied for grant for town office and Fire Station/EOC generators; installed portable generator for Camp Morgan and Elementary School; and permanent generator at communication tower on Faxon Hill	All Hazards/Entire Town	EMD	Average	None/Only had school generator and small portable at EOC
Best management practices for erosion and sedimentation control	Guidelines established by the State	Flooding & Erosion/Entire Town	Select Board	Average	Need checklist with start date; put info on web/brochures provided at Town Offices
Comprehensive Shoreland Protection Act	Protects water bodies of 10 acres or more and fourth order streams	Flooding & Erosion/Entire Town	Select Board	Average	None/Had proposed local stream ordinance but State expanded protection coverage to include fourth order streams: Ashuelot River; Beard Brook; Shedd Brook; Unnamed Stream/ River
Flood zone land protection	Work with willing flood zone landowners on protecting land to mitigate flooding and erosion; work with a land trust	Flooding & Erosion; north of Ashuelot Lake	Conservation Commission	Average	More education & land conservation/moved from proposed actions
Hazard tree trimming	Program for cutting hazardous branches and trees as necessary; Applied for grant for hazard tree trimming	All Hazards/Entire Town	DPW (road rights of way); Forest Committee (other)	Average	None/Town Forestry Committee hires professional forester as needed for town forests (was a proposed action)

Existing Mitigation Action	Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Proposed Improvements/Changes from Previous Hazard Mitigation Plan
School Emergency Action Plan	Elementary school participates in Comprehensive Emergency Planning for Schools Program (CEMPS); Annual emergency drills are carried out and the Plan is updated periodically	All Hazards/Entire Town	Police Chief & SAU	Average	All-agency drills more often/None
Class VI road maintenance	Roads kept open and made accessible for fire lanes	Wildfire/Entire Town	DPW Director	Average	Provide secondary access from Old Marlow Road to Ashuelot Pond Development/None (was also a proposed action)
Wildfire Education	Educate public about wild fire prevention	Wildfire/Entire Town	Fire Warden and Deputy Wardens	Average	Become more involved in Fire Wise Program and pursue training for town boards/Provides education at public meetings for lake associations (moved from proposed actions); provides educational brochures
Public Notification/Preparedness Information	E-mails to limited list of recipients and provides public programmable LED sign board	All Hazards/Entire Town	Police Chief	Average	Add more people to e-mail list and information on more types of hazards/New
911 Numbering	Town has ordinance to post 911 numbers at building	All Hazards/Entire Town	Police Chief	Low	Enforce numbering and require replacement of illegible numbers/New though on-going
ICS (Incident Command System) & NIMS (National Incident Management System)	Provides training for town personnel	All Hazards/Entire Town	EMD	Average	Provide additional training to town office staff and school personnel/New though on-going

Table VI-2 examines the proposed improvements and evaluates them as 1: Low; 2: Average; and 3: High for effectiveness looking at several criteria as shown in the table. The totals are then ranked to prioritize the improvements to help the Committee focus on the most effective strategy improvements.

**Table VI-2: PRIORITIZING EXISTING MITIGATION STRATEGY IMPROVEMENTS**

Rank	Strategy Improvement	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
1	Public Notification/ Preparedness Information - Add more people to e-mail list and information on more types of hazards	3	3	3	3	3	3	3	3	24	Both
1	School Emergency Action Plan - All-agency drills more often	3	3	3	3	3	3	3	3	24	Both
2	Best management practices for erosion and sedimentation control - Need permit checklist with start date	2	3	3	3	3	3	3	3	23	New
2	Best management practices for erosion and sedimentation control - Put info on web	2	3	3	3	3	3	3	3	23	Both
2	Flood zone land protection - More education	2	3	3	3	3	3	3	3	23	Both
2	ICS & NIMS - Provide additional training to town office staff and school personnel	2	3	3	3	3	3	3	3	23	Both
3	Town Master Plan - Incorporate hazard mitigation information	2	3	3	2	3	3	3	3	22	Both
3	National Flood Insurance Program - More public awareness through web site and notices to property owners in flood zones	1	3	3	3	3	3	3	3	22	Both
3	Dam emergency plans and maintenance - More public awareness through web site and notices to property owners in inundation areas	1	3	3	3	3	3	3	3	22	Both
3	Mutual Aid – Fire – Purchase new equipment	3	3	3	2	3	3	2	3	22	Both
3	Wildfire Education - Become more involved in Fire Wise Program and pursue training for town boards	2	3	3	2	3	3	3	3	22	Both
3	Flood zone land protection – Provide more land conservation	3	3	3	2	2	3	3	3	22	Both
4	Emergency Management Plan – More training	1	2	3	3	3	3	3	3	21	Both
4	Haz/Mat Program - Purchase more personal protection equipment and water recovery equipment; more training	2	3	2	2	3	3	3	3	21	Both
4	911 Numbering - Enforce numbering and require replacement of illegible numbers	2	3	3	1	3	3	3	3	21	Both
4	Mutual Aid – Fire - Obtain written agreements and obtain inventory of neighboring towns' equipment	3	3	3	1	3	3	3	2	21	Both
5	Class VI road maintenance - Provide secondary access to Lake Ashuelot Estates from Old Marlow Road	2	3	3	1	3	3	3	2	20	Both
6	Land Use Ordinance – Add driveway standards	2	3	2	1	2	3	3	3	19	New
7	Land Use Ordinance – Add water body buffers	2	3	1	1	2	3	3	3	18	New
7	State Wetland Regulations – Encourage change for water body buffers	2	3	1	1	2	3	3	3	18	New

## **VII. GOALS AND NEWLY IDENTIFIED MITIGATION ACTIONS**

### **A. GOALS & OBJECTIVES**

The Washington Hazard Mitigation Committee reviewed its goals and developed objectives to meet these goals.

#### **Goals**

1. To improve upon the protection of the general population, the citizens of the Town of Washington and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Washington's Emergency Response Services.
3. To reduce the potential impact of natural and man-made disasters on the Critical Facilities in the Town of Washington.
4. To reduce the potential impact of natural and man-made disasters on the Town of Washington's infrastructure.
5. To improve the Town of Washington's Emergency Preparedness and Disaster Response and Recovery Capability.
6. To reduce the potential impact of natural and man-made disasters on private property in the Town of Washington.
7. To reduce the potential impact of natural and man-made disasters on the Town of Washington's economy.
8. To reduce the potential impact of natural and man-made disasters on the Town of Washington's natural environment.
9. To reduce the Town of Washington's liability with respect to natural and man-made hazards through a community education program.
10. To reduce the potential impact of natural and man-made disasters on the Town of Washington's specific historic treasures.
11. To identify, introduce and implement cost-effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.
12. The Town of Washington will work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals.

### **B. NEW PROPOSED MITIGATION ACTIONS**

The Washington Hazard Mitigation Committee brainstormed potential mitigation actions. The proposed new measures are organized by the type(s) of hazard event that the mitigation action is expected to mitigate.



**Table VII-1: PROPOSED NEW MITIGATION ACTIONS**

<b>Service Area</b>	<b>Proposed New Mitigation Action Description</b>	<b>Hazard Type</b>	<b>Responsible Local Agent</b>	<b>Changes from Previous Hazard Mitigation Plan</b>
Entire Town	Reverse 911	All Hazards	Police Chief	New
Mill Street Bridge	Replace culvert inadequate for water flow with larger culvert	Flooding & Erosion	DPW Director	New
Faxon Hill Road	Replace culvert inadequate for water flow with larger culvert at northern intersection with Millen Pond Road	Flooding & Erosion	DPW Director	New
Bailey Road	Replace culvert inadequate for water flow with larger culvert at Beaver Bog	Flooding & Erosion	DPW Director	New
East Washington Road	Replace culvert inadequate for water flow with larger culvert; improve roadway alignment for culvert flow at Freezeland Pond outlet	Flooding & Erosion	DPW Director	New
Valley Road	Replace culvert inadequate for water flow with larger culvert at intersection with Cove Road and Beech Way	Flooding & Erosion	DPW Director	New
Lovell Mountain Road	Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road	Flooding & Erosion	DPW Director	New
Millen Pond Road	Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance	Flooding & Erosion	DPW Director	Remaining from 2004 plan due to lack of funds
Millen Pond Road	Replace culvert inadequate for water flow with larger culvert at Rochfords' camp	Flooding & Erosion	DPW Director	New
Halfmoon Pond Road	Replace culvert inadequate for water flow with larger culvert after boat landing	Flooding & Erosion	DPW Director	New
Island Pond dam	Install slip liner in existing culvert which is part of dam system to mitigate future dam breach	Dam Failure	DPW Director	New
Valley Road	Replace culvert inadequate for water flow with larger culvert by Jane Kelly's	Flooding & Erosion	DPW Director	New
Valley Road	Replace culvert inadequate for water flow with larger culvert by Bob & Rita Joys'	Flooding & Erosion	DPW Director	New
Ayers Pond Road	Improve drainage work by Marshalls	Erosion	DPW Director	New
Bear Hill Road	Improve drainage with ditches and blasting	Erosion	DPW Director	New
Halfmoon Pond Road	Improve drainage with ditch work; tree work; and pavement to prevent drainage clogging on very steep grade near Jagers'	Erosion	DPW Director	New
Old Marlow Road	Improve drainage and pave to prevent drainage clogging on very steep grade	Erosion	DPW Director	New
Farnsworth Hill Road	Pave road to prevent clogging of drainage on very steep grade	Erosion	DPW Director	New

Service Area	Proposed New Mitigation Action Description	Hazard Type	Responsible Local Agent	Changes from Previous Hazard Mitigation Plan
Bailey Road	Improve drainage and pave road to prevent drainage clogging	Erosion	DPW Director	New
Halfmoon Pond Road	Improve drainage on gradual slope over ledge north of Lovell Mountain Road	Erosion	DPW Director	New
Entire Town	Map and assess water sites and other resources along woods roads and trails for wildland firefighting.	Wildfire	Forest Fire Warden	New
Valley Road area	Install dry hydrant to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Boat launch off Peninsula Road	Install dry hydrant to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Washington Drive Dam area	Install dry hydrant to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Eastern side of Highland Lake	Install cistern to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Washington Heights Road	Install cistern to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Martin Road	Install cistern to provide year-round access to water fire protection	Wildfire	Fire Chief	New
Entire Town	Purchase bucket truck for Public Works to limb and remove hazard trees	All Hazards	DPW Director	Remaining from 2004 Plan due to lack of funds
Entire Town	Develop water resource protection plan to address issues pertaining to water quantity and quality for the town’s many water bodies	Flooding & Erosion	Planning Board and Conservation Commission	Remaining from 2004 Plan due to lack of support
Entire Town	Enact a local building code	<i>Eliminated as Committee felt irrelevant to hazard mitigation</i>		

### C. SUMMARY OF CRITICAL EVALUATION

The Washington Hazard Mitigation Committee reviewed each of the newly identified mitigation strategies using the following factors:

- Does it reduce disaster damage?
- Does it contribute to community objectives?
- Does it meet existing regulations?
- Can it be quickly implemented?
- Is it socially acceptable?

- Is it technically feasible?
- Is it administratively possible?
- Does the action offer reasonable benefits compared to cost of implementation?

Each mitigation strategy was evaluated and assigned a score (High – 3; Average – 2; and Low – 1) based on the criteria.

**Table VII-2: PRIORITIZING PROPOSED NEW MITIGATION STRATEGIES**

Rank	Strategy	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration. Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
1	East Washington Road - Replace culvert inadequate for water flow with larger culvert; improve roadway alignment for culvert flow	3	3	3	3	3	3	3	2	23	Both
1	Millen Pond Road - Replace culvert inadequate for water flow with larger culvert at Rochfords' camp	3	3	3	3	3	3	3	2	23	Both
1	Island Pond dam - Install slip liner in existing culvert which is part of dam system to mitigate future dam breach	3	3	3	3	3	3	3	2	23	Both
1	Map and assess water sites and other resources along woods roads and trails	2	3	3	3	3	3	3	3	23	Both
2	Mill Street Bridge - Replace culvert inadequate for water flow with larger culvert	3	3	3	2	3	3	3	2	22	Both
2	Valley Road - Replace culvert inadequate for water flow with larger culvert by Bob & Rita Joys'	3	3	3	3	3	3	2	2	22	Both
2	Valley Road area – Install dry hydrant	3	3	3	2	3	3	2	3	22	Both
2	Boat Launch off Peninsula Road – Install dry hydrant	3	3	3	2	3	3	2	3	22	Both
2	Washington Drive Dam area – Install dry hydrant	3	3	3	2	3	3	2	3	22	Both
2	Develop water resource protection plan to address issues pertaining to water quantity and quality for the town's many water bodies	3	3	3	2	2	3	3	3	22	Both
3	Reverse 911	2	3	3	2	3	3	3	2	21	Both
3	Faxon Hill Road - Replace culvert inadequate for water flow with larger culvert	3	3	3	2	3	3	2	2	21	Both
3	Bailey Road - Replace culvert inadequate for water flow with larger culvert at Beaver Bog	3	3	3	1	3	3	3	2	21	Both
3	Valley Road - Replace culvert inadequate for water flow with larger culvert at intersection with Cove Road and Beech Way	3	3	3	2	3	3	2	2	21	Both

Rank	Strategy	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration. Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
3	Millen Pond Road - Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance	3	3	3	2	3	3	2	2	21	Both
3	Halfmoon Pond Road - Replace culvert inadequate for water flow with larger culvert after boat landing	3	3	3	2	3	3	2	2	21	Both
3	Valley Road - Replace culvert inadequate for water flow with larger culvert by Jane Kelly's	3	3	3	2	3	3	2	2	21	Both
3	Farnsworth Hill Road - Pave road to prevent clogging of drainage on very steep grade	3	3	3	2	3	3	2	2	21	Both
3	Halfmoon Pond Road - Improve drainage on gradual slope over ledge north of Lovell Mountain Road	3	3	3	1	3	3	2	3	21	Both
4	Lovell Mountain Road - Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road	3	3	3	1	3	3	2	2	20	Both
4	Ayers Pond Road - Improve drainage work by Marshalls	3	3	3	1	3	3	2	2	20	Both
4	Bear Hill Road - Improve drainage with ditches and blasting	3	3	3	1	3	3	2	2	20	Both
4	Bailey Road - Improve drainage and pave road to prevent drainage clogging	3	3	3	1	3	3	1	3	20	Both
4	Lond Pond Road and East Shore Road – Install cistern	3	3	3	1	3	3	1	3	20	Both
4	Washington Heights Road – Install cistern	3	3	3	1	3	3	1	3	20	Both
4	Martin Road – Install cistern	3	3	3	1	3	3	1	3	20	Both
5	Halfmoon Pond Road - Improve drainage with ditch work; tree work; and pavement to prevent drainage clogging on very steep grade near Jagers'	3	3	3	1	3	3	1	3	20	Both
5	Old Marlow Road - Improve drainage and pave to prevent drainage clogging on very steep grade	3	3	3	1	3	3	1	2	19	Both
6	Purchase bucket truck for Public Works	3	3	3	1	3	3	1	1	18	Both

The Washington Hazard Mitigation Committee assigned the following scores to each strategy for its effectiveness related to the critical evaluation factors listed above, and actions had the following scores, with the highest scores suggesting the highest priority.

### VIII. PRIORITIZED IMPLEMENTATION SCHEDULE

The Washington Hazard Mitigation Committee created the following action plan for implementation of priority mitigation strategies:

**Table VIII-1: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING PROGRAM IMPROVEMENTS**

Location: Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
Town Master Plan - Incorporate hazard mitigation information	Planning Board	2009	N/A	N/A
Emergency Management Plan – More training	EMD	2010	Taxes and Grants	\$500
Haz/Mat Program - Purchase more personal protection equipment and water recovery equipment; more training	Fire Chief	2009	Taxes and Grants	\$15,000
National Flood Insurance Program - More public awareness through web site	Web Manager	2009	N/A	N/A
National Flood Insurance Program - Notices to property owners in flood zones	Select Board	2009	Taxes & Grants	\$250
Dam emergency plans and maintenance - More public awareness through web site	Web Manager	2009	N/A	N/A
Dam emergency plans and maintenance - Notices to property owners in flood zones	Select Board	2009	Taxes & Grant	\$250
Mutual Aid – Fire - Obtain written agreements and inventory of neighboring towns’ equipment	Fire Chief	2009	N/A	N/A
Mutual Aid – Fire - Purchase new equipment	Fire Chief	2009-2013	Taxes & Grants	\$30,000/year

Location: Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
Land Use Ordinance – Add water body buffers and add driveway standards	Planning Board	2009	Taxes	\$300
State Wetland Regulations – Encourage change for water body buffers	Conservation Commission	2010	N/A	N/A
Best management practices for erosion and sedimentation control - Need permit checklist with start date; put info on web	Select Board	2009	N/A	N/A
Flood zone land protection - More education	Conservation Commission	2009	N/A	N/A
Flood zone land protection - More land conservation	CC & Select Board	2009	Grants, donations, and taxes	Unknown
School Emergency Action Plan - All-agency drills more often	Police Chief & SAU	2009	N/A	N/A
Class VI road maintenance - Provide secondary access from Old Marlow Road to Lake Ashuelot Estates	DPW Director	2012	Taxes & Grants	\$20,000
Wildfire Education - Become more involved in Fire Wise Program and pursue training for town boards	Fire Warden	2009	Taxes & Grants	\$500
Public Notification/ Preparedness Information - Add more people to e-mail list and information on more types of hazards	Police Chief	2009	N/A	N/A
911 Numbering - Enforce numbered and require replacement of illegible numbers	Police Chief	2009	N/A	N/A

**Table VIII-2: PRIORITIZED IMPLEMENTATION SCHEDULE FOR PROPOSED PROGRAMS**

Location: Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
Reverse 911	Police Chief	2009	Grants & Taxes	Unknown
Mill Street Bridge - Replace culvert inadequate for water flow with larger culvert	DPW Director	2013	Grants & Taxes	\$500,000
Faxon Hill Road - Replace culvert inadequate for water flow with larger culvert	DPW Director	2010	Grants & Taxes	\$45,000
Bailey Road - Replace culvert inadequate for water flow with larger culvert at Beaver Bog	DPW Director	2020	Grants & Taxes	\$300,000
East Washington Road - Replace culvert inadequate for water flow with larger culvert; improve roadway alignment for culvert flow	DPW Director	2010	Grants & Taxes	\$50,000
Valley Road - Replace culvert inadequate for water flow with larger culvert at intersection with Cove Road and Beech Way	DPW Director	2011	Grants & Taxes	\$35,000
Lovell Mountain Road - Replace culvert inadequate for water flow with larger culvert on summer maintenance section of Class V road	DPW Director	2011	Grants & Taxes	\$5,000
Millen Pond Road - Replace culvert inadequate for water flow with larger culvert at Camp Morgan entrance	DPW Director	2013	Grants & Taxes	\$6,000
Millen Pond Road - Replace culvert inadequate for water flow with larger culvert at Rochfords' camp	DPW Director	2010	Grants & Taxes	\$3,000
Halfmoon Pond Road - Replace culvert inadequate for water flow with larger culvert after boat landing	DPW Director	2013	Grants & Taxes	\$5,000
Island Pond dam - Install slip liner in existing culvert which is part of dam system to mitigate future dam breach	DPW Director	2009	Grants & Taxes	\$35,000
Valley Road - Replace culvert inadequate for water flow with larger culvert by Jane Kelly's	DPW Director	2014	Grants & Taxes	\$5,000

Location: Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
Valley Road - Replace culvert inadequate for water flow with larger culvert by Bob & Rita Joys'	DPW Director	2013	Grants & Taxes	\$3,000
Ayers Pond Road - Improve drainage work by Marshalls	DPW Director	2015	Grants & Taxes	\$10,000
Bear Hill Road - Improve drainage with ditches and blasting	DPW Director	2016	Grants & Taxes	\$25,000
Halfmoon Pond Road - Improve drainage with ditch work; tree work; and pavement to prevent drainage clogging on very steep grade near Jagers'	DPW Director	2018	Grants & Taxes	\$30,000
Old Marlow Road - Improve drainage and pave to prevent drainage clogging on very steep grade	DPW Director	2018	Grants & Taxes	\$50,000
Farnsworth Hill Road - Pave road to prevent clogging of drainage on very steep grade	DPW Director	2016	Grants & Taxes	\$40,000
Bailey Road - Improve drainage and pave road to prevent drainage clogging	DPW Director	2019	Grants & Taxes	\$50,000
Halfmoon Pond Road - Improve drainage on gradual slope over ledge north of Lovell Mountain Road	DPW Director	2014	Grants & Taxes	\$35,000
Entire Town - Map and assess water sites and other resources along woods roads and trails	Forest Fire Warden	2009	NA	NA
Valley Road area – Install dry hydrant	Fire Chief	2010	Grants	\$3,000
Boat Launch off Peninsula Road – Install dry hydrant	Fire Chief	2011	Grants & Donations	\$3,000
Washington Drive Dam area – Install dry hydrant	Fire Chief	2013	Grants & Donations	\$3,000
Long Pond Road and East Shore Road – Install cistern	Fire Chief	2011	Grants & Donations	\$3,000



Location: Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
Washington Heights Road – Install cistern	Fire Chief	2012	Grants & Donations	\$3,000
Martin Road – Install cistern	Fire Chief	2012	Grants & Donations	\$3,000
Purchase bucket truck for Public Works	DPW Director	Unknown depending on availability	Grants & Taxes	\$3,000
Develop water resource protection plan to address issues pertaining to water quantity and quality for the town’s many water bodies	Conservation Commission & Planning Board	2009	Grants & Taxes	Unknown

## **IX. ADOPTION & IMPLEMENTATION OF THE PLAN**

A good plan needs to provide for periodic monitoring and evaluation of its successes and challenges, and to allow for updates of the Plan where necessary. In order to track progress and update the Mitigation Strategies identified in the Plan, the Town of Washington will revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Washington Emergency Management Director will initiate this review and should consult with the Hazard Mitigation Committee. Changes will be made to the plan to accommodate for projects that have failed, or that are not considered feasible after a review for their consistency with the evaluation criteria, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked highest, but that were identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of this plan, to determine feasibility for future implementation. The plan will be updated and submitted for FEMA approval at a minimum every five years as required by the Disaster Mitigation Act 2000.

### **A. IMPLEMENTATION THROUGH EXISTING PROGRAMS**

The Plan will be adopted locally as an Annex to the recently updated Emergency Operations Plan (EOP), and it will be updated annually along with the EOP. In addition, the Board of Selectmen, during the Capital Improvement Process, will review and include any proposed structural projects outlined in this plan.

### **B. CONTINUED PUBLIC INVOLVEMENT**

The public will continue to be involved in the hazard mitigation planning process. In future years, a public meeting will be held (separate from the adoption hearing) to inform and educate members of the public. Additionally, a press release will be distributed, and information will be posted on the Town website.

Copies of the Hazard Mitigation Plan have been or will be sent to the following parties for review and comment:

- Selectmen's Offices in neighboring towns
- Richard Verville, NH Homeland Security & Emergency Management
- Board of Selectmen, Washington
- Upper Valley Lake Sunapee Regional Planning Commission

## RESOURCES USED IN THE PREPARATION OF THIS PLAN

*Guide to Hazard Mitigation Planning for New Hampshire Communities*, prepared for NH HSEM by the Southwest Regional Planning Commission (October 2002)

FEMA *Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000* (March 2004, Last Revised June 2007)

FEMA 386-1 *Getting Started: Building Support for Mitigation Planning* (September 2002)

FEMA 386-2 *Understanding Your Risks: Identifying Hazards and Estimating Costs* (August 2001)

FEMA 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies* (April 2003)

*Ice Storm '98* by Eugene L. Lecomte et al for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business & Home Safety (U.S.) (December 1998) [www.meteo.mcgill.ca/extreme/Related\\_Info.htm#disname](http://www.meteo.mcgill.ca/extreme/Related_Info.htm#disname)

*Town of Washington Emergency Operations Plan*, 2008

*Town of Washington Master Plan*, 2006

NH HSEM's *State of New Hampshire Natural Hazard Mitigation Plan* (2004)

[www.fema.gov/news/disasters.fema](http://www.fema.gov/news/disasters.fema): Website for FEMA's Disaster List

[www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms](http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms): Website for National Oceanic & Atmospheric Administration Disaster List

[www.tornadoproject.com](http://www.tornadoproject.com): Website for The Tornado Project

[www.crrel.usace.army.mil/](http://www.crrel.usace.army.mil/): Website for Cold Regions Research and Engineering Laboratory Website (CRREL)

[www.nesec.org](http://www.nesec.org): Website for Northeast States Emergency Consortium

[http://earthquake.usgs.gov/research/hazmaps/products\\_data/2002/ceus2002.php](http://earthquake.usgs.gov/research/hazmaps/products_data/2002/ceus2002.php): Website for area earthquake information

**APPENDICES**

- Appendix A: Technical Resources**
- Appendix B: Hazard Mitigation Assistance Grants**
- Appendix C: Meeting Documentation**
- Appendix D: Map of Hazard Areas and Critical Facilities**
- Appendix E: Town Adoption Resolution**
- Appendix F: Crosswalk Submitted to FEMA for Plan Approval**
- Appendix G: FEMA Approval Letter**



**APPENDIX A:**  
**Technical Resources**

**APPENDIX A: TECHNICAL RESOURCES**

**1) Agencies**

New Hampshire Homeland Security and Emergency Management  
Hazard Mitigation Section ..... 271-2231  
Federal Emergency Management Agency .....(617) 223-4175  
NH Regional Planning Commissions:  
Upper Valley Lake Sunapee Regional Planning Commission ..... 448-1680  
NH Executive Department:  
Governor’s Office of Energy and Community Services ..... 271-2611  
New Hampshire Office of State Planning ..... 271-2155  
NH Department of Cultural Affairs: ..... 271-2540  
Division of Historical Resources ..... 271-3483  
NH Department of Environmental Services: ..... 271-3503  
Air Resources ..... 271-1370  
Waste Management ..... 271-2900  
Water Resources ..... 271-3406  
Water Supply and Pollution Control ..... 271-3504  
Rivers Management and Protection Program ..... 271-1152  
NH Office of Energy and Planning ..... 271-2155  
NH Municipal Association ..... 224-7447  
NH Fish and Game Department ..... 271-3421  
NH Department of Resources and Economic Development: ..... 271-2411  
Natural Heritage Inventory ..... 271-3623  
Division of Forests and Lands ..... 271-2214  
Division of Parks and Recreation ..... 271-3255  
NH Department of Transportation ..... 271-3734  
Northeast States Emergency Consortium, Inc. (NESEC) .....(781) 224-9876  
US Department of Commerce:  
National Oceanic and Atmospheric Administration:  
National Weather Service; Gray, Maine ..... 207-688-3216

US Department of the Interior:	
US Fish and Wildlife Service .....	225-1411
US Geological Survey .....	225-4681
US Army Corps of Engineers.....	(978) 318-8087
US Department of Agriculture:	
Natural Resource Conservation Service .....	868-7581

**2) Mitigation Funding Resources**

404 Hazard Mitigation Grant Program (HMGP) .....	NH Homeland Security and Emergency Management
406 Public Assistance and Hazard Mitigation .....	NH Homeland Security and Emergency Management
Community Development Block Grant (CDBG).....	NH HSEM, NH OEP, also refer to RPC
Dam Safety Program .....	NH Department of Environmental Services
Disaster Preparedness Improvement Grant (DPIG) .....	NH Homeland Security and Emergency Management
Emergency Generators Program by NESEC‡ .....	NH Homeland Security and Emergency Management
Emergency Watershed Protection (EWP) Program .....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP) .....	NH Homeland Security and Emergency Management
Flood Plain Management Services (FPMS) .....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP) .....	NH Homeland Security and Emergency Management
Mutual Aid for Public Works .....	NH Municipal Association
National Flood Insurance Program (NFIP) † .....	NH Office of Energy and Planning
Power of Prevention Grant by NESEC‡ .....	NH Homeland Security and Emergency Management
Project Impact.....	NH Homeland Security and Emergency Management
Roadway Repair & Maintenance Program(s) .....	NH Department of Transportation
Section 14 Emergency Stream Bank Erosion & Shoreline Protection.....	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing .....	US Army Corps of Engineers
Shoreland Protection Program.....	NH Department of Environmental Services
Various Forest and Lands Program(s).....	NH Department of Resources and Economic Development
Wetlands Programs.....	NH Department of Environmental Services



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

† Note regarding National Flood Insurance Program (NFIP) and Community Rating System (CRS):

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

### 3) Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	<a href="http://www.colorado.edu/litbase/hazards/">http://www.colorado.edu/litbase/hazards/</a>	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	<a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	<a href="http://nemaweb.org">http://nemaweb.org</a>	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	<a href="http://www.gsfc.nasa.gov/ndrd/disaster/">http://www.gsfc.nasa.gov/ndrd/disaster/</a>	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	<a href="http://ltpwww.gsfc.nasa.gov/ndrd/main/html">http://ltpwww.gsfc.nasa.gov/ndrd/main/html</a>	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	<a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>	General information through the federal-state partnership.
National Weather Service	<a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	<a href="http://h20.usgs.gov/public/realtime.html">http://h20.usgs.gov/public/realtime.html</a>	Provisional hydrological data
Dartmouth Flood Observatory	<a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	<a href="http://www.fema.gov/fema/csb.htm">http://www.fema.gov/fema/csb.htm</a>	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	<a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a>	Tracking and NWS warnings for Atlantic Hurricanes and other links

Sponsor	Internet Address	Summary of Contents
National Lightning Safety Institute	<a href="http://lightningsafety.com/">http://lightningsafety.com/</a>	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	<a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	<a href="http://wwwep.es.llnl.gov/wwwep/ghp.html">http://wwwep.es.llnl.gov/wwwep/ghp.html</a>	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	<a href="http://www.tornadoobject.com/">http://www.tornadoobject.com/</a>	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	<a href="http://www.nssl.uoknor.edu/">http://www.nssl.uoknor.edu/</a>	Information about and tracking of severe storms.
Independent Insurance Agents of America IAA Natural Disaster Risk Map	<a href="http://www.iaa.iix.com/ndcmap.htm">http://www.iaa.iix.com/ndcmap.htm</a>	A multi-disaster risk map.
Earth Satellite Corporation	<a href="http://www.earthsat.com/">http://www.earthsat.com/</a>	Flood risk maps searchable by state.
USDA Forest Service Web	<a href="http://www.fs.fed.us/land">http://www.fs.fed.us/land</a>	Information on forest fires and land management.

**APPENDIX B:**

**Hazard Mitigation Assistance Grants**

## **APPENDIX B: HAZARD MITIGATION ASSISTANCE GRANTS**

Hazard Mitigation Assistance (HMA) grant programs of the Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA), presents a critical opportunity to protect individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. The HMA programs provide pre-disaster mitigation grants annually to local communities. The statutory origins of the programs differ, but all share the common goal of reducing the loss of life and property due to natural hazards. Eligible applicants include State-level agencies including State institutions; Federally recognized Indian Tribal governments; Public or Tribal colleges or universities (PDM only); and Local jurisdictions that are participating in the National Flood Insurance Program (NFIP).

The HMA grant assistance includes four programs:

1. *The Pre-Disaster Mitigation (PDM) program:* This provides funds 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 awarded on a competitive basis.
2. *The Flood Mitigation Assistance (FMA) program:* This provides funds so that cost-effective measures can be taken to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the NFIP. The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities.
3. *The Repetitive Flood Claims (RFC) program:* This program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured by NFIP that have had one or more claim payments for flood damages. The long-term goal of the RFC program is to reduce or eliminate claims under the NFIP through mitigation activities that are in the best interest of the NFIP.
4. *The Severe Repetitive Loss (SRL) program:* This program provides funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP.

Potential eligible projects are shown in the following table by grant program. For further information on these programs visit the following FEMA websites:

PDM – [www.fema.gov/government/grant/pdm/](http://www.fema.gov/government/grant/pdm/)

FMA – [www.fema.gov/government/grant/fma/](http://www.fema.gov/government/grant/fma/)

RFC – [www.fema.gov/government/grant/rfc/](http://www.fema.gov/government/grant/rfc/)

SRL – [www.fema.gov/government/grant/srl/](http://www.fema.gov/government/grant/srl/)

Mitigation Project:	PDM	FMA	RFC	SRL
<b>1. Property Acquisition and Demolition or Relocation Project</b>				
Property Elevation	X	X	X	X
<b>2. Construction Type Projects</b>				
Property Elevation	X	X	X	X
Mitigation Reconstruction <sup>1</sup>				X
Localized Minor Flood Reduction Projects	X	X	X	X
Dry Floodproofing of Residential Property <sup>2</sup>		X		X
Dry Floodproofing of Non-residential Structures		X	X	
Stormwater Management	X	X		
Infrastructure Protection Measure	X			
Vegetative Management/Soil Stabilization	X			
Retrofitting Existing Buildings and Facilities (Wind/Earthquake)	X			
Safe room construction	X			
<b>3. Non-construction Type Projects</b>				
All Hazard/Flood Mitigation Planning	X	X		
1. The SLR Program allows Mitigation Reconstruction projects located outside the regulatory floodway or Zone V as identified on the effective Flood Insurance Rate Map (FIRM), or the mapped limit of the 1.5-foot breaking wave zone. Mitigation Reconstruction is only permitted if traditional elevation cannot be implemented.				
2. The residential structure must meet the definition of “Historic Structure” in 44 CFR§59.1.				

### **Appendix C: Meeting Documentation**

#### **AGENDAS:**

##### **Meeting # 1:**

##### **July 16, 2009: 6:00 – 8:30 PM Washington Center Fire Station**

- Why do a Hazard Mitigation Plan? Lessen impact; grant qualification
- Goals of the plan – are they still relevant?
- \$5,000 In-Kind Match – tracking time
- What hazards may occur in Washington? Go through flip chart list. Eliminate irrelevant hazards.
- Identify and map past/potential hazards (map);
- Identify general areas where structures could be damaged;
- Potential development areas in town (especially in hazard areas);
- Identify & locate critical facilities (emergency response & non-response);
- Identify special populations if any;
- Identify hazard mitigation efforts already in place (see list from previous plan; and
- Identify gaps in the current mitigation efforts/programs.

##### **Meeting #2**

##### **July 21, 2009: 6:00 – 8:30 PM Washington Center Fire Station**

- Determine probability of each hazard
- Determine vulnerability of developed areas
- Determine risk assessment based on previous two items
- Prioritize EXISTING mitigation strategy improvements determined at first meeting
- Develop implementation schedule for EXISTING strategy improvements
- Brainstorm potential NEW mitigation efforts for all hazards
- Prioritize NEW mitigation efforts
- Develop a prioritized implementation schedule and discuss the adoption and monitoring of the plan

##### **Meeting #3**

##### **August 5, 2009: 6:00 – 7:00 PM Washington Center Fire Station**

Review and revise draft plan.

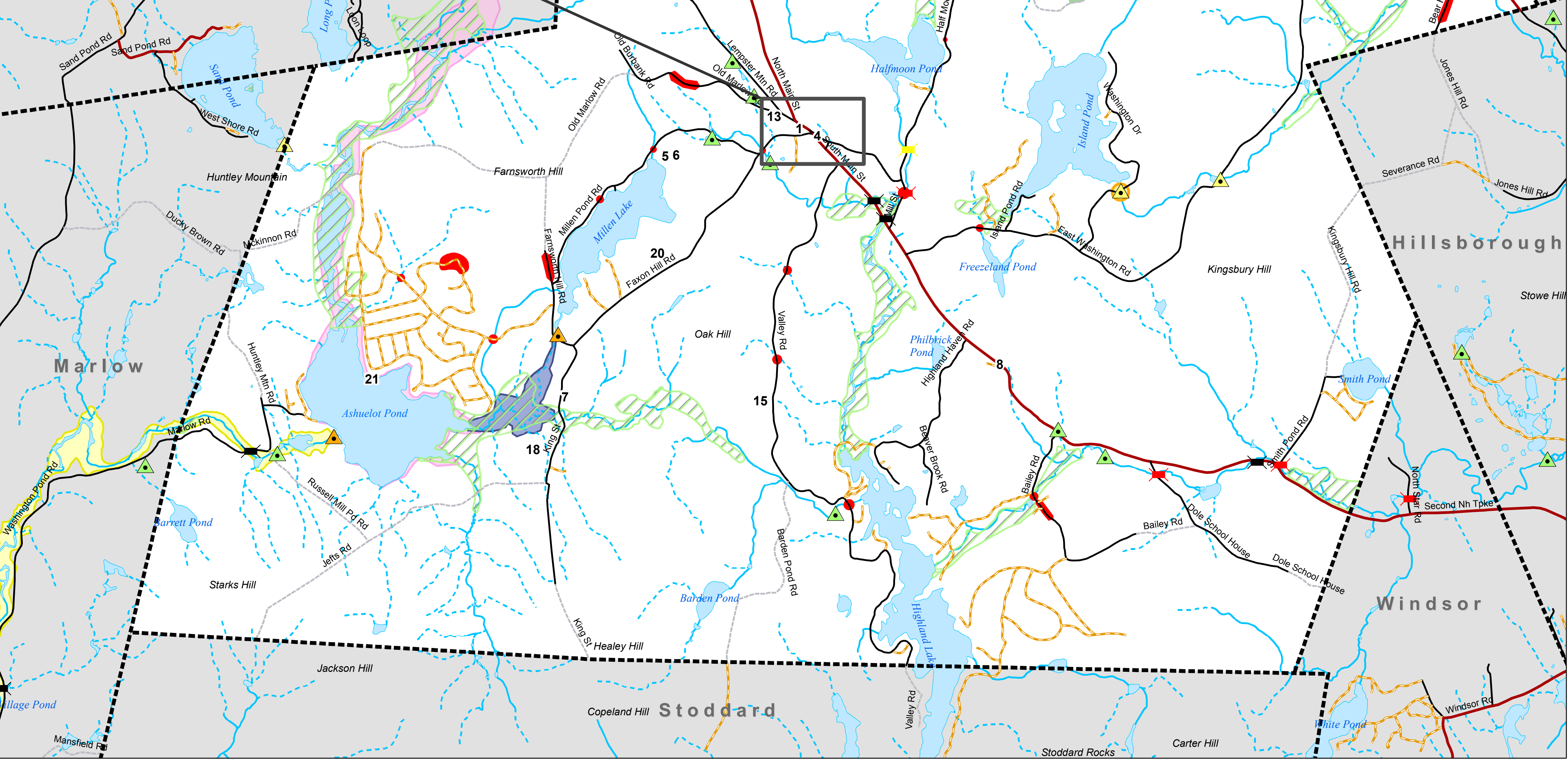
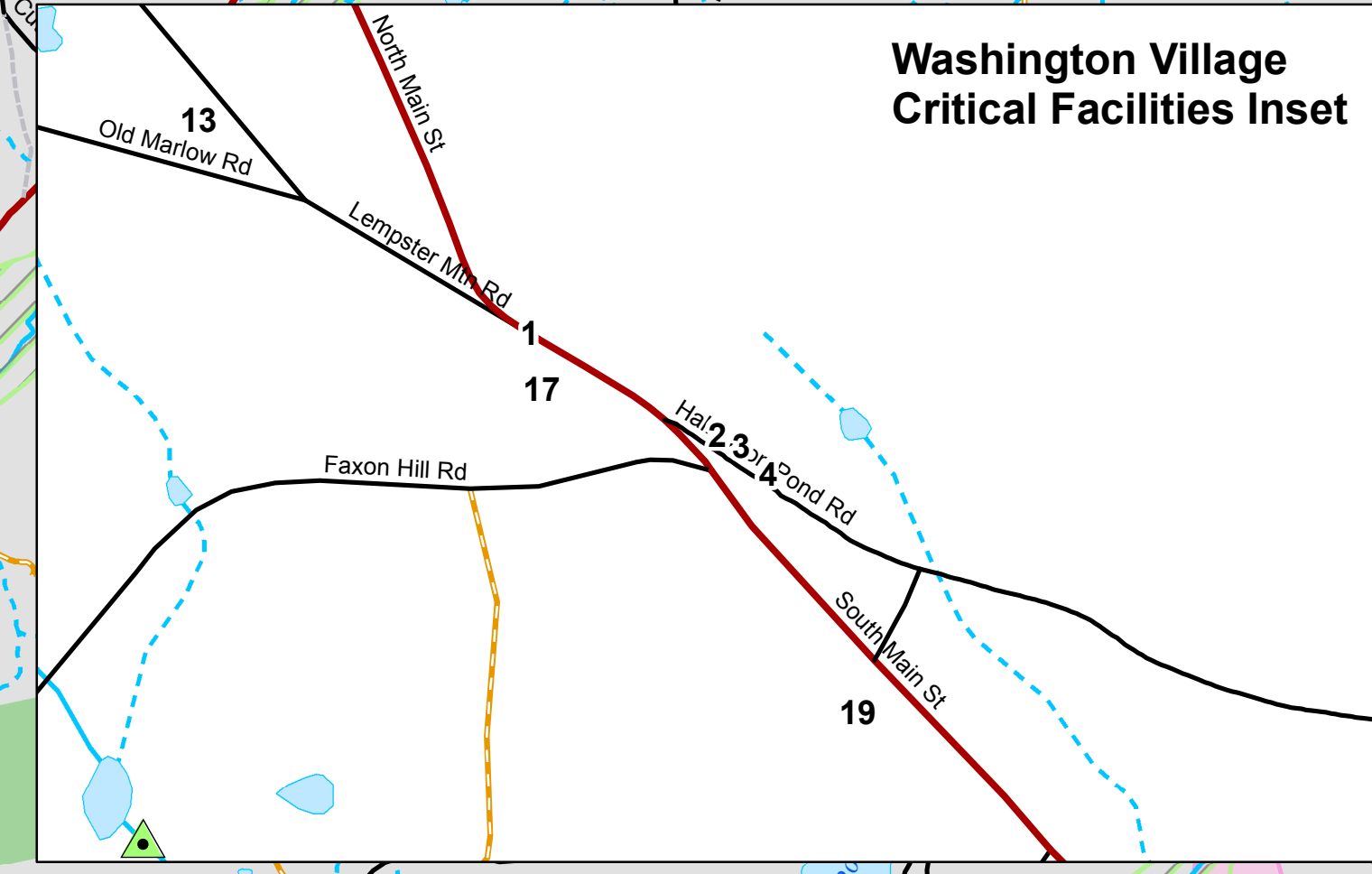
**APPENDIX D:**

**Map of Hazard Areas and Critical Facilities**





ID#	Critical Facility
1	Shedd Free Library
2	Washington Congregational Church
3	Police Department
4	Town Hall
5	Camp Morgan Lodge
6	Washington Elementary School
7	Seventh Day Adventist Church
8	Highway Garage
9	East Washington School
10	East Washington Fire Station
11	East Washington Baptist Church
12	Purling Beck Grange No 268
13	Washington Fire/Rescue
14	Post Office
15	Idle Times Campground
16	Pillsbury State Park
17	Washington General Store
18	Granite State Telephone Switch Station
19	Montfort Retreat
20	Faxon Hill Radio Tower
21	Lake Ashuelot Estates Beach House



## Hazards and Critical Facilities Map Washington, NH



Data drawn from NH GRANIT, the state's GIS clearinghouse, and represents the best available data. Sullivan County floodplains from FEMA. Bridge condition from NH DOT, 2008. Dam inundation data from NH DES Dam Bureau, date varies. Localized hazards and critical facilities developed by Washington Hazard Mitigation Committee, digitized by UVLSRPC, 2009.

**Data Source Disclaimer:** Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of these data.

### Legend

<ul style="list-style-type: none"> <li>Critical Facilities</li> <li>Town Lines</li> <li>Dams by Hazard Class <ul style="list-style-type: none"> <li>High hazard potential</li> <li>Significant hazard potential</li> <li>Low hazard potential</li> <li>Non Menace</li> <li>Ruins, removed, breached, notbuilt, or exempt</li> </ul> </li> <li>Bridges by Condition <ul style="list-style-type: none"> <li>Red List: More Frequent Inspection Required</li> <li>Structurally Deficient or Functionally Obsolete</li> <li>Other Bridges</li> </ul> </li> <li>Roads <ul style="list-style-type: none"> <li>State</li> <li>Local</li> <li>Not Maintained</li> <li>Private</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Localized Hazards <ul style="list-style-type: none"> <li>Dam Failure</li> <li>Roadway Erosion</li> <li>Culvert Erosion</li> <li>Landslide</li> </ul> </li> <li>Flood Zones, 100-Year Floodplains <ul style="list-style-type: none"> <li>A</li> <li>AE</li> </ul> </li> <li>Waterbodies <ul style="list-style-type: none"> <li>Lake, Pond, Reservoir</li> <li>Perennial Streams</li> <li>Intermittent Streams</li> <li>Ashuelot Pond Dam Flood Area (245-05)</li> <li>Millen Lake Dam Flood Area (245-04)</li> <li>May Pond Dam Flood Area (245-01)</li> <li>Pillsbury State Park</li> <li>Neighboring Towns</li> </ul> </li> </ul>
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**APPENDIX E:**

**Town Adoption of Updated Hazard Mitigation Plan**



**Town of Washington, New Hampshire  
Board of Selectmen  
A Resolution Approving the Washington Hazard Mitigation Plan**

WHEREAS, the Town of Washington received assistance from the Upper Valley Lake Sunapee Regional Planning Commission through funding from the NH Homeland Security and Emergency Management to prepare a hazard mitigation plan; and

WHEREAS, several planning meetings to develop the hazard mitigation plan were held in July 2009 and then presented to the Board of Selectmen for review and discussion on August 26, 2010; and

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

WHEREAS, the Board of Selectmen held a public meeting on 8/26/10, 2010 to formally approve and adopt the Washington Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Washington Board of Selectmen approve the Washington Hazard Mitigation Plan.

APPROVED and SIGNED this 26<sup>th</sup> day of August, 2010.

(seal)

TOWN OF WASHINGTON  
BOARD OF SELECTMEN

[Signature]  
Chairman  
[Signature]  
[Signature]

ATTEST:

[Signature: Sandra Poole]



**Appendix F:**  
**Crosswalk Submitted to FEMA for Plan Approval**





**Title of Plan:** Town of Washington Hazard Mitigation Plan    **X 2009 Update**    **Date of Plan:** August 2009

Multi-jurisdiction Plan? Yes  No     Update? Yes  No

Local Point of Contact: Victoria Davis  
 Title: Planner  
 Address: 30 Bank Street  
Lebanon, NH 03766

Agency: Upper Valley Lake Sunapee Regional Planning  
 E-Mail: vdavis@uvlsrc.org

Phone Number: Office: 603-448-1680

**State Reviewer:** \_\_\_\_\_    Title: \_\_\_\_\_    Date of State Review: \_\_\_\_\_

FEMA Review 1    FEMA Review 2    FEMA Review 3

Name: Brigitte Ndikum-Nyada    Name: \_\_\_\_\_    Name: \_\_\_\_\_

Not Approved    Not Approved    Not Approved

Approved     Approved     Approved

Date Reviewed: 5-20-10    Date Reviewed: \_\_\_\_\_    Date Reviewed: \_\_\_\_\_

Jurisdiction Information	Jurisdiction(s)		DFIRM in Plan?		NFIP Participation		
	Yes	No	Yes	No	Yes	No	CRS Class
1. <u>Town of Washington, NH. (Sullivan County)</u>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							

Attach pages with additional jurisdictions as needed

## LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a "Needs Improvement" score.

**SCORING SYSTEM** - Please check one of the following for each requirement.

- N – Needs Improvement:** The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.
- S – Satisfactory:** The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

	Prerequisite(s) (Check Applicable Box)	Not Met	
		Met	Met
1.	Adoption by the Local Governing Body: §201.6(c)(5)		X

OR

2.	Multi-Jurisdictional Plan Adoption: §201.6(c)(5) AND	n/a	n/a
3.	Multi-Jurisdictional Planning Participation: §201.6(a)(3)	n/a	n/a

### Planning Process

	N	S
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		X

### Risk Assessment

	N	S
5. Identifying Hazards: §201.6(c)(2)(i)		X
6. Profiling Hazards: §201.6(c)(2)(i)		X

### Assessing Vulnerability

7. Overview: §201.6(c)(2)(ii)		X
8. Addressing Repetitive Loss Properties: §201.6(c)(2)(ii)		X
9. Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		X
10. Estimating Potential Losses: §201.6(c)(2)(ii)(B)		X
11. Analyzing Development Trends: §201.6(c)(2)(ii)(C)		x
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)	n/a	n/a

	Mitigation Strategy	N	S
13.	Local Hazard Mitigation Goals: §201.6(c)(3)(i)		X
14.	Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		X
15.	Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		X
16.	Implementation of Mitigation Actions: §201.6(c)(3)(iii)		X
17.	Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)	n/a	n/a

### Plan Maintenance Process

	N	S
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		X
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		X
20. Continued Public Involvement: §201.6(c)(4)(iii)		X

### Additional State Requirements\*

	N	S
21. (insert)		
22. (insert)		
23. (insert)		

\*States that have additional requirements can add them in the appropriate sections of the Local Multi-Hazard Mitigation Planning Guidance or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

Not Approved \*      Approved

LOCAL MITIGATION PLAN APPROVAL STATUS           

\* (see reviewer's comments)

**PREREQUISITES**

1. Adoption by the Local Governing Body  
*Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Has the local governing body adopted new or updated plan?	Pages 2 & 60 Appendix E	Plan states that "the Washington Board of Selectmen adopted the Plan after FEMA conditional approval as shown in Appendix E." The reviewed & approval of this Plan was completed today 5-20-09. However Plan was already adopted prior to receiving FEMA's 'Conditionally Approval Notice' <b>Plans are adopted ONLY after receiving FEMA's APA.</b> <b>Recommended Revision:</b> Adoption of Plan should be initiated only after receiving FEMA's APA.		X
B. Is supporting documentation, such as a resolution, included?	Pages 2 & 60 Appendix E (missing)	Plan states that "the Washington Board of Selectmen adopted the Plan after FEMA conditional approval as shown in Appendix E." The reviewed & approval of this Plan was completed today 5-20-09. However Plan was already adopted prior to receiving FEMA's 'Conditionally Approval Notice' <b>Plans are adopted ONLY after receiving FEMA's APA.</b>		X
<b>SUMMARY SCORE</b>				X

2. Multi-Jurisdictional Plan Adoption  
*Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Does the new or updated plan indicate the specific jurisdictions represented in the plan?	n/a	This is a single jurisdiction plan.		n/a
B. For each jurisdiction, has the local governing body adopted the new or updated plan?	n/a			n/a
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	n/a			n/a
<b>SUMMARY SCORE</b>				n/a

3. Multi-Jurisdictional Planning Participation  
*Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process ... Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			Not Met	Met
A. Does the new or updated plan describe how each jurisdiction participated in the plan's development?	n/a			n/a
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	n/a			n/a
<b>SUMMARY SCORE</b>				n/a

**PLANNING PROCESS §201.6(b):** An open public involvement process is essential to the development of an effective plan.

4. Documentation of the Planning Process

**Requirement §201.6(b):** In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process;
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

**Requirement §201.6(c)(1):** [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the plan provide a narrative description of the process followed to prepare the new or updated plan?	Pages 2 - 4	Yes. The ten-step process very well documented.		X
B. Does the new or updated plan indicate who was involved in the current planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)	Page 6	Yes. The acknowledgement page includes a list of 17 people who participated. The diverse background of the Hazard Mitigation Committee members, certainly meets the requirement of involving external contributors. Also see comment on 20.A., page 10 of this crosswalk.		X
C. Does the new or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Pages 2, 4 & 6	Yes. All meetings were posted inviting the general public and notices were sent to the Town Offices of neighboring towns to invite town officials. The public will continue to be involved in future revisions at meetings posted publicly. Plan should go beyond inviting only town officials, as mentioned somewhere in the text.		X
D. Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	Pages 2, 6 & 60	Yes. Information was posted on the Town's website. Neighboring communities, agencies, businesses, academia, non-profits and other interested parties were invited to participate through the public posting of meeting times and agendas or through invitation.		X
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Pages 2 - 9 & 60	Yes. Review & incorporation of existing plan, reports technical information and studies is part of the planning process.		X
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	Pages 2- 4	Yes. The ten-step process clearly documents how the HM Committee diligently reviewed and analyzed each section of the Plan as part of the update process. The Plan is well done.		X
<b>SUMMARY SCORE</b>				X

**RISK ASSESSMENT §201.6(c)(2):** The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

**5. Identifying Hazards**

**Requirement §201.6(c)(2)(i):** [The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan include a description of all natural hazards that affect the jurisdiction?	Pages 2 & 12-34	Yes. Excellent identification, definitions and descriptions of 'what are the hazards in Washington.'		X
<b>SUMMARY SCORE</b>				X

**6. Profiling Hazards**

**Requirement §201.6(c)(2)(j):** [The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?	Pages 12 - 34 & 38	Yes. Excellent risk assessment identification of locations. For example, between 11 to 16 roadways washed out by erosion hazard events and the areas flooded during the 2006 flooding event. See table 11-12.		X
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?	Pages 12 - 34	Yes. The HM Committee used a table to combine the probability estimates with vulnerability estimates to arrive at a risk estimate for each hazard.		X
C. Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?	Pages 12 - 34	Yes. The town has experienced several erosion events which have caused several town roads wash outs. The discusses 15 hazards as having low, medium or high impact on the town		X
D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?	Pages 12 - 34	Yes. The HM Committee used a table to combine the probability estimates with vulnerability estimates to arrive at a risk estimate for each hazard. An estimate of the financial impact is included.		X
<b>SUMMARY SCORE</b>				X

**7. Assessing Vulnerability: Overview**

**Requirement §201.6(c)(2)(ii):** [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(j) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan include an overall	Pages 12 -34	Yes. The HM Committee used a table to combine the probability estimates		X

summary description of the jurisdiction's vulnerability to each hazard?	Pages 35-36	with vulnerability estimates to arrive at a risk estimate for each hazard. An estimate of the financial impact is included.	
B. Does the new or updated plan address the impact of each hazard on the jurisdiction?	Pages 12-34	Yes. Excellent presentation of the potential loss estimates. Some impacts are difficult to quantify, especially when it involves the loss of life.	X
<b>SUMMARY SCORE</b>			X

**8. Assessing Vulnerability: Addressing Repetitive Loss Properties**

**Requirement §201.6(c)(2)(ii):** [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of repetitive loss properties located in the identified hazard areas	Page 17	Yes. A new participating community in the NFIP since 2008. No Repetitive Loss Property.		X
<b>SUMMARY SCORE</b>				X

**9. Assessing Vulnerability: Identifying Structures**

**Requirement §201.6(c)(2)(ii)(A):** The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area ....

Element	Location in Plan (section & page #)	Reviewer's Comments	Score (*)	
			N	S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas? (*)	Pages 38, 39 & 40 - 41	Yes. To determine how much will be affected, the HM Committee, focused on critical facilities, populations & facilities to protect.		X
B. Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas? (*)	Pages 9, 11 & 41	Yes. Excellent community profile identifies where development will or may occur or why it may not occur etc.		X
<b>SUMMARY SCORE</b>				X

\* A "Needs Improvement" score on this requirement will not preclude the plan from passing

**10. Assessing Vulnerability: Estimating Potential Losses**

**Requirement §201.6(c)(2)(ii)(B):** [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate ....

Element	Location in Plan (section & page #)	Reviewer's Comments	Score (*)	
			N	S
A. Does the new or updated plan estimate potential dollar losses to vulnerable structures? (*)	Pages 38, 39, 41-45	Yes. To determine how much will be affected, the HM Committee, focused on critical facilities, populations & facilities to protect.		X
B. Does the new or updated plan describe the methodology used to prepare the estimate? (*)	Pages 38, 41- 45	Yes. To determine how much will be affected, the HM Committee, focused on critical facilities, populations & facilities to protect.		X

\* A "Needs Improvement" score on this requirement will not preclude the plan from passing

**11. Assessing Vulnerability: Analyzing Development Trends**

**Requirement §201.6(c)(2)(ii)(C):** [The plan should describe vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.]

Element	Location in Plan (section & page #)	Reviewer's Comments	Score (*)	
			N	S
A. Does the new or updated plan describe land uses and development trends? (*)	Pages 9-11, 38 -39 & 41 - 45	Yes. There is a lot of potential for future subdivisions in Washington. Major restriction is no public water or sewer services in Washington. Ground water pollution problem is a concern.		X
* A "Needs Improvement" score on this requirement will not preclude the plan from passing.				X

**SUMMARY SCORE**

X

**12. Multi-Jurisdictional Risk Assessment**

**Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	N/A	This is a single Plan.		N/A
* A "Needs Improvement" score on this requirement will not preclude the plan from passing.				N/A

**SUMMARY SCORE**

N/A

**MITIGATION STRATEGY §201.6(c)(3):** The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

**13. Local Hazard Mitigation Goals**

**Requirement §201.6(c)(3)(i):** [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?	Pages 1, 5 & 50	Yes. The HM Committee reviewed & adopted 12 goals and identified new mitigation actions along with objectives to meet these goals.		X
* A "Needs Improvement" score on this requirement will not preclude the plan from passing.				X

**SUMMARY SCORE**

X

**14. Identification and Analysis of Mitigation Actions**

**Requirement §201.6(c)(3)(ii):** [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?	Pages 46 - 48 Pages 51 - 54	Yes. The existing actions that are to be continued and proposed new mitigation actions are well presented on three tables.		X

B. Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?	Pages 49 & 53-54	Yes. Plan's existing programs, Land-Use Ordinance, State Wetland Regulations, New proposed Local Building Code, Flood zone protection are all measures aim at reducing effects of hazards on new buildings & infrastructure.	X
C. Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?	Pages 49 & 53-54	Yes. Plan's existing programs, Land-Use Ordinance, State Wetland Regulations, New proposed Local Building Code, Flood zone protection are all measures aim at reducing effects of hazards on new buildings & infrastructure.	X
<b>SUMMARY SCORE</b>			X

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance  
 Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?	Page 17	Yes. The Town of Washington has been a participating community in the NFIP since July 28, 2008. Community has a new DFIRM. Table 11-3 reports locations in the SFHAs and the numbers of structures & value.		X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Pages 46 -- 48 Pages 51 -- 52 Appendix A	Yes. To provide more public awareness through website and notices to property owners in the flood zone. NFIP's Community Rating System (CRS) is discussed in Appendix A.		X
<b>SUMMARY SCORE</b>				X

16. Implementation of Mitigation Actions  
 Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated mitigation strategy include how the actions are prioritized? (For example, is there a discussion of the process and criteria used?)	Pages 46 -- 49 Pages 52 -- 54	Yes. The Plan's prioritized implementation process is accomplished by using the STAPLEE method. Excellent documentation & presentation of data in a table form. This Plan was able to capture & demonstrate the existing mitigation actions and evaluate their effectiveness as well as improvement proposals.		X
B. Does the new or updated mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources and the timeframe to complete each action?	Pages 4, 8 & 55-59	Yes. Great presentation in a table format of the "who, when, how and cost," of implementing and administering the Plan.		X
C. Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?	Pages 49, 52 -- 54	Yes. The Plan's prioritized implementation process is accomplished by using the STAPLEE method. Excellent documentation & presentation of data in a table format.		X
D. Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?	Pages 46 -- 49 Pages 51 -- 54	Yes. Great presentation of this material in a table format, with only one existing mitigation actions eliminated for not being relevant to hazard mitigation. This action is replaced with a new one, adopt a 'Local Building Code.'		X



	<b>SUMMARY SCORE</b>	X
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17. Multi-Jurisdictional Mitigation Actions  
 Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan include identifiable action items for each jurisdiction requesting FEMA approval of the plan?	N/A			N/A
B. Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?	N/A			N/A
<b>SUMMARY SCORE</b>				N/A

**PLAN MAINTENANCE PROCESS**

18. Monitoring, Evaluating, and Updating the Plan  
 Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan describe the method and schedule for monitoring the plan, including the responsible department?	Page 60	Yes. A good plan needs to provide for periodic monitoring and evaluation of its successes and challenges and to allow for updates of the Plan where necessary. This is indeed a good plan		X
B. Does the new or updated plan describe the method and schedule for evaluating the plan, including how, when and by whom (i.e. the responsible department)?	Page 60	Yes. Washington EMD is responsible and will consult with the Hazard Mitigation Committee to revisit the HM Plan annually or after a hazard event.		X
C. Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?	Page 60	Yes. At a minimum of five year, the Plan will be updated and submitted for FEMA's approval.		X
<b>SUMMARY SCORE</b>				X

19. Incorporation into Existing Planning Mechanisms  
 Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the new or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Pages 46 48 52 & 60	Yes. Plan will be adopted locally as an annex to the recently updated Emergency Operations Plan (EOP). Incorporate HM information and more in-depth water resources section. Obtain inventory of neighboring towns' equipment and coordinating with the Director of the Department of Public Works.		X

B. Does the <b>new or updated</b> plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?	Pages 46 48 52 & 60	Yes. Plan will be adopted locally as an annex to the recently updated Emergency Operations Plan (EOP). Incorporate HM information and more in-depth water resources section. Obtain inventory of neighboring towns' equipment and coordinating with the Director of the Department of Public Works.	X
C. Does the <b>updated</b> plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?	Pages 46 48 52 & 60	Yes. Plan will be adopted locally as an annex to the recently updated Emergency Operations Plan (EOP). Incorporate HM information and more in-depth water resources section. Obtain inventory of neighboring towns' equipment and coordinating with the Director of the Department of Public Works.	X
<b>SUMMARY SCORE</b>			X

20. Continued Public Involvement  
**Requirement §201.6(c)(4)(iii):** [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Element	Location in Plan (section & page #)	Reviewer's Comments	Score	
			N	S
A. Does the <b>new or updated</b> plan explain how <b>continued public participation</b> will be obtained? (For example, will there be public notices, an ongoing mitigation plan committee, or annual review meetings with stakeholders?)	Page 60	Yes. The public will continue to be involved. According to Plan, in the future years, a public meeting will be held separately from the adoption hearing to inform and educate members of the public and press release will be distributed as well as posting information on the Town website. Plan indicates sending or will send copies of Washington HM Plan to the Selectmen's offices in the neighboring town. An excellent approach to involve your neighbors.		X
<b>SUMMARY SCORE</b>				X

**MATRIX A: PROFILING HAZARDS**

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place an "X" in either the N or S box for each applicable hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)		A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Not a Hazard	Yes	N	S	N	S	N	S	N	S
Snow Avalanche										
Coastal Erosion										
Coastal Storm										
Dam Failure										
Drought										
Earthquake										
Expansive Soils										
Levee Failure										
Flood										

Hailstorm										
Hurricane										
Land Subsidence										
Landslide										
Blizzard/Snow Storm										
Tornado/Downburst										
Tsunami										
Nor'easter										
Wild/Forest fire										
Conflagration										
Thunderstorm/Lightning										
Ice Jam										
Other:										
Other:										

**Legend:**

**§201.6(c)(2)(i) Profiling Hazards**

- A. Does the risk assessment identify the location (i.e., geographic area affected) of each hazard addressed in the new or updated plan?
- B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?
- C. Does the plan provide information on previous occurrences of each natural hazard addressed in the new or updated plan?
- D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?

**MATRIX B: ASSESSING VULNERABILITY**

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that the new or updated plan addresses each requirement **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place an "X" in either the S box "Satisfactory" or the N box "Needs Improvement" for each applicable hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk. Note: Receiving an N in the shaded columns will not preclude the plan from passing.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)		§201.6(c)(2)(ii) Overview				§201.6(c)(2)(ii)(A) Identifying Structures (types and estimated number)			§201.6(c)(2)(ii)(B) Estimating Potential Losses		
	Not a Hazard	Yes	A. Description of Vulnerability		B. Hazard Impact		Existing Structures	Future Structures	Loss Estimate	B. Methodology		
			N	S	N	S				N	S	
Snow Avalanche												
Coastal Erosion												
Coastal Storm												
Dam Failure												
Drought												
Earthquake												
Expansive Soils												
Levee Failure												
Flood												
Hailstorm												
Hurricane												
Land Subsidence												

Other: Landslide																			
Other: Severe Winter Storm																			
Other: Tornado/Downburst																			
Other: Tsunami																			
Other: Nor'easter																			
Other: Wild/Forest fire																			
Other: Conflagration																			
Other: Thunderstorm/Lightning																			
Other: Ice Jam																			
Other:																			

Legend:

**§201.6(c)(2)(ii) Assessing Vulnerability: Overview**

- A. Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- B. Does the new or updated plan address the impact of each hazard on the jurisdiction?

**§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures in Hazard Area**

- A. Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

B. Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

**§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses**

- A. Does the new or updated plan estimate potential dollar losses to vulnerable structures?
- B. Does the new or updated plan describe the methodology used to prepare the estimate?

**MATRIX C: IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS**

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required. Note:** First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place an "X" in either the N or S box for each applicable hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)		A. Comprehensive Range of Actions and Projects	
	Not a Hazard	Yes	N	S
Snow Avalanche				
Coastal Erosion				
Coastal Storm				
Dam Failure				
Drought				
Earthquake				
Expansive Soils				
Levee Failure				
Flood				
Hailstorm				
Hurricane				

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)		A. Comprehensive Range of Actions and Projects	
	Not a Hazard	Yes	N	S
Land Subsidence				
Landslide				
Severe Winter Storm				
Tornado				
Nor'easter				
Wild/Forest fire				
Conflagration				
Other: Thunderstorm/Lightning				
Other: Ice Jam				
Other: Nor'easter				

Legend:

**§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions**

A. Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

**OTHER COMMENTS**

Note Number	Comments
1.	
2.	
3.	
4.	
5.	
6.	
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15.	



**Appendix G:**  
**FEMA Approval Letter**







FEMA

September 10, 2010

Guy Easton, Chairman  
Washington Board of Selectmen  
7 Halfmoon Pond Road  
Washington, NH 03280

Dear Mr. Easton:

Thank you for the opportunity to review the Town of Washington's Hazard Mitigation Plan Update. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I has evaluated the plan for compliance with the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206). The plan satisfactorily meets all of the mandatory requirements set forth by the regulations. Congratulations on this achievement!

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

The Town of Washington's Hazard Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within five years of the **plan approval date of June 10, 2010** in order to maintain eligibility as an applicant for mitigation grants. Over the next five years, we encourage the Town of Washington to continue updating the plan's assessment of vulnerability, adhere to its maintenance schedule, and begin implementing, when possible, the mitigation actions proposed in the plan.

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

Sincerely,

Don R. Boyce  
Regional Administrator

Enclosure

Cc: Richard Verville, State Hazard Mitigation Officer, NH  
Lance Harbour, Hazard Mitigation Planner, NH  
Christine Walker, Executive Director, UVLSRPC

