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I. INTRODUCTION

A. BACKGROUND

The New Hampshire Department of 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 Goshen, to update their local Hazard Mitigation Plan. UVLSRPC wrote the first Goshen Hazard Mitigation Plan that was approved in 2008. The *Goshen Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Goshen 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.

In the original plan of 2008, much of the focus was on emergency management though this is a hazard mitigation plan. Due to greater focus on hazard mitigation, the update 2015 plan includes an inventory of emergency management improvements, but the heart of the plan is now hazard mitigation. Stormwater control along Route 10 was and is a concern in both plans. All proposed actions of the 2008 plan were re-evaluated for the current plan by the Town committee. Changes to the Town have been made since 2008 as will be noted in the *Development Trends* section of Chapter II.

The Goshen Hazard Mitigation Committee updated the *Goshen 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 Goshen Town Offices, the Goshen Town Selectboard adopted the updated plan on November 30, 2015 as shown in Appendix E.

B. PURPOSE

The Goshen Hazard Mitigation Plan is a planning tool for use by the Town of Goshen 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 any hazard mitigation 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 *Goshen Hazard Mitigation Plan* includes the identification of natural hazards affecting the Town, as identified by the Goshen 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
- Drought
- Extreme Heat
- Erosion/Landslide
- Wildfire
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

E. METHODOLOGY

Using the *Local Mitigation Planning Handbook by FEMA (2013*), the Goshen Hazard Mitigation Committee, in conjunction with the UVLSRPC, developed the content of the *Goshen Hazard Mitigation Plan Update 2015* by tailoring the nine-task process set forth in

the handbook appropriate for the Town of Goshen. Many FEMA resources and multiple State and Federal websites were also used as well. The Committee held a total of four posted meetings in 2013. All meetings were posted inviting the general public and notices were sent to the Town Offices of neighboring towns to invite town officials. This will go in Appendix C. No members of the public attended the meetings.

The Goshen Town Selectboard held a public meeting and adopted the Plan after FEMA conditional approval on November 30, 2015 as shown in Appendix E. Prior to the Town of Goshen adopting the updated Plan, a public meeting was held to gain additional input from the citizens of Goshen and to raise awareness of the ongoing hazard mitigation planning process. No members of the public attended the committee meetings.

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

September 12, 2013
September 26, 2013
October 10, 2013
October 17, 2013
August 24, 2015

To complete this updated Plan, the Hazard Mitigation Committee followed the following planning tasks to re-evaluate the plan sections of the existing 2009 plan and to update it to reflect current information and issues:

Task 1: Determine the Planning Area and Resource (September 2013)
Goshen is a rural town and chose to continue their planning as process as a single town. The Town chose to work with the Upper Valley Lake Sunapee Regional Planning Commission to provide technical support.

Task 2: Build the Planning Team (September 2013)
Members of the Committee included all relevant personnel as well as any interested citizens. This included a Planning Board member and Selectboard member to represent municipal organizations with general and land use planning authority.

Task 3: Create an Outreach Strategy (September 2013)
The Committee chose to provide public notices to the public to encourage participation at the public meetings. They also put a notice on the town website. Notices were also sent to each of the neighboring towns to invite them to participate in the meetings, send comments, or request a final plan. The final plan will also be available for public review prior to adoption.

Task 4: Review Community Capabilities (September 2013)

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 Goshen Hazard Mitigation Committee. A summary listing of "Critical Facilities" is presented in Chapter IV. Costs were determined for losses for each type of hazard. 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.

Task 5: Conduct a Risk Assessment (October 2013):

The Committee determined natural and human-made hazards affecting the Town and updated a description, location, and extent of those previous and potential hazards. Existing and future assets were updated to determine vulnerability to potential hazard events. Critical facilities needed during an emergency were identified and given values based on tax data. It was also determined if these facilities are in a hazard zone or not. Other facilities identified are those needed to continue the daily operation of the municipality and those that have dense populations or valued historical structures and vulnerable natural areas.

Task 6: Develop a Mitigation Strategy (October 2013 & August 2015):

The Committee evaluated the goals in the previous plan and determined they were still appropriate. They then determined actions that they could take to meet those goals to reduce their risk to hazard events. They discussed existing regulations, ordinances, and the Master Plan and how they could continue to incorporate hazard mitigation strategies into these documents to include hazard mitigation in land use planning. Committee members agreed to pursue this integration with appropriate municipal boards.

Task 7: Keep the Plan Current:

The plan will be reviewed after every major event to evaluate the effectiveness of the plan. It will also be updated at least every five years as required. This includes review of goals, existing and proposed actions, and prioritizing those actions.

Task 8: Review and Adopt the Plan:

The Committee will incorporate any feedback from Committee members, municipal officials, residents, businesses and institutions, and neighboring communities. The plan will be assessed by using FEMA's Local Mitigation Plan Review Tool prior to sending to NH Homeland Security and Emergency Management for preliminary review. If HSEM considers the plan to meet the requirements, they will forward the draft plan to FEMA for their review. Once FEMA determines the plan meets requirements, the municipality will hold a public meeting to obtain further comments and review the final draft. If there are no major suggested changes, the municipal government will adopt the plan and the adoption form will be sent to HSEM and then to FEMA to receive a final approval of the plan.

Task 9: Create a Safe and Resilient Community:
The municipality will implement the plan by committing to task accomplishment as indicated in the plan. The municipality will take advantage of available funding opportunities such as FEMA's mitigation grant programs. The process for monitoring and updating the Plan can be found in Chapter IX.

UVLSRPC staff compiled the results of tasks one through nine in a draft document, as well as helpful and informative materials from the *State of New Hampshire Multi-Natural Hazard Mitigation Plan Update 2013*, which served as a resource for the *Goshen Hazard Mitigation Plan Update 2015*.

F. HAZARD MITIGATION GOALS

The Goshen Hazard Mitigation Committee reviewed the hazard mitigation goals set forth in the previous Hazard Mitigation Plan and revised them as follows:

1. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the Town's goals and to raise awareness and acceptance of hazard mitigation opportunities generally.

2. To improve upon the protection of the general population, the citizens, and visitors of the Town of Goshen from natural and human-made hazards.

3. To reduce the potential impact of natural and human-made disasters to:
   - the Town of Goshen's Critical Support Services,
   - Critical Facilities in the Town of Goshen,
   - the Town of Goshen's infrastructure,
   - private property,
   - the Town's economy,
   - the Town's natural environment, and
   - the Town's specific historic treasures and interests.

4. To improve the Town's Disaster Response and Recovery capability as a hazard mitigation strategy to be prepared for emergencies and reduce their impact.

G. ACKNOWLEDGEMENTS

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

- John Herr, Town of Goshen Emergency Management Director, Assistant Fire Chief and Co-Chair of the Cold River Area Fire Chiefs' Assoc.
- Robert Bell, Town of Goshen Selectman
- Daniel Peterson, Town of Goshen Fire Chief/Forest Fire Warden
- Edward Andersen Sr., Town of Goshen Selectman
- Edward Andersen Jr., Town of Goshen Police Chief
- Russ Lamson, Town of Goshen Police

- Elizabeth Lufkin, Field Representative, NH Homeland Security and Emergency Management
- Victoria Davis, Planner, Upper Valley Lake Sunapee Regional Planning Commission
- Adam Ricker, Assistant Planner, Upper Valley Lake Sunapee Regional Planning Commission

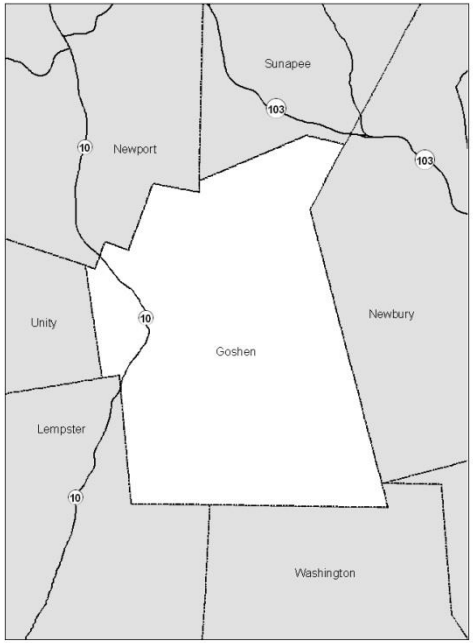
The Hazard Mitigation Committee was composed of local officials, citizens of Goshen and a staff representative of the UVLSPRC for meeting facilitation and plan development. Neighboring communities were invited to participate, submit comments, and request copies of the final plan. They were provided with the dates of three meetings. The general public was invited to attend three meetings by public postings at the town office, the town hall, the Goshen General Store, and on the town website. These were posted 10 days prior to the first posted meeting date and remained until the last meeting occurred. No surveys were requested town-wide due to a lack of broadband in Goshen. No towns or other parties inquired about the update process or attended any of the meetings and no comments were submitted to be incorporated into the plan.

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[1]

The Town of Goshen, New Hampshire is located in the southeastern corner of Sullivan County. Goshen is bordered by Lempster and Unity to the west, Newport and Sunapee to the north, Newbury to the east, and Washington to the south.



NH Route 10 runs through the western portion of town from the Newport line to the Lempster line and follows the South Branch of the Sugar River. Other waterways in Goshen include, Blood Brook, Gunnison Brook and Babb Brook.

In the village of Goshen, the Town Office, Police Department, Fire Department are all located within close proximity to each other on NH Route 10.

There are about 18 miles of State roads in Goshen. There are about 27 miles of Class V maintained roads and about 4 miles of Class VI (unmaintained) roads in Goshen.

There are a total of approximately 13,387 acres within the town. Currently, there are a total of 11,120 acres of land in Current Use within the town of Goshen.[2]

[1] Town of Goshen Master Plan (1996)

[2] NH Department of Revenue Administration: Summary Inventory of Valuation Form MS-1 for 2012.

B. DEVELOPMENT TRENDS

Despite a substantial increase in the population in the several decades, Goshen remains a rural community. The rate of growth was very high in the 1970's and 1980's, but has slowed significantly since then. In 2010, the total population was 810 persons. Not counted in these statistics from the NH Office of Energy and Planning is the large seasonal population in Goshen; approximately one-quarter of housing units are not occupied for the full year.

Population projections show Goshen to continue to grow at a very slow rate. See the population projections table below.

There are areas of Goshen that have the potential for development. There was an approved subdivision of 27 units on Old Province Road, but they did not renew their application, and would have to start the application process from scratch to complete this project. Mt. Sunapee Resorts LLC has a large parcel, in excess of 600 acres, on Brook Road that has the potential for development which is being evaluated by the State for ski trails to the existing ski area. Any erosion concerns will be addressed during the State permitting process. The west side of Route 10, Mummery Road to the Lempster town line, was also determined by the Committee as an area that has great potential for development in the future.

During the last five years, there have only been four building permits for new houses: one in 2010; one in 2011; and two so far in 2015. The Planning Board Chair reports that only minor subdivisions have occurred in the last five years, and the Board does not anticipate and substantial new subdivisions in the near future.

The Committee does not feel that the vulnerability of the Town to hazards has changed in the last five years due to new development.

Table II-1: AREA POPULATION TRENDS

Area	1980	1990	2000	2010
Goshen	**549**	**718**	**744**	**810**
Newport	6,229	6,110	6,269	6,507
Sunapee	2,312	3,069	3,330	3,365
Newbury	961	1,351	1,712	2,072
Washington	411	629	907	1123
Lempster	637	948	976	1154
Unity	1,092	1,341	1,530	1,671
Sullivan County	36,063	38,592	40,458	42,093
New Hampshire	920,475	1,109,252	1,235,786	1,315,000

Source: US Census

Table II-2: POPULATION GROWTH IN GOSHEN

	1980	1990	2000	2010
Population	**549**	**718**	**744**	**810**
Decade Change in Population		23%	4%	9%

Source: 1980 – 2010 US Censuses

Table II-3: POPULATION PROJECTIONS FOR GOSHEN

Area	2015	2020	2025	2030	2035	2040
Goshen	**829**	**852**	**873**	**896**	**912**	**922**
Change in Population in 5 yrs.	2.3%	2.8%	2.5%	2.6%	1.8%	1.1%
Change in Population in 10 yrs		5.2%		5.2%		2.9%

Source: State of New Hampshire, Regional Planning Commissions, Office of Energy and Planning - County Population Projections, 2013

III. HAZARD IDENTIFICATION

The Goshen 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 Goshen, 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 GOSHEN?

Goshen is prone to a variety of natural and human-made hazards. The hazards that Goshen 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 potentially affecting the Town of Goshen are dam failure, flooding, hurricane, tornado & downburst, thunderstorm (including lightning and hail), severe winter weather, earthquake, drought, extreme heat, erosion, landslide, wild and structure fire, natural contaminants, hazardous materials spills, terrorism and ice jams. 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 Goshen 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 Goshen. Eliminated hazards include Land Subsidence, Expansive Soils, and Snow Avalanches.

B. DESCRIPTIONS OF HAZARDS

An assessment of each hazard relevant to Goshen 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
- Drought
- Extreme Heat
- Erosion/Landslide
- 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 Goshen.

NH DES assigns a hazard designation to each dam in the state depending upon the potential damage it would cause if the dam failed:

- A "high hazard potential" is indicated if the dam is in a location and of a size that failure or mis-operation of the dam would result in the following: major economic loss to structures or property; structural damage to roads; major environmental; or public health losses; and probable loss of human life.

- A "significant hazard potential" would mean 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 to roads; major environmental or public health losses.

- A "low" hazard dam failure could cause some structural damage to buildings and roads.

- A "non-menace" dam failure would not cause any significant damage.

"High" and Significant" hazard potential dam owners must provide NH DES with maps of the potential inundation area if the dam were to fail. It should be noted that there are some exemptions from this requirement such as lagoons.

Past Dam Failure Events

There have been no dam failures within the Town of Goshen or outside the town that would have affected the town.

Table III-1 - DAMS

Dam #	Class	Dam Name	Water Body	Owner (Now or Formerly)	Status	Impound-ment Area in Acres	Height of Dam (Ft)	Drainage Area in Square Miles
95.26	NM	Pheasant Run Farm Pond	runoff	PHEASANT RUN FARM	ACTIVE	0.25	7.5	0.01
95.05	NM	Erickson Dam	Natural swale	PETER BRIGHAM	ACTIVE	0.21	15	0.00
95.08	NM	Fire pond	Unnamed stream	MT REACH	ACTIVE	0.3	11	0.00
95.07	NM	Fire pond	Tr Gunnison Brook	MR NEIL K BUTTER	ACTIVE	0.5	5	0.00
95.22	NM	Fire pond	Unnamed stream	MR RICHARD ANDREWS	ACTIVE	0.27	11	0.00
95.1	-	Recreation pond	Unnamed stream	MR EDWARD J ANDERSON	NOT BUILT	0	0	0.00
95.04	NM	Rand Pond Outlet Brook Dam	Rand Pond outlet brook	NH FISH & GAME DPT	ACTIVE	0.15	4	1.27
95.17	NM	Scranton Farm Pond Dam	Tr Gunnison Brook	MR JOHN SCRANTON	ACTIVE	0.46	5	0.10
95.02	-	Branch Gunnison Brook Dam	Branch Gunnison Brook	MR HARRY G BARTLETT	RUINS	0	0	0.00
95.06	-	Stephan Fire Pond	Unnamed stream	MR DAVID W STEPHAN	NOT BUILT	0	0	1.62
95.14	-	Wildlife pond	Natural swale	MR ROY BALLA	NOT BUILT	1.4	10.5	0.00
95.01	-	South Brank Sugar River Dam	S Branch Sugar River	MR ROBERT E HADLEY	RUINS	0	5	31.60
95.09	NM	Farm pond	Tr Blood Brook	MS BEATRICE JILLETE	ACTIVE	0.2	8	0.00
95.11	NM	Fire pond	Tr Sugar River	MR & MRS HAROLD COVIT	ACTIVE	0.26	13	0.00
95.24	-	Recreation pond	Unnamed stream	EDINA REALTY TRUST	EXEMPT	1	3	0.00
95.03	-	Blood Brook Dam	Blood Brook	MS LYNN WEATHERS	RUINS	0	0	0.00
95.25	H	Gunnison Lake Site D2	Blood Brook	NH WATER DIVISION	ACTIVE	96.2	62	5.50
95.2	-	Recreation pond	Tr Trow Brook	MR RICHARD SUAREZ	EXEMPT	0.3	2	0.00
95.13	NM	Farm pond	Tr South Branch River	MS ADELORD AYOTTE	ACTIVE	0.14	5	0.00
95.19	-	Wildlife pond	Unnamed stream	MR WILLIAM HUGHS	NOT BUILT	0	0	0.00
95.15	NM	Wildlife pond	Natural swale	VIRGINIA SCHENDLER	ACTIVE	0.54	8	0.00
95.21	NM	Fire pond	Unnamed stream	VIRGINIA SCHENDLER	ACTIVE	0.2	4	0.00
95.12	NM	Wildlife pond	Natural runoff	VIRGINIA SCHENDLER	ACTIVE	0.54	4	0.02
95.16	NM	Wildlife pond	Trow Brook	MR THOMAS POWERS	ACTIVE	3.4	6	0.01
95.18	NM	Farm pond	Tr Trow Brook	MR THOMAS POWERS	ACTIVE	0.32	6	0.00
95.27	-	Rand Pond	Rand Pond	TOWN OF GOSHEN	RUINS	0	0	0.00
95.23	NM	Wildlife pond		MR DIRK R CASAGRANDE	ACTIVE	6	15.5	0.20

Class of potential hazard: NM – non-menace; L-low; S-significant *Source: NH DES*
Material: T-timber; S-stone; E-earth; C-concrete **The Committee believed the status to be incorrect and has changed them.*

Potential Future Dam Failure Damage

Although there are 27 dams in Goshen (1 not built at time of inventory), there is one "high" and no "significant" hazard dams within town. The "high" hazard dam is the Gunnison Lake Dam at the outflow of the lake. All active dams are shown on a map in Appendix D.

Outside the Town of Goshen, there are no dams that would affect the Town of Goshen if they failed.

The committee determined that the Dam Failure risk in Goshen to be medium/high.

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 Goshen area are most likely to occur in the spring due to the increase in rainfall, snowmelt and ice flow; 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.

<u>100-Year Floods</u> 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."

<u>River Ice Jams</u> 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.

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

The Committee determined there are no other flood areas in the town other than the FEMA designated flood zones. Appendix D shows the special flood hazard areas of Special Flood Hazard Areas. The following tables provide a list of floods in the State, County, and Goshen. Other flooding issues are listed in the Erosion section—primarily for roads. The committee recalled that there have been ice jams at Lear Hill Road on the South Branch of the Sugar River, but they do not recall any damage. The committee also recalled a week of heavy rain in July 2014 that lead to the South Branch of the Sugar River cresting on July 15th which caused a temporary foot bridge, put in place for the town's old home days celebration, to be washed out and destroyed resulting in a loss of $1,000 in materials.

Table III-2: FLOODING

FLOODING				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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; no substantial damage in Goshen
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; no substantial damage in Goshen
Flood (Ice Jam)	March 26, 1992	Cold River, Acworth	Ice jam (CRREL) which formed near a bend caused road flooding. Ice was removed by State equipment.	Unknown; no damage in Goshen

FLOODING				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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; no damage in Goshen
Flood	October 7-18, 2005	Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding; major devastation in Alstead	$3,000,000 in damages; no damage in Goshen
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144- NH	No damage in Goshen
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; no damage in Goshen
Flood	July 24, 2008	Central and Southern NH; Counties Declared: Belknap, Carroll, Merrimack, Rockingham, and Strafford	FEMA DR 1782	Severe storms, tornado, and flooding; no damage in Goshen
Flood	August 14, 2008	Central Northern NH; Counties Declared: Belknap, Carroll, Coos, and Grafton	FEMA Disaster Declaration #1787	$3 million in public assistance; primary damage to roads; no damage in Goshen
Flood	March 14-31, 2010	Statewide	FEMA DR-1913; severe storms & flooding; Declared Counties: Hillsborough and Rockingham Counties	75% federal match; no damage in Goshen
Flood	May 26-30, 2011	Coos and Grafton Counties	FEMA-4006-DR Federal assistance for Coos and Grafton Counties and hazard mitigation statewide	$1.8 million in public assistance; primary impact to roads and bridges; no damage in Goshen
Flood	May 29-31, 2012	Cheshire County	FEMA DR-4065; severe storm and flood event	No damage in Goshen
Flood	June26-July 3, 2013	Grafton, Sullivan and Cheshire Counties	FEMA DR-4139; severe storms, flooding, and landslides	No damage in Goshen

Goshen became a participating member of the National Flood Insurance Program on April 2, 1986. Updated maps and flood insurance studies for all municipalities within Sullivan County were finalized on May 23, 2006. There are currently three single family residential policies in the town with $657,700 of insurance. However, flood insurance purchase is not a reflection of the

number of structures within the flood plain. One loss claim has been paid for a total of $16,916; there have not been any repetitive loss claims made. (Source: NH OEP office, 3/20/2013)

Goshen's 100-Year Special Flood Areas are located within the A and AE Zone, with no base flood elevations determined. See Appendix D for a map showing all Special Flood Hazard Areas. There are no non-compliant structures in the Town of Goshen according to the NH Floodplain Insurance Program State Coordinator (July 2014).

As an NFIP participant, the Town of Goshen has a floodplain ordinance which restricts building within the special floodplains to protect the flow of flood waters and not increase the needed land area for those waters. The Town adopted the model ordinance provided by the NH Floodplain Management Office. This ordinance is reflected in the zoning ordinance, subdivision regulations, and site plan review regulations. The Town is in the process of updating its Town Master Plan and will incorporate information about the NFIP and the importance of protecting its floodplains into this document which reflects Town goals.

Potential Future Flooding Events

Future flooding is likely as noted in the above table based upon local knowledge of past flood events. There are currently 88 structures located within the FEMA determined 100-year flood areas. Using the average building value calculated using the town's MS-1 tax form, the total structural value of these properties is $7,748,488. The Hazard Mitigation Committee will recommend to the Planning Board that the zoning ordinance be amended to prevent further new development within the 100 year flood plain.

There are a total of seven state and town owned bridges with the flood plain. No value has been assigned to these structures as it is unknown.

According to the State's Mitigation Plan, Sullivan County has a high hazard risk for flooding. The Committee determined flooding is a medium/high risk in Goshen.

Table III-3: STRUCTURE VALUES IN 100-YEAR FLOOD AREAS BY TYPE

Flood Zone	Properties	
	#	Value
Zone A and AE	88	$7,748,488

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).

The Saffir-Simpson Hurricane Wind Scale provides categories of sustained winds by miles per hour: 1 – 74-95 mph; 2 – 96-110 mph; 3 – 111-129 mph; 4 – 130 – 156 mph; and 5 – 157 mph or higher. Categories 3 -5 are considered to be major wind events that can cause devastating to catastrophic damage.

Past Hurricane Events

There have been several hurricanes over the years which have impacted New England and New Hampshire. These are listed below.

Table III-4: HURRICANES & TROPICAL STORMS

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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.	No damage in Goshen
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast	No damage in Goshen
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds	No damage in Goshen
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1	No damage in Goshen
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	No damage in Goshen
Hurricane (Bob)	August 19, 1991	Southern New England	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	No damage in Goshen
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	No damage in Goshen
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains	No damage in Goshen
Hurricane (Katrina)	August 29, 2005 & continuing	East Coast of US and more	FEMA-3258-EM. Heavy rains and flooding devastating SE US	No damage in Goshen

HURRICANES AND TROPICAL STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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.	No damage in Goshen
Tropical Storm (Irene)	August 26 – September 6, 2011	East Coast of US	FEMA-4026-DR for Coos, Carroll, Grafton, Strafford, Belknap, Merrimack and Sullivan Counties; EM-3333 Hillsboro, Rockingham, and Cheshire Counties	$2 Million primarily for roads and bridges; Goshen had $50,000 in damage with $25,000 on Mountain Road.
Hurricane (Sandy)	October 26 – November 8, 2012	East Coast of US	FEMA-4095-DR-NH for Belknap, Carroll, Coos, Grafton and Sullivan Counties.	No damage in Goshen

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 Goshen.

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. Macroburst, 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) and the *NH Natural Hazard Mitigation Plan*. The committee did not recall any tornadoes or downburst in which the town was impacted. The tornado on April 15, 2007 in nearby Enfield, did not cause damage in Goshen. Similarly, the damage from the 2008 tornado in Deerfield did not impact the town of Goshen. The committee could not recall when Goshen had experienced any wide spread and notable damage from tornadoes or downbursts.

Table III-5: TORNADOES IN OR NEAR SULLIVAN COUNTY

TORNADOES & DOWNBURSTS – MEDIUM RISK			
	Date	**Scale**	**Damages**
Tornado	September 9, 1821	Most intense in NH	Killed 6 people; crossed Lake Sunapee
Tornado	July 14, 1963	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	June 27, 1964	F0	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	August 11, 1966	F2	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	August 25, 1969	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	May 31, 1972	F1	No deaths or injuries; costs unknown (Merrimack County); no damage in Goshen
Tornado	July 21, 1972	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	May 11, 1973	F2	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	June 11, 1973	F0	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	August 15, 1976	F1	No deaths; 5 injuries; costs unknown (Merrimack County); no damage in Goshen
Tornado	August 13, 1999	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	July 6, 1999	F2	No deaths or injuries; costs unknown (Merrimack County); in New London two roofs blown off structures; power outages,; downed trees, utility pole, and wires; no damage in Goshen
Tornado	Summer 2006	NA	Began in Barnet, VT and moved to Monroe, NH; no damage in Goshen
Tornado	April 15, 2007	NA	Numerous trees were knocked down in Enfield, NH; no damage in Goshen
Tornado	July 24, 2008	(EF 2)	DR 1799: Numerous trees and utility poles down; damage to many houses; 1 fatality; $2.5 million from FEMA; no damage in Goshen

Source: www.tornadoproject.com

Table III-6 ENHANCED FUJITA SCALE

FUJITA SCALE (old model)			OPERATIONAL EF SCALE	
F Number	**Fastest ¼-mile (mph)**	**3 second gust (mph)**	**EF Number**	**3 second gust (mph)**
F0	**40-72**	**45-78**	**EF0**	**65-85**
F1	**73-112**	**79-117**	**EF1**	**86-110**
F2	**113-157**	**118-161**	**EF2**	**111-135**
F3	**158-207**	**162-209**	**EF3**	**136-165**
F4	**208-260**	**210-261**	**EF4**	**166-200**
F5	**261-318**	**262-317**	**EF5**	**Over 200**

Source: http://www.spc.noaa.gov/faq/tornado/ef-scale.html

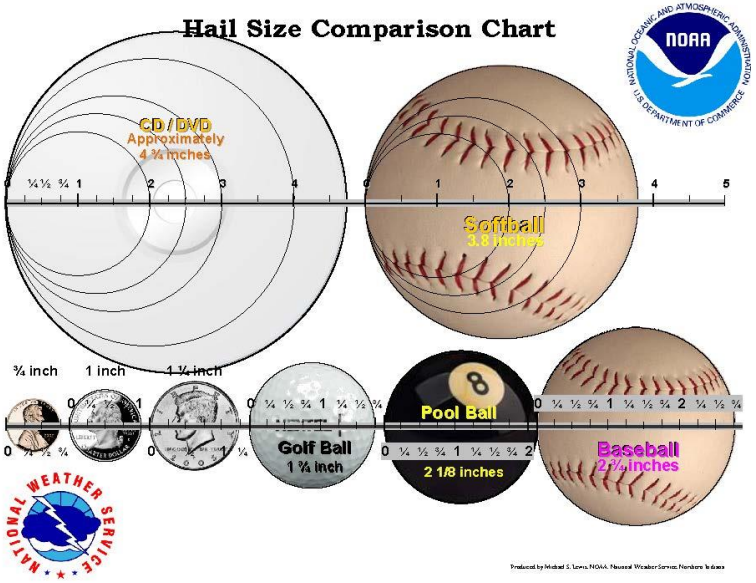
Potential Future Tornado and Downburst Damage

It is impossible to predict where a tornado or downburst will occur or what damage it will inflict. A tornado or downburst could happen anywhere in town. The Goshen Committee does not recall tornadoes or downbursts in Goshen. 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 low/medium risk for tornadoes and downbursts in Goshen.

Thunderstorms/Lightning/Hail

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. Below is a comparison chart for the various sizes of hail.

Figure III-1: HAIL SIZE COMPARISON CHART



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 Goshen, but there is no record of damage.

A lightning activity level has been developed by the National Weather Service and is shown below:

Table III-7: LIGHTNING ACTIVITY LEVEL

Lightning Activity Level	Description
1	No thunderstorms
2	Isolated thunderstorms: Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.
3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.
4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.
5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
6	Dry lightning (same as LAL3, but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.

Source: http://graphical.weather.gov/definitions/defineLAL.html

Past Thunderstorm Events

There have been lightning strikes in Goshen, but none were noteworthy according to the Committee. A thunderstorm with lightning or hail could impact the entire town, although lightning is more likely in isolated areas.

Potential Future Thunderstorm Damage

It is inevitable that thunderstorms will occur in Goshen's future. Lightning, hail, or wind from a thunderstorm could impact anywhere in town. It is not possible to estimate potential 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/med risk in Goshen

Table III-8: THUNDERSTORMS/LIGHTNING, HAIL

Thunderstorms/Lightning/Hail				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Hail	June 16, 2007	SW NH	A severe thunderstorm produced large hail (.75 in) in southwestern New Hampshire.	No damage in Goshen
Hail	August 3, 2007	Sullivan County	An isolated thunderstorm produced large hail in Sullivan County.	No damage in Goshen

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 sustained wind or frequent gusts greater than or equal to 35 miles per hour accompanied by falling and/or blowing snow, frequently reducing visibility to less than ¼ mile for three hours or more (NOAA National Weather Service). 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 is at or below O 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.

The National Weather Service has developed a Scaled Predictive Ice Storm Aftermath (SPIA) Index. The potential impacts are scaled from 0 to 5 and suggest potential electrical outage coverage and duration. Current ice storm warnings are based on forecast of ice accumulation only. SPIA reports on the combined effects of the predicted ice and wind. Below is a chart of the SPIA index levels.

Table III-9: SCALED PREDICTIVE ICE STORM AFTERMATH INDEX

Ice & Wind: Average Ice in Inches and Wind in Miles per hour	**<15 mph**	**15-25 mph**	**25-35 mph**	**≥35 mph**
0.10 – 0.25 inches	0	1	2	3
0.25 – 0.50 inches	1	2	3	4
0.50 – 0.75 inches	2	3	4	5
0.75 – 1.00 inches	3	4	5	5
1.00 – 1.50 inches	4	5	5	5
>1.50 inches	5	5	5	5

"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 Goshen.

Table III-10: SEVERE WINTER WEATHER

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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	No damage in Goshen
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH	No damage in Goshen
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH	No damage in Goshen
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH	No damage in Goshen
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	No damage in Goshen
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH	No damage in Goshen
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH	No damage in Goshen
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH	No damage in Goshen
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH	No damage in Goshen
Snow Storm	February, 1979	New Hampshire	President's Day storm	No damage in Goshen
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation	No damage in Goshen
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH	No damage in Goshen

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
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	No damage in Goshen
Extreme Cold	November-December, 1988	New Hampshire	Temperature was below 0 degrees F for a month	No damage in Goshen
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH	No damage in Goshen
Snow Storm	1996	Regional	Two major storms with five feet of snow in a week	No damage in Goshen
Snow Storm	1997	New Hampshire	Power outages throughout region due to heavy snowfall	No damage in Goshen
Ice Storm	January 15, 1998	New Hampshire; Substantial power in NH	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	No damage in Goshen
Snow Storm	2000	Regional	Heavy snow	No damage in Goshen
Snow Storm	March 5-7, 2001	New Hampshire	Heavy snow.	No damage in Goshen
Snow Storm	December 6-7, 2003	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3193-NH	No damage in Goshen
Snow Storm	February 10-12, 2005	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3208-NH	No damage in Goshen
Ice Storm	December 2008	New Hampshire	Debris removal. FEMA DR-1812; power outages in region for up to 10 days; downed trees blocked roads and damaged utility lines	$15 Million; no damage in Goshen
Wind Storm	February 23 – March 3, 2010	New Hampshire	FEMA DR-1892; Federal funding to Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties; power loss	$2 Million; no damage in Goshen
Snow Storm	October 29-30, 2011	Statewide	EM-3344; FEMA-4049 Hillsborough & Rockingham Counties	No damage in Goshen
Ice Storm	January 27, 2012	Region	Isolated power outages in region; several limbs down	No damage in Goshen

SEVERE WINTER WEATHER/ICE STORMS				
Hazard	**Date**	**Location**	**Description of Areas Impacted**	**Damages**
Snow Storm	February 8-10, 2013	New Hampshire	Heavy Snow. FEMA DR-4105	No damage in Goshen
Snowstorm	January 26-28, 2015	Hillsborough, Rockingham, and Strafford Counties, NH	Severe Winter Storm and Snowstorm DR-4209	No damage in Goshen

Potential Future Severe Winter Damage:

There is the potential for severe winter damage every year. An 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 medium/high risk in Goshen.

Earthquake

Earthquakes are characterized by a sudden and rapid shaking of the ground caused by the shifting of rock beneath the ground. The damage caused by an earthquake can be severe, causing the collapse and destruction of buildings, bridges, roads and other critical infrastructure. As a result, there can be many other hazards that occur, such has gas leaks, fires, electrical outages, landslides, etc. The magnitude and intensity of an earthquake can be rated on a scale such as the Richter or Mercalli, which are both illustrated below.

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

Table III-11: EARTHQUAKES

EARTHQUAKES			
Date	**Location**	**Magnitude**	**Damage**
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; no damage in Goshen
December 24, 1940	Ossipee, NH	NA	No damage in Goshen
December 28, 1947	Dover-Foxcroft, ME	4.5	No damage in Goshen
June 10, 1951	Kingston, RI	4.6	No damage in Goshen
April 26, 1957	Portland, ME	4.7	No damage in Goshen
April 10, 1962	Middlebury, VT	4.2	No damage in Goshen
June 15, 1973	Near Quebec Border	4.8	No damage in Goshen
Summer 1977-1978*	Centered in Franklin	NA	No damage in Goshen
January 19, 1982	West of Laconia	4.5	Structure damage 15 miles away in Concord: no damage in Goshen
October 20, 1988	Near Berlin, NH	4	No damage in Goshen
September 26, 2010	New Hampshire	3.4	Centered in Boscawen, NH, The Committee recalls feeling the earthquake; no damage in Goshen
August 23, 2011	Central Virginia, East Coast	5.8	Felt in region; no damage in Goshen
September 18, 2012	Concord, NH	1.2	Epicenter was Concord, NH and the quake was felt in the capital region of NH; No damage in Grantham
October 16, 2012	Southern Maine	4.0	The earthquake was located southern Maine and felt throughout the area and into southern NH; No damage in Grantham

Source: earthquake.usgs.gov/earthquakes/states/new_hampshire/history.php for earthquakes through 1964. NH Multi-Hazard Mitigation Plan, 2010 for 1973-1982; earthquake.usgs.gov/earthquakes (12/13/11)
**Committee recollection*

Table III-12 RICHTER SCALE AND MERCALLI INTENSITY

Richter Scale and Mercalli Intensity		
Richter Scale	**Modified Mercalli Intensity**	**Average Earthquake Effects**
1.0-3.0	I	**I** – Not felt except by a very few under especially favorable conditions.
3.0-3.9	II-III	**II** – Felt only by a few persons at rest, especially on upper floors of buildings. **III** – Felt quite noticeably by persons indoors. Standing motor cars may rock slightly.
4.0-4.9	IV-V	**IV** – Felt indoors by many, outdoors by few during the day. Dishes, windows, doors disturbed; walls make cracking sound. V – Felt by nearly everyone; many awakened. Some dishes, windows broken.
5.0-5.9	VI-VII	**VI** – Felt by all. Some heavy furniture moved; a few instances of fallen plaster. **VII** – Damage negligible in buildings of good design and construction, considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0-6.9	VII-IX	**IX** – Damage considerable in specially designed structures; damage great is substantial buildings, with partial collapse.
7.0 and higher	VIII or higher	**VIII** and higher: damage slight in specially designed structures. Fall of chimneys, factory stacks, columns, monuments, walls. **X** – Some well-built wooden structures destroyed, most masonry and frame structures destroyed with foundations. **XI** – Few if any masonry structures remain standing. Bridges destroyed. **XII** – Total damage. Lines of sight and level are distorted. Objects thrown in air.

Potential Future Earthquake Damage:

A United States Geographic Survey mapping tool on the web (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 Goshen. 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 low/medium in Goshen.

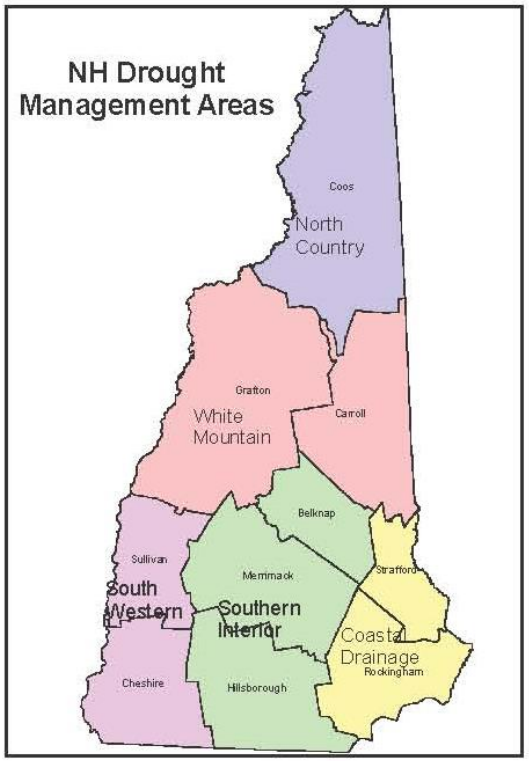
Drought

Droughts or abnormally low precipitation are generally not as damaging or disruptive as floods, but are more difficult to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years or only a few months. Fortunately, droughts are rare in New Hampshire. The severity of the water deficit if gauged by the degree of moisture deficiency, its duration, and the size of the area affected. 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. Not all of these indicators will be minimal during a particular drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground water levels or increasing stream flow.

Low stream flow correlates with low ground water level because it is ground water discharge to streams and rivers that maintain stream flow during extended dry periods. Low stream flow and low ground water levels commonly cause diminished water supply.

New Hampshire breaks the State into five Drought Management Areas, with one in the north, one across the central region, and three along the southern portion of the State. The National Oceanic and Atmospheric Administration (NOAA) and the US government use the Palmer Drought Survey Index for conditions of the nation. The Palmer Drought Management areas divide the State into two areas and use the Palmer Drought Severity Index which is based on rainfall, temperature, and historic data. The Town of Goshen is in Area 2. The NH Drought Management Team, coordinated by the NH Department of Environmental Services Dam Bureau, uses these maps to help determine which areas are hardest hit.

Figure III-2: DROUGHT MAPS



Past Drought Events

Around 2001-2002, Goshen and other nearby towns had drought issues. This occurred again in 2010.

Table III-13: DROUGHT

Date	Location	Description	Damages
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	No impact in Goshen recalled
2001-2002	Statewide	Affected residential wells and agricultural water sources; third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942; recurrence level not determined yet	Minor impact in Goshen
2010	Mostly southern counties	Affected dug wells and those in hillsides.	Minor impact in Goshen

Source: NH DES through 2002; Concord Monitor August 22, 2010

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 Goshen.

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. The National Weather Service developed a heat index based upon temperature and relative humidity. This is shown below.

Table III-14: HEAT INDEX

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Past Extreme Heat Events

The following table lists the extreme heat events in the past which included the Northeast and New Hampshire.

Table III-15: EXTREME HEAT

Date	Location	Description	Damage
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
June - August, 1999	Northeast	Mean temperatures well above long-term average	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
July 2010	Northeast	Regional heat wave	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 Goshen.

Erosion/Landslide

Soil erosion is the process of removal and transportation of soil by wind or water to a new location. Landslides are also the removal and transportation of soils on a larger scale and including larger materials such as rocks. The most common trigger of a landslide is water as it reduces the friction between the bedrock and overlying sediment, and gravity sends the debris sliding downhill.

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. The committee felt that Erosion and Landslide were essentially the same hazard. They recognize that there can be varying causes to both erosion and landslide, but that the product of the hazard is the same, as such, they have grouped landslide with the erosion section.

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.

Fluvial Erosion Hazard Data

During the summer of 2013 the NH Department of Environmental Services hired a contractor to assess the conditions and attributes of many reaches of river and stream throughout the Sugar River Watershed. The results of that data provided the towns with information regarding vulnerabilities to erosion, or Fluvial Erosion Hazard (FEH) Sensitivity Rating, and the conditions that contribute to the rating. In Goshen, a reach of the South Branch of the Sugar River extending from the Newport/Goshen town line to just north of Brook Road was assessed. This section was given a "Very High" FEH rating due to several characteristics of the stream, including: migration of the stream bed, stormwater input, steep riffle or head cuts, and bridges and culverts not be correctly positioned or sized for the water body. The area along the river that the town is concerned with is the bank behind the Fire Station and Grange Hall which are located on NH Route 10. This area has seen severe erosion from the river in the past and is a growing concern for the town. The past history is outlined below. The town has used an engineer to identify the actions that need to be taken to mitigate the erosion and protect the town's critical facility.

Past Erosion/Landslide Events

The bank of the South Branch of the Sugar River, behind the Fire Station and Grange Hall, has experienced erosion in the past and is part of an ongoing effort to mitigate the erosion/landslide of materials. In the 1990s the bank adjacent to the Grange Hall collapsed due to the swift movement of the water causing erosion. The northern corner of the Grange Hall was suspended in air due to the land below it washing into the river. At that time, the bank behind the Grange was stabilized using large rocks for a retaining wall. The area behind the Fire Station and Grange has flooded many times through the last two decades, most recently in 2009, 2011 and 2014. So far, the flooding has not impeded the ability of the fire department to respond but the erosion is becoming more severe and will eventually impact the structural integrity of the land under the fire station and therefore the building itself.

Potential Erosion/Landslide 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. The Committee determined there was a medium risk for erosion damage.

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). 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 wildfires 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 wildfires. Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wildfire. 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.

According to the National Wildfire Coordination Group, there are categories of wildfire based upon size: Class A - one-fourth acre or less; Class B - more than one-fourth acre, but less than 10 acres; Class C - 10 acres or more, but less than 100 acres; Class D - 100 acres or more, but less than 300 acres; Class E - 300 acres or more, but less than 1,000 acres; Class F - 1,000 acres or more, but less than 5,000 acres; Class G - 5,000 acres or more.

Past Wildfire Events

There are no significant past wildfire events in Goshen.

Potential Future Wildfire Events

There are many large, contiguous forest tracts in Goshen. 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. The most likely areas for wildfire are where ice storm impact downs trees and branches providing fuel for a fire. During drought conditions, many areas may be at risk for wildfire. 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 wild and structure fire risk in Goshen medium.

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. Following is a map of New Hampshire by the U.S. EPA to show radon zones.

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

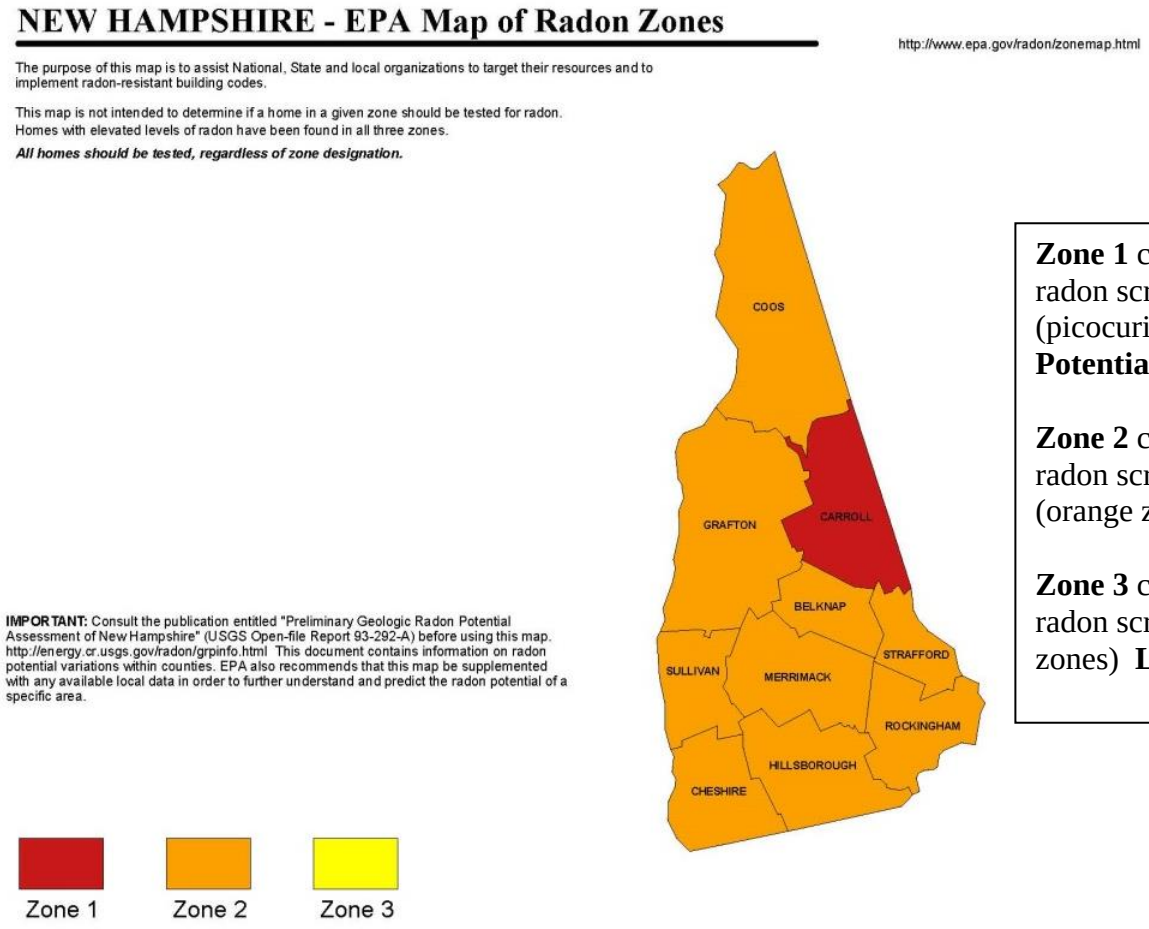
There have been no known events related to natural water and air contamination in Goshen although uranium was found when constructing I-89 to the east of Goshen. It is also anticipated that although no one is aware of any radon contamination, given that we are in the "Granite State," it is likely that some homes are affected by radon.

Table III-16: RADON – LOW/MEDIUM RISK

RADON					
Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)					
County	**# Tests**	**G. Mean**	**Maximum**	**% > 4.0 pCi/l**	**% > 12.0 pCi/l**
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

RADON					
Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)					
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
Sullivan	**466**	**1.4**	**29.4**	**15.7**	**2.1**
STATEWIDE	**15860**	**2.4 pCi/L**	**478.9 pCi/L**	**32.4**	**8.6**

Figure III-3: MAP OF RADON ZONES



Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCI/L (picocuries per liter) (red zones) **Highest Potential**

Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L (orange zones) **Moderate Potential**

Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L (yellow zones) **Low Potential**

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 Goshen, 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 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. The spills may occur on-site at hazardous waste generators or in transport through town.

In Goshen, there are five hazardous waste generators listed on the NH Department of Environmental Services (DES) "one-stop" list. Four of these are inactive and probably only produced small amounts of hazardous waste. The Goshen Transfer Station is listed as a "non-notifier" generator of hazardous waste. There are no large generators of hazardous waste in Goshen.

Past Hazardous Waste Spill Events

No known significant spills have occurred in Goshen.

Potential Future Hazardous Waste Spill Damage

Although there have not been any significant spills in Goshen, hazardous materials spills could occur along the NH Route 10 or NH Route 31. In addition, heating fuel is delivered to homes on many of the town's roads: spills could occur at storage tanks during the filling of the tanks. There conceivably could be spills near any home in Goshen due to home heating fuel delivery. The property owner is responsible for clean-up. The State oversees these reported spills.

The State did not determine county risk for hazardous waste spills in the *NH Multi-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. Section 802 of the USA Patriot Act expanded the definition of terrorism to cover "domestic," as opposed to international terrorism. A person engages in domestic terrorism if they do an act "dangerous to human life" that is a violation of the criminal laws of a state or the United States, if the act appears to be intended to: (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."

Past Terrorism Events

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

Future Terrorism Events

Terrorism is not considered a major risk, although vandalism is an occasional problem. The Committee determined that the risk of terrorism is a low/medium risk in Goshen.

C. HAZARD RISK RATINGS

The Town of Goshen 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 Goshen. These ratings were reevaluated for change in 2013. The two highest risks in Goshen were determined to be hurricane and severe winter weather.

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 – Low: 0-33% chance of occurrence during a 10-year period
2 – Medium: 33-66% chance of occurrence during a 10 year-period
3 – High: 66-100% chance of occurrence during a 10-year period

An n/a score was given if there was insufficient evidence to make a decision. To ensure some balance with a more scientific measurement, the plan also identifies the probability of occurrence from the State Hazard Plan as shown in Table III-10. For comparative purposes the Low rating was given a designation of "1," the Medium rating a designation of "2," and the High rating a designation of "3." These figures are shown in Table III-17 and III-18.

Table III-17: PROBABILITY OF HAZARD

Probability of Hazard Occurring in Sullivan County from State Plan											
Flood	**Dam Failure**	**Drought**	**Wildfire**	**Earth-quake**	**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.

Table III-18: 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	3	3	3	3
Flooding	2	3	3	2.67
Hurricane	2	3	3	2.67
Tornado & Downburst	2	3	3	2.67
Thunderstorm/Lightning/Hail	1	2	1	1.33
Severe Winter/Ice Storms	2	2	2	2
Earthquake	1	3	3	2.33

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**
Drought	1	1	2	1.33
Extreme Heat	1	1	1	1
Erosion/Landslide	1	2	2	1.67
Wildfire	1	3	3	2.33
Natural Contaminants	1	1	3	1.66
HazMat Spills	1	1	1	1
Terrorism	3	3	3	3

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.

HIGH**:** 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-13: RISK ASSESSMENT

Risk Assessment 0-1.9 Low 2-3.9 Low/Med 4-5.9 Med 6-7.9 Med-High 8-9 High				
Hazards	**Probability based on Committee Review**	**Vulnerability based on Committee Review**	**Risk Rating (Probability x Vulnerability)**	**Risk**
Dam Failure	2	3	6	Medium/High
Flooding	3	2.67	7.98	Medium/High
Hurricane	2	2.67	5.32	Medium
Tornado & Downburst	1	2.67	2.67	Low/Medium
Thunderstorm/Lightning/Hail	3	1.33	3.99	Low/Medium
Severe Winter	3	2	6	Medium/High
Earthquake	1	2.33	2.33	Low/Medium
Drought	2	1.33	2.66	Low/Medium
Extreme Heat	3	1	3	Low/Medium
Erosion/Landslide	3	1.67	4.98	Medium
Wildfire	2	2.33	4.66	Medium
Natural Contaminants	3	1.67	4.98	Medium
HazMat	2	1	2	Low/Medium
Terrorism	1	3	3	Low/Medium

IV. CRITICAL FACILITIES/LOCATIONS

The Critical Facilities list, identified by the Goshen 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 Goshen. 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 accessory structures for 2012.

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

Critical Facility	Hazard Vulnerability	Value
Fire Station	All Hazards; Flooding	$54,390
Town Hall (Shelter)/Police Station	All Hazards; Dam Failure, Wildfire, Earthquake	$168,430
Highway Garage	All Hazards; Wildfire	$32,590

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

Critical Facility	Hazard Vulnerability	Value
Grange Hall	All Hazards; Flooding	$172,850
Post Office	All Hazards; Flooding	$94,940
Library	All Hazards; Dam Failure, Wildfire, Earthquake	$82,690
Goshen Community Church	All Hazards; Dam Failure, Wildfire, Earthquake	$257,180
Power Conversion Station (Co-Op)	Wildfire and Severe Winter	Unknown
Goshen Country Store	All Hazard; Flooding, Winter Weather	$133,410

Table IV-3: FACILITIES & POPULATIONS TO PROTECT

Critical Facility	Hazard Vulnerability	Value
Lumber Yard	All Hazards; Flooding and Dam Failure	$242,290
75 Homes around Rand Pond Road	All Hazards; Winter Weather	Unknown
Backside Inn	All Hazard	$215,500
Horseshoe Pines (Elderly Assisted Living)	All Hazards; Wildfire	$142,490
Tippy Canoe Campground	All Hazards	$521,420

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, dam inundation 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 except to note logical future development areas.

Table V-1: VULNERABILITY OF EXISTING DEVELOPED AREAS

Area	Hazard	Critical Facilities	Buildings (residential & non-residential)	Infrastructure	Natural Resources	Total Known Building Value
A and AE Flood Zone	Flooding	$172,850	$7,748,488	Unknown	Unknown	

Table V-2: VULNERABILITY OF POTENTIAL DEVELOPMENT

Area	Hazard	Critical Facilities	Projected Buildings	Projected Infrastructure	Projected Value
None Known	All Hazards	None	N/A	N/A	N/A

B. IDENTIFYING VULNERABLE SPECIAL POPULATIONS

There are few centers of special populations in town including the elementary school, the town offices, the town hall during special meetings, and the library. The elderly and physically or mentally impaired residents are also residing throughout the town in their homes.

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 – Medium/High Risk – Unknown cost
The Committee determined the risk for Dam Failure to be low. The Gunnison Lake Dam is the only dam that is designated as "high." The cost of a dam failure is unknown due to the many variables in such an event; however, the impact could be devastating in not only Goshen, but also in the Town of Newport and the City of Claremont. The inundation area of this dam if it were to fail, follows north along Route 10 into downtown Newport and then travels west into downtown Claremont and finally into the Connecticut River. A dam failure would affect several homes in Goshen as well as the Town Hall (emergency shelter) and Police Station and an unknown number of structures in the downtowns of the two largest municipalities in the county. Additionally roads, bridges, and stream beds would be detrimentally impacted.

Flooding – Medium/High Risk - $2,169,576 Estimated Cost (not including roads, bridges)
There are approximately 88 structures located within the FEMA designated Special Flood Hazard areas and dam inundation area. These areas are all "Zone A and AE." The total value of the buildings (including residential and non-residential) is $7,748,488. Assuming a 28 % structural damage to the buildings, the damage would total close to $2,169,576. There are seven town and state bridges and several sections of road in these flood areas. No value estimate has been done for these structures. No estimate for contents of buildings was done.

Hurricane – Medium Risk – $445,000 Million Estimated Cost
Damage caused by hurricanes can be severe and expensive. Goshen 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 Goshen is approximately $44.4 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. If 10% of the buildings received 10% damage, the damage cost would be about $445,000.

Tornado & Downburst – Low/Medium Risk – No Recorded or Estimated Cost
Tornadoes, downbursts, and microbursts are relatively uncommon natural hazards in New Hampshire. On average, about two tornado events strike each year in New Hampshire. In the State, the average annual cost of tornadoes between 1950 and 1994 was $9 million (NOAA's Storm Prediction Center) in adjusted US dollars. These wind events occur in specific areas, so calculating potential town-wide losses is difficult. There is no standard loss estimation model available for tornadoes due to their random nature although it is likely that there could be severe damage to buildings, utilities, crops, livestock, and trees as well as potential for human fatalities.

Although more recent information was not found for New Hampshire, a July 2008 tornado which touched down in Deerfield, NH where it resulted in one fatality and damaged nearly 100 homes and completely destroyed two homes. The 52 mile long damage path was the longest damage path for any tornado in NH and extended from several other NH counties before crossing into Maine. Twisted trees still remained in some towns five years later, as property owners could not afford to clear them. No cost estimate for this disaster was found, but FEMA provided about $2.5 million in assistance to affected NH communities.

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. Lightning strikes can start fires in buildings and forests causing great loss of property and natural resources. Lightning can also cause power outages costing significantly in repairs to utilities, not to mention great inconvenience to homeowners and businesses.

Severe Winter Weather – Medium/High 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. Municipal costs rise in severe winters as towns

attempt to keep ice and snow off the roads. The purchase of salt and sand can greatly increase if the severity of winter weather is greater than anticipated.

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). U.S. average insurance claim was $1,325 for personal property, $1,980 for commercial property, and $1,371 for automobiles. In a 2014 study by the Insurance Information Institute, winter-related disasters totaled $3.7 billion nationwide. The organization further reported that severe winter weather caused 15% of all insured auto, home, and business catastrophe losses in the US in 2014.

Earthquake – Low/Medium Risk - $4.4 million Estimated Cost if All Buildings Impacted

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 10% of buildings in Goshen were impacted by an earthquake, the estimated damage could be around $4.4 million.

Drought – Low 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 Goshen as no drought has significantly affected Goshen in the past. If any farms are impacted, the crop loss could be devastating, but it depends upon the length of the drought. Drought can also require the development of new and deeper wells for residential use. Fires can occur during a drought especially if combined with a lightning strike and dry tinder.

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/Landslide – 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**.** Severe erosion has occurred along the South Branch of the Sugar River near the intersection with Gunnison Brook and behind the Fire Station. The cost of repair is estimated at $85,000 which does not include previous damage to the road shoulder. This is only one example of potential erosion/landslide in Goshen and does not reflect a town-wide impact of various instances over time.

Wildfire– Medium Risk – $222,000 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 Goshen interfaces with forest, all structures are potentially vulnerable to wildfire. The estimated value of all structures in the Town is approximately $44.4 million. If 1% of the structures received 50% damage, the total estimated cost would be about $222,000.

According to the Sullivan County Forester, big wildfires are uncommon in Sullivan County as the weather here is generally not favorable for a high probability of ignition and rapid spread. Additionally, there are enough roads and people in the county that fires are generally spotted and addressed before they are too large. Occasionally weather conditions are more favorable as was seen in the 1950s on Croydon Mountain.

Natural Contaminants – 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 as often people do not even know they have radon in their home interior air or water. The impact to their health may never be known as they may not realize the source of their illness if it is related to radon which can cause cancer. The Centers for Disease Control and Prevention, the American Lung Association and the American Medical Association agree with estimates that radon causes thousands of preventable lung cancer deaths every year. (US EPA)

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.

Terrorism – Low/Medium Risk – No Recorded or Estimated Cost

The cost of any terrorism event is unpredictable and not estimated in this document. The Committee does not feel that terrorism is a substantial threat in Goshen.

VI. EXISTING MITIGATION ACTIONS

A. EXISTING HAZARD MITIGATION PROGRAMS

The following table provides the existing mitigation actions in Goshen. The fourth or "Effectiveness" column ranks each program as one of the following: "high" – the existing program works as intended and meets its goals; "average" – the existing program works though there is room for improvement; and "low" – the existing program does not work as intended or falls short of its goals. The fifth column lists if there were recommendations for improvement in the previous hazard mitigation plan and if those recommendations were put into action or not and if not, why not. The final column provides either an update of the mitigation action or proposed improvements that are currently being recommended for the future. Any proposed actions or actions to be continued will be shown again in future tables for evaluation, prioritization, and scheduling for implementation.

Table VI-1: EXISTING MITIGATION ACTIONS

Existing Mitigation Action & Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Floodplain Ordinance – Regulate development in floodplain	Flooding/Entire Town	Planning Board	Average	No recommendations in previous plan	Continue to enforce Floodplain Ordinance to prevent disruption of floodplain
Conservation Commission – Conserves land unsuitable for development and protection of natural resources	Erosion, Flooding/ Entire Town	Conservation Commission	Average	No recommendations in previous plan	Continue to purchase or place easements on suitable properties
Zoning Ordinance - The town regulates development on steep slopes thereby mitigating potential erosion.	Erosion/Entire Town	Zoning Board	Average	No recommendations in previous plan	Continue to enforce steep slopes restrictions
Subdivision Regulations – Requirements and guidance for subdivision	Erosion and Flooding/ Entire Town	Planning Board	Average	No recommendations in previous plan	Continue to regulate and encourage more open space; maintenance of existing vegetation; erosion control; and evaluation of character of land for subdivision
Building Codes – Requirements for new building construction.	Wind Events & Severe Winter/ Entire Town	Selectboard	Average	No recommendations in previous plan	Continue to enforce building code.

Existing Mitigation Action & Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Emergency Power – Maintain emergency power systems for critical facilities.	All hazards/Entire Town	Selectboard	Average	Provide additional generators for critical facilities/COMPLETED: Bought generator for town office building	Consider replacement of portable generator as it is quite old
Tree Trimming – Keep trees along roadways trimmed to prevent future hazards provided by utility company.	Severe Winter & Wind Events/ Entire Town	Road Agent	Average	No recommendations in previous plan.	Continue to work with utility company.
Public Education & Outreach – hazard mitigation and emergency preparedness	All hazards/Entire Town	Selectboard	Average	Provide more education and outreach & distribute materials at Town Meeting and on website /PARTIALLY COMPLETED – *Materials distributed with State Fire Permits*	Distribute educational literature at Town Meeting and on Town website; also complete a school outreach program.
Capital Improvement Plan – Municipal budget for capital purchases	All hazards/Entire Town	Selectboard	Average	Develop a capital improvement program to address when culverts, roads and bridges will be improved/ COMPLETED.	Continue to update plan annually for a 10 year cycle.
Highway Department – Road and bridge maintenance	All hazards/Entire town	Road Agent	Average	Protect structures and infrastructure with Winter Maintenance Town Highway Plan/ COMPLETED plan	Continue to follow winter maintenance plan.
Road & Bridge Improvements - Mitigate problem areas to prevent substantial future damage from natural hazards	All hazards/Entire Town	Road Agent	Average	Inventory culverts and replace damaged and undersized culverts in the Town/ COMPLETED inventory and replacements.	Continue evaluation and replacement program.
Stormwater Evaluation – Efforts to mitigate road washing by stormwater	Flooding & erosion/Entire Town	Road Agent	Average	Arrange for a storm water management study from the intersection of Brook Road and Route 10 heading north to the Newport Town line for re-channelization of storm waters and reduction of flooding. /DEFERRED: *Not completed due to lack of resources*.	Provide storm water management study from intersection of Brook Road and Route 10 to Newport.

The Town of Goshen will provide a public education and outreach program by using brochures and the town website to reach their citizens. There will also be one-on-one outreach as appropriate. Below is a table showing the potential topics and outreach methods. Dam failure is not included as this is performed by the State Dam bureau in their assessment of all dams in the State.

Table VI-2: PUBLIC EDUCATION AND OUTREACH TOPICS

Natural Hazard	Educational Topics	Outreach Methods
Multi-Hazard	Shelters; evacuation routes; proper evacuation procedures; emergency kits and family plans	Town web site Town meeting display
Flooding	National Flood Insurance Program participation; building in a floodplain; stormwater runoff; driving on flooded roads; protecting natural systems which provide flood mitigation; securing property items such as propane tanks prior to a flood	Town web site Brochures
Wind Events (Hurricane, Tornado, Downburst	Wind retrofits such as shutters, hurricane clips; school and town official sheltering basics; resident and business sheltering basics; window coverings	Town web site
Severe Winter Weather	Installation of carbon monoxide monitor and alarms; ventilation of fuel-burning equipment; protecting water pipes	Town web site
Thunderstorms/Lightning/Hail	Taking cover; staying inside when it thunders	Town web site
Earthquake	Structural and non-structural home retrofitting; securing furnishings	Town web site
Drought	Water-saving measures; crop insurance; soil and water conservation practices by farmers	Town web site
Extreme Heat	Preparing for extreme heat; air conditioning; cooling shelters	Town web site
Erosion	High risk areas; stormwater management; bank stabilization; water body buffers	Town web site
Wildfire	Most vulnerable areas; reducing fuel for fires such as dry brush	Town web site; Fire Department and Fire Warden interactions
Natural Contaminants	Testing for contaminants in air and water	Town web site
Hazardous Materials Spills	What to do if there's a fuel delivery spill	Town web site

B. NEW MITIGATION PROGRAMS

The Committee evaluated the existing programs and proposed improvements to determine if they were addressing all the hazards they felt could impact the town. Table VII-3 summarizes this evaluation and notes where new programs could be implemented to address all hazards.

Table VI-3: COMMITTEE ASSESSMENT FOR NEW HAZARD MITIGATION ACTIONS

Hazard	Committee Ideas and Assessment
Dam Failure	The committee felt that overall they did not have the ability to mitigate dam failures. They noted that NH DES keeps record of dam inspections and that the State-owned Gunnison Lake Dam keeps an updated inundation plan. The committee felt that nay actions that could be taken regarding dam failure were beyond the scope of their jurisdiction.
Drought	The Committee did not feel they needed to pursue mitigation strategies for drought due to the rural nature of the town and low frequency of occurrence.
Earthquake & Severe Wind	For earthquake and major wind events, the Town already has building codes which take these events into account. The Committee did not feel they could adopt more stringent requirements since these events are rare and the available actions to take were outside the capacity and resources of the Town. The Town does plan to continue its tree trimming by the highway department to reduce damage by severe wind.
Erosion/Landslide	Road maintenance and upgrades; Subdivision Regulations restrict development on steep slopes and Site Plan Review Regulations address stormwater; Driveway Regulations assure proper culvert size. Mitigate erosion/landslide hazard between Goshen Fire Station and the South Branch of the Sugar River before land and well are lost.
Extreme Temperatures	The town offers cooling stations and water to the public at the Town Office.
Flood	The Town is an NFIP member and has adopted a floodplain ordinance; the highway department will continue to evaluate culverts and bridges for flooding impacts.
Thunderstorms, Lightning and Hail	The Committee discussed the hazards, but did not feel a particular area of town is more prone to lightning strikes, and there are no feasible mitigation strategies at this point.
Severe Winter Weather	The Town does its best to maintain the roads in the winter to keep them clear of snow and ice. The Town already adopted the State's International Building Coad and International Residential Code which are enforced by the Building Inspector. The Town provides shelter during major storms and power outages.
Earthquake	The Committee felt the risk of a destructive earthquake was not sufficient enough to warrant expensive mitigation strategies. The building codes provide a standard to meet the risk of earthquakes in town.

Hazard	Committee Ideas and Assessment
Wildfire	The Town requires fire permits to reduce unsafe fire practices. The Committee did not feel there were other strategies they should adopt.
Natural Contaminants	The Committee discussed the different natural contaminants and noted that radon is always a risk living in a region on granite bedrock. They did not feel it appropriate for the town to take action other than educating its residents about the danger and how to test for radon.
Hazardous Materials	The Committee felt the most suitable strategies for hazardous materials was to continue their mutual aid agreements regarding HazMat spills. They recognize this is considered a preparedness item, but the committee feels it is the best action for the town to take and did not feel they could hake on any other measures at this time.
Terrorism	Since the Town is quite rural and terrorism is a low risk, the Committee did not feel they needed to develop strategies for this hazard. The Town does not have a school.

Table VI-4 provides a list of proposed new mitigation actions including ones that had been proposed in the previous plan. If these actions had not been accomplished since the last plan, then there is an explanation, however, all mitigation actions are new.

Table VI-4: PROPOSED NEW MITIGATION ACTIONS

Proposed New Mitigation Action Description	Hazard Type/Service Area	Responsible Local Agent	If Recommended in Previous Plan, why was it not put into place?
Fire Station Erosion Mitigation – Work to Aid town in addressing the erosion area on the South Branch behind the Fire Department.	Flooding and Erosion/South Branch near Fire Department	Selectboard; EMD	It was not in the previous plan

C. CRITICAL EVALUATION FOR IMPROVEMENTS TO EXISTING PROGRAMS AND NEW PROGRAMS

The Goshen Hazard Mitigation Committee reviewed each of the proposed improvements to existing programs and proposed new programs identified for existing mitigation programs 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.

The Goshen 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. These scores are re-evaluated during each update process for new and existing strategies.

Table VI-5: PRIORITIZING EXISTING & NEW 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	**Floodplain Ordinance** – Continue to enforce ordinance.	3	3	3	3	3	3	3	3	24	Both
1	**Subdivision Regulations -** Continue to regulate and encourage more open space; maintenance of existing vegetation; erosion control; and evaluation of character of land for subdivision	3	3	3	3	3	3	3	3	24	New
1	**Building Codes -** Continue to enforce building code.	3	3	3	3	3	3	3	3	24	New
1	**Highway Department -** Continue to follow winter maintenance plan.	3	3	3	3	3	3	3	3	24	Both
1	**Public Outreach –** Distribute safety materials; add link web site; school outreach program.	3	3	3	3	3	3	3	3	24	Both
2	**Zoning Ordinance -** Continue to enforce steep slopes restrictions	2	3	3	3	3	3	3	3	23	New
3	**Replace Portable Generator** – Used for critical facilities such as the highway garage	1	3	3	3	3	3	3	3	22	Both
3	**Tree Trimming -** Continue to work with utility company.	3	3	3	2	3	3	2	3	22	Both
4	**Fire Station Erosion Mitigation** – Mitigate erosion between fire station and South Branch Sugar River	3	3	1	2	3	3	3	3	21	Both
4	**Conservation Commission** – Work to Aid town in addressing the erosion area on the South Branch behind the Fire Department.	3	3	1	2	3	3	3	3	21	Both
4	**Road and Bridge Improvements –** Completion of culvert inventory and replacement.	3	3	3	1	3	3	3	2	21	Both
5	**Capital Improvement Program –** Continue to update plan annually	1	3	3	2	3	3	2	3	20	Both
5	**Stormwater Evaluation -** Provide storm water management study from intersection of Brook Road and Route 10 to Newport.	1	3	3	2	3	3	2	3	20	Both
6	**Conservation Commission -** Continue to purchase or place easements on suitable properties	3	2	3	1	3	3	1	2	18	Both

D. EMERGENCY PREPAREDNESS ACTIONS

Although this is a hazard mitigation plan, the Committee felt it was important to address new and proposed emergency preparedness actions. It is sometimes difficult to distinguish between hazard mitigation and emergency preparedness. Essentially, emergency preparedness is the preparation to act once a hazard has occurred. And as has been discussed previously, hazard mitigation includes

actions to eliminate or reduce hazards before they happen. Table VI-7 below is a list of the emergency preparedness actions that the Committee felt should be addressed and included in this plan.

Table VI-6: EMERGENCY PREPAREDNESS ACTIONS

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Local Emergency Operations Plan - Describes the preparation and response necessary for the Town to address emergency situations	Emergency Preparedness/ Entire Town	EMD & Selectboard	Average	No recommendations in previous plan/updated LEOP in 2014	Continue to evaluate updated LEOP
School Notification and Evacuation	Emergency Preparedness/ schools	School Superintendent /EMD	Average	Develop plan for notification and evacuation of the Goshen-Lempster Co-op School, Newport High School and Fall Mountain High School. / COMPLETED: The Goshen-Lempster Co-Op School is complete;	No further action needed.
Emergency Preparedness Training –	Emergency Preparedness/ Entire Town	Fire Chief; Police Chief; Road Agent	Average	Provide greater training for all departments for response and extend NIMS and CIS training to all Town employees	Continue membership in Keene Mutual Aid; continue training departments for emergency response
Police Support – Upper Sullivan/Merrimack Mutual Aide, State Police.	Emergency Preparedness/ Entire town	Selectboard	Average	No recommendations in previous plan.	Continue to participate in police mutual aid programs.
Fire Department – training and response	Emergency Preparedness/ Entire town	Fire Chief	Average	Receive ongoing training in mitigating hazards before they occur and emergency response procedures/ COMPLETED wildfire certifications	Continue to provide fire department with training to improve disaster and emergency response; acquire additional masks..
Mutual Aid – Fire – SW Fire Mutual Aid; Kearsarge and Newport Mutual Aid	Emergency Preparedness /Entire Town	Fire Chief	Average	No recommendations in previous plan	Continue participation in the Cold River Fire Chiefs Association for training.

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met*	Update/Future Proposed Improvements
Community Emergency Reaction Team – A local committee joining other communities in the greater region in lessening the severity of hazard events.	Emergency Preparedness/ Entire Town	Selectboard	Low	No recommendations in previous plan	CERT no longer exists in the greater Sunapee area at this time.
Snowmobile Club – Maintains trails	Emergency Preparedness/ Entire Town	EMD	Average	The club maintains and maps trails that can be used to access remote areas in the event of wildfire and other emergencies.	Acquire a set of trail maps and contacts from the snowmobile club for the Town.
Hazard Communication & Equipment – Provide public information about hazards and provide equipment for road closures.	Emergency Preparedness/ Entire Town	Road Agent	Average	Acquire signage for road closure in the event of flooding, ice, landslide and any other hazards/ COMPLETED: The PD has acquired 1/3 ownership of a variable message board	Acquire more barricades, cones, road closed and national weather service signs.
Town Coordination – Standard Operating Procedures for each department to share	Emergency Preparedness/ Entire Town	Department Heads	Low	Develop a standard policy and procedure manual for each Town Department. The manual could include standard practice for the mitigation of potential hazards, information on day-to-day operations and information on what to do in the event of a hazard. This plan should enhance communication between departments. / DEFERRED: *Not completed due to lack of leadership.*	Pursue the writing of a single document that outlines the standard operating practices for each department. Organizing the manual with chapters specific to each department.
Emergency Response Committee - The town has established a committee for emergency operations planning.	Emergency Preparedness/ Entire Town	EMD	Average	No recommendations in previous plan	Continue to meet on an as needed basis and address safety response issues.
911 Numbering – Encourage residents to display the correct	Emergency Preparedness/	Selectboard and Police	NA	New recommendation	New

Existing Emergency Preparedness Action & Description	**Type/Service Area**	**Responsible Local Agent**	**Effectiveness (Low, Average, High)**	**Recommendations in Previous Hazard Mitigation Plan/*Actions Taken to Meet Recommendations or Not Met***	**Update/Future Proposed Improvements**
house numbers in a visible manner	Entire Town	Department			
Reverse 911 – Participate in First Net System when it becomes available.	Emergency Preparedness/ Entire Town	EMD	NA	New recommendation	New
Emergency Communication – Acquire a trunk repeater for 2 police cars to improve emergency communication.	Emergency Preparedness/ Entire Town	Police Department	NA	New recommendation	New
Evacuation Plan – Write evacuation plans for town buildings and facilities.	Emergency Preparedness/ Entire Town	Fire Chief	NA	New recommendation	New
Fire Suppression – Pursue a pressurized hydrant system using the water from the Gunnison Lake Dam that can service: Brook Road, RT 31, to the Newport Line and the Goshen-Lempster School.	Emergency Preparedness/ Entire Town	EMD and Fire Chief	NA	New recommendation	New
Chainsaw Certification – Town employees and first responders obtain certification from the state as chainsaw operators.	Emergency Preparedness/ Entire Town	Fire Chief	NA	New recommendation	New

VII. PRIORITIZED IMPLEMENTATION SCHEDULE

The Goshen Hazard Mitigation Committee created the following action plan for implementation of priority mitigation strategies.

Table VII-1: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING AND NEW PROGRAMS

Rank	Evaluation Score	Problem Statement	Mitigation Action	Responsible Party	Timeframe	Potential Funding Source	Anticipated Cost
1	24	Development in floodplain can cause change in floodplain area and increase damage	**Floodplain Ordinance** – Continue to enforce ordinance.	Planning Board	Ongoing*	Selectboard	$0
1	24	Land evaluation is needed to control development which can cause hazards such as taking up flood storage space.	**Subdivision Regulations -** Continue to regulate and encourage more open space; maintenance of existing vegetation; erosion control; and evaluation of character of land for subdivision	Planning Board	Ongoing*	Volunteers	$0
1	24	Buildings need to be built to a standard to prevent damage from severe weather events	**Building Codes -** Continue to enforce building code.	Selectboard	Ongoing*	Staff	Part of salary
1	24	Roads maintenance must be provided in a systematic way to prioritize roads requiring immediate winter maintenance	**Highway Department -** Continue to follow winter maintenance plan.	Highway Agent	Ongoing*	Taxes	Part of road maintenance budget
1	24	Many residents do not know how to install/maintain fireplaces	**Public Outreach –** Distribute safety materials with fireplace inspections.	Fire Chief	Ongoing*	Taxes	$100 per year
2	23	Development on steep slopes can cause erosion by clearing vegetation and construction.	**Zoning Ordinance -** Continue to enforce steep slopes restrictions	Planning Board	Ongoing*	Volunteer	$0
3	22	Power outages can hamper municipal provision of needed services	**Replace Portable Generator** – Used for critical facilities such as the highway garage	Selectboard	4-5 years	HazMit Assistance Grant	$100,000
3	22	Dead and damaged trees can cause power outages	**Tree Trimming -** Continue to work with utility company.	Road Agent	Ongoing*	Taxes – Staff Time	$0

Rank	Evaluation Score	Problem Statement	Mitigation Action	Responsible Party	Timeframe	Potential Funding Source	Anticipated Cost
4	21	The land behind the fire station is eroding away threatening the well and the building	**Fire Station Erosion Mitigation** – Mitigate erosion between fire station and South Branch Sugar River	Selectboard; EMD	1-2 years	HazMit Assistance Grant/Taxes	$85,000
4	21	Undersized culverts can cause flooding and the cost requires a plan to replace continuously	**Road and Bridge Improvements** – Completion of culvert inventory and replacement of those inventoried that are deemed to be insufficient.	Road Agent	Ongoing*	Taxes	$5,000 per year
5	20	The Town needs to plan ahead for large expenditures	**Capital Improvement Program –** Continue to update plan annually	Selectboard	Ongoing*	Volunteers	$0
5	20	Need for re-channelization of storm waters to reduce flooding on Route 10	**Stormwater –** Complete assessment of storm water from Brook Road to Newport on Route 10.	Selectboard and NH DOT	4-5 years	Taxes/Utility grants	Unknown as need bids
6	18	Lands need to be conserved to protect natural resources and natural mitigation systems such as wetlands	**Conservation Commission Fund** - Continue to purchase or place easements on suitable properties	Conservation Commission	Ongoing*	Conservation Fund	Unknown as depends on available properties

*This action will be completed on an ongoing basis throughout the life of the plan.

VIII. 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 Goshen will revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Goshen 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

Many municipalities have web sites where they can share information about hazard mitigation and emergency management. The use of the web site by its citizens is often dictated by the availability of broadband service to easily access the web. The Town of Goshen has provided a link to the Regional Planning Commission's web page, "A Citizen's Guide to Hazard Mitigation and Emergency Management."

Municipalities have documents to convey town goals and objectives that are used to guide future programs. They can be used to promote and implement hazard mitigation. A Municipal Master Plan outlines how the community wants to grow and develop. It includes overall goals and objectives of the community and recommendations for ordinances and regulations to accomplish those goals. A zoning ordinance is a common vehicle to implement goals of the master plan and regulates land use. It can be used to restrict development in flood zones, steep sloped areas, buffer zones around wetlands and water bodies, drinking water recharge areas, hillsides, and ridgelines. These areas may be "overlay districts" mapped out for protection. A zoning ordinance can also require best management practices in forestry and timber harvesting and stormwater management to prevent erosion. A floodplain management plan is part of the zoning ordinance and has typically followed a format recommended by the NH Flood Management Program.

Other municipal documents include regulations such as Curb Cut Regulations, Excavation Regulations, Subdivision Regulations and Site Plan Review Regulations. Curb Cut Regulations are used to make sure the culverts at the intersection of driveways and roads are adequate to handle runoff water or stream flow. Excavation Regulations are used to restrict the removal of earth including distance to seasonal high water table and the requirements to restore the site once the excavation is completed. This is essential to make sure the

area is graded and re-vegetated to reduce the chances of erosion. Subdivision Regulations determine how lots are to be laid out in a subdivision. This might include requirements for fire protection, stormwater runoff management, vegetated buffers, and reference back to the zoning ordinance. Site Plan Review Regulations are for multi-family housing and commercial development. Again, these regulations refer back to the zoning ordinance. The regulations can determine site specific development requirements such as parking, open space, vegetated buffers, and traffic flow.

Subdivision Regulations and Site Plan Review Regulations typically refer back to the Zoning Ordinance, so it may be more effective to amend the zoning ordinance to address hazard mitigation through specific restrictions though this can vary by municipality.

Another important municipal document is the Capital Improvements Program which is a "budget of the future" to consider potential capital expenditures such as new roads, major road improvements, equipment, schools, parks. This allows a systematic evaluation of potential projects. Any capital expenditures related to hazard mitigation will be incorporated into this document.

There are other regulations and ordinances that municipalities may adopt such as to regulate water use during a drought or restrict development in areas around drinking water sources. This all varies by municipality.

It should also be noted that many municipalities do not update these documents very often, and some towns do not have them at all. However, where they exist, they offer the potential to include hazard mitigation and emergency management topics.

The Town of Goshen has driveway regulations, site plan review, subdivision regulations, and a zoning ordinance. The zoning ordinance prohibits building on land with slopes greater than 25% and requires a special exception from the Zoning Board to building on land with a slope of 15-25%. This will continue to be part of the ordinance to reduce potential erosion caused by removal of vegetation and building on steep slopes. The zoning ordinance contains a "Water Resources Protection Ordinance" to protect groundwater supply areas and surface water. This will provide protection from water pollution.

B. CONTINUED PUBLIC INVOLVEMENT

The public will continue to be invited to participate 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. It is hoped that a separate meeting discussing hazard mitigation and emergency management will create more interest in the process. Additionally, a press release to local newspapers (to be published at their discretion) will be distributed and information will be posted on the Town website as well as the town office, library, and post office.

Copies of the Hazard Mitigation Plan have been or will be shared with to the following parties for review for reference:

- Select Board Offices in neighboring towns
- NH Homeland Security & Emergency Management
- Goshen Select Board, Conservation Commission, and Planning Board
- Upper Valley Lake Sunapee Regional Planning Commission

RESOURCES USED IN THE PREPARATION OF THIS PLAN

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

Town of Goshen Emergency Operations Plan, 2009

Town of Goshen Master Plan, 2013

NH HSEM's *State of New Hampshire Multi-Hazard Mitigation Plan*, Update 2013

www.fema.gov/news/disasters.fema: Website for FEMA's Disaster List
www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms: Website for National Oceanic & Atmospheric Administration Disaster List

www.tornadoproject.com: Website for The Tornado Project

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

www.nesec.org: Website for Northeast States Emergency Consortium

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: **Maps of Hazard Areas and Critical Facilities**

Appendix E: **Town Adoption & FEMA Approvals of Hazard Mitigation Plan**

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

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

All sub-applicants for Flood Mitigation Assistance Program (FMA) must currently be participating in the National Flood Insurance Program (NFIP) to be eligible to apply for this grant. Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) mitigation project sub-applications for projects sited within a special flood hazard area are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project sub-applications located outside the special flood hazard area. Properties included in a project sub-application for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained at least through completion of the mitigation activity.

The HMA grant assistance includes three programs:

1. *Hazard Mitigation Grant Program (HMGP*): This program assists in the implementation of long-term hazard mitigation measures following a major disaster.

2. *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.

3. *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.

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

HMGP - http://www.fema.gov/hazard-mitigation-grant-program

PDM – www.fema.gov/government/grant/pdm/

FMA – www.fema.gov/government/grant/fma

Mitigation Project:	HMPG	PDM	FMA
1. Mitigation Projects	**X**	**X**	**X**
Property Acquisition and Structure Demolition	**X**	**X**	**X**
Property Acquisition and Structure Relocation	**X**	**X**	**X**
Structure Elevation	**X**	**X**	**X**
Mitigation Reconstruction	**X**	**X**	**X**
Dry Floodproofing of Historic Residential Structures	**X**	**X**	**X**
Dry Floodproofing of Non-residential Structures	**X**	**X**	**X**
Generators	**X**	**X**	
Localized Flood Reduction Projects	**X**	**X**	**X**
Non-Localized Flood Reduction Projects	**X**	**X**	
Structural Retrofitting of Existing Buildings	**X**	**X**	**X**
Non-structural Retrofitting of Existing Buildings and Facilities	**X**	**X**	**X**
Safe Room Construction	**X**	**X**	
Wind Retrofit for One- and Two-Family Residences	**X**	**X**	
Infrastructure Retrofit	**X**	**X**	**X**
Soil Stabilization	**X**	**X**	**X**
Wildfire Mitigation	**X**	**X**	
Post-Disaster Code Enforcement	**X**		
Advance Assistance	**X**		
5% Initiative Projects	**X**		
Misc. Other	**X**	**X**	**X**
2. Hazard Mitigation Planning	**X**	**X**	**X**
Planning Related Activities	**X**		
3. Technical Assistance			**X**
4. Management Costs	**X**	**X**	**X**

OTHER HAZARD MITIGATION ASSISTANCE FUNDING

Environmental Protection Agency

The EPA makes available funds for water management and wetlands protection programs that help mitigate against future costs associated with hazard damage.

Mitigation Funding Sources Program	Details	Notes
Clean Water Act Section 319 Grants	Grants for water source management programs including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulation. http://www.epa.gov/OWOW/NPS/cwact.html	Funds are provided only to designated state and tribal agencies
Clean Water State Revolving Funds	State grants to capitalize loan funds. States make loans to communities, individuals, and others for high-priority water-quality activities. http://www.epa.gov/owow/wetlands/initiative/srf.html	States and Puerto Rico
Wetland Program Development Grants	Funds for projects that promote research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. http://www.epa.gov/owow/wetlands/initiative/#financial	See website

National Oceanic and Atmosphere Administration (NOAA)

NOAA is the major source for mitigation funding related to coastal zone management and other coastal protection projects.

Mitigation Funding Sources Program	Details	Notes
Coastal Services Center Cooperative Agreements	Funds for coastal wetlands management and protection, natural hazards management, public access improvement, reduction of marine debris, special area management planning, and ocean resource planning. http://www.csc.noaa.gov/funding/	May only be used to implement and enhance the states' approved Coastal Zone Management programs
Coastal Services Center Grant Opportunities	Formula and program enhancement grants for implementing and enhancing Coastal Zone Management programs that have been approved by the Secretary of Commerce. http://www.csc.noaa.gov/funding/	Formula grants require non-federal match
Coastal Zone Management Program	The Office of Ocean and Coastal Resource Management (OCRM) provides federal funding and technical assistance to better manage our coastal resources. http://coastalmanagement.noaa.gov/funding/welcome.html	Funding is reserved for the nation's 34 state and territory Coastal Zone Management Programs
Marine and Coastal Habitat Restoration	Funding for habitat restoration, including wetland restoration and dam removal. http://www.nmfs.noaa.gov/habitat/recovery/	Funding available for state, local and tribal governments and for- and non-profit organizations.

Floodplain, Wetland and Watershed Protection Programs

USACE and the U.S. Fish and Wildlife Service offer funding and technical support for programs designed to protect floodplains, wetlands, and watersheds.

Funding and Technical Assistance for Wetlands and Floodplains Program	Details	Notes
USACE Planning Assistance to States (PAS)	Fund plans for the development and conservation of water resources, dam safety, flood damage reduction and floodplain management. http://www.lre.usace.army.mil/planning/assist.html	50 percent non-federal match
USACE Flood Plain Management Services (FPMS)	Technical support for effective floodplain management. http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&MyCategory=126	See website
USACE Environmental Laboratory	Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials. http://el.erdc.usace.army.mil/index.cfm	See website
U.S. Fish & Wildlife Service Coastal Wetlands Conservation Grant Program	Matching grants to states for acquisition, restoration, management or enhancement of coastal wetlands. http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home	States only. 50 percent federal share
U.S. Fish & Wildlife Service Partners for Fish and Wildlife Program	Program that provides financial and technical assistance to private landowners interested in restoring degraded wildlife habitat. http://ecos.fws.gov/partners/viewContent.do?viewPage=home	Funding for volunteer-based programs

Housing and Urban Development

The Community Development Block Grants (CDBG) administered by HUD can be used to fund hazard mitigation projects.

Mitigation Funding Sources Program	Details	Notes
Community Development Block Grants (CDBG)	Grants to develop viable communities, principally for low and moderate income persons. CDBG funds available through Disaster Recovery Initiative. http://www.hud.gov/offices/cpd/communitydevelopment/programs/	Disaster funds contingent upon Presidential disaster declaration
Disaster Recovery Assistance	Disaster relief and recovery assistance in the form of special mortgage financing for rehabilitation of impacted homes. http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm	Individuals
Neighborhood Stabilization Program	Funding for the purchase and rehabilitation of foreclosed and vacant property in order to renew neighborhoods devastated by the economic crisis. http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/	State and local governments and non-profits

Bureau of Land Management

The Bureau of Land Management (BLM) has two technical assistance programs focused on fire mitigation strategies at the community level.

Mitigation Funding Sources Program	Details	Notes
Community Assistance and Protection Program	Focuses on mitigation/prevention, education, and outreach. National Fire Prevention and Education teams are sent to areas across the country at-risk for wildland fire to work with local residents. http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html	See website
Firewise Communities Program	Effort to involve homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire before a fire starts. http://www.firewise.org/	See website

U.S. Department of Agriculture

There are multiple mitigation funding and technical assistance opportunities available from the USDA and its various sub-agencies: the Farm Service Agency, Forest Service, and Natural Resources Conservation Service.

Mitigation Funding Sources Agency Program	Details	Notes
USDA Smith-Lever Special Needs Funding	Grants to State Extension Services at 1862 Land-Grant Institutions to support education-based approaches to addressing emergency preparedness and disasters. http://www.csrees.usda.gov/funding/rfas/smith_lever.html	Population under 20,000
USDA Community Facilities Guaranteed Loan Program	This program provides an incentive for commercial lending that will develop essential community facilities, such as fire stations, police stations, and other public buildings. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population under 20,000
USDA Community Facilities Direct Loans	Loans for essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Community Facilities Direct Grants	Grants to develop essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Farm Service Agency Disaster Assistance Programs	Emergency funding and technical assistance for farmers and ranchers to rehabilitate farmland and livestock damaged by natural disasters. http://www.fsa.usda.gov/	Farmers and ranchers
USDA Forest Service National Fire Plan	Funding for organizing, training, and equipping fire districts through Volunteer, State and Rural Fire Assistance programs. Technical assistance for fire related mitigation. http://www.forestsandrangelands.gov/	See website
USDA Forest Service Economic Action Program	Funds for preparation of Fire Safe plans to reduce fire hazards and utilize byproducts of fuels management activities in a value-added fashion. http://www.fs.fed.us/spf/coop/programs/eap/	80% of total cost of project may be covered
USDA Natural Resources Conservation Service Emergency Watershed Protection Support	Funds for implementing emergency measures in watersheds in order to relieve imminent hazards to life and property created by a natural disaster. http://www.nrcs.usda.gov/programs/ewp/	See website

Mitigation Funding Sources Agency Program	Details	Notes
Services		
USDA Natural Resources Conservation Service Watershed Protection and Flood Prevention	Funds for soil conservation; flood prevention; conservation, development, utilization and disposal of water; and conservation and proper utilization of land. http://www.nrcs.usda.gov/programs/watershed/index.html	See website

Health and Economic Agencies

Alternative mitigation programs can be found through health and economic agencies that provide loans and grants aimed primarily at disaster relief.

Federal Loans and Grants for Disaster Relief Agency Program	Details	Notes
Department of Health & Human Services Disaster Assistance for State Units on Aging (SUAs)	Provide disaster relief funds to those SUAs and tribal organizations who are currently receiving a grant under Title VI of the Older Americans Act. http://www.aoa.gov/doingbus/fundopp/fundopp.asp	Areas designated in a Disaster Declaration issued by the President
Economic Development Administration (EDA) Economic Development Administration Investment Programs	Grants that support public works, economic adjustment assistance, and planning. Certain funds allocated for locations recently hit by major disasters. http://www.eda.gov/AboutEDA/Programs.xml	The maximum investment rate shall not exceed 50 percent of the project cost
U.S. Small Business Administration Small Business Administration Loan Program	Low-interest, fixed rate loans to small businesses for the purpose of implementing mitigation measures. Also available for disaster damaged property. http://www.sba.gov/services/financialassistance/index.html	Must meet SBA approved credit rating

Research Agencies

The United States Geological Survey (USGS) and the National Science Foundation (NSF) provide grant money for hazard mitigation-related research efforts.

Hazard Mitigation Research Grants Agency Program	Details	Notes
National Science Foundation (NSF) Decision, Risk, and Management Sciences Program (DRMS)	Grants for small-scale, exploratory, high-risk research having a severe urgency with regard to natural or anthropogenic disasters and similar unanticipated events. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES	See website
U.S. Geological Survey (USGS) National Earthquake Hazards Reduction Program	The purpose of NEHRP is to provide products for earthquake loss reduction to the public and private sectors by carrying out research on earthquake occurrence and effects. http://www.usgs.gov/contracts/nehrp/	Community with a population under 20,000

Appendix C: Meeting Documentation

Meeting #1: Thursday, September 12, 2013 6:30-8:30 PM (2 Hours)

- General discussion of requirements and in-kind match process
- Review goals of hazard mitigation plan and revise (hand out)
- Review hazards (– Add hazards? Remove hazards?)
- Specific past and potential events of hazards not in 2009 plan (recent events)
- Potential development areas in town (compare with list in 2009 plan)
- Identify critical facilities (update map and list)
- Review Critical Facilities & hazard vulnerability
- Determine Vulnerability to Hazards for Town
- Determine Probability of Hazards for Town
- Discuss future meetings, public notice, stakeholders to be notified, notices to abutting towns

Meeting #2 Thursday, September 26, 2013 6:30-8:30 PM (2 Hours)

- Identify and map past/potential hazards (update map & lists in Chapter 2)
- Flooding – Are there any non-FEMA flood areas?
- Review previously determined potential mitigation efforts (were they implemented? If not, why not and are they still on the table to be implemented?)
- Brainstorm improvements to existing mitigation efforts
- Brainstorm potential new mitigation efforts

Meeting #3 Thursday, October 10, 2013 6:30-8:30 PM (2 Hours)

- Evaluate the past and potential mitigation efforts
- Develop a prioritized implementation schedule and discuss the adoption and monitoring of the plan

Meeting #4 Thursday October 17, 2013 (1 Hour)

- Review and revise draft plan

Meeting #5 Monday August 24, 2015 (2 Hour)

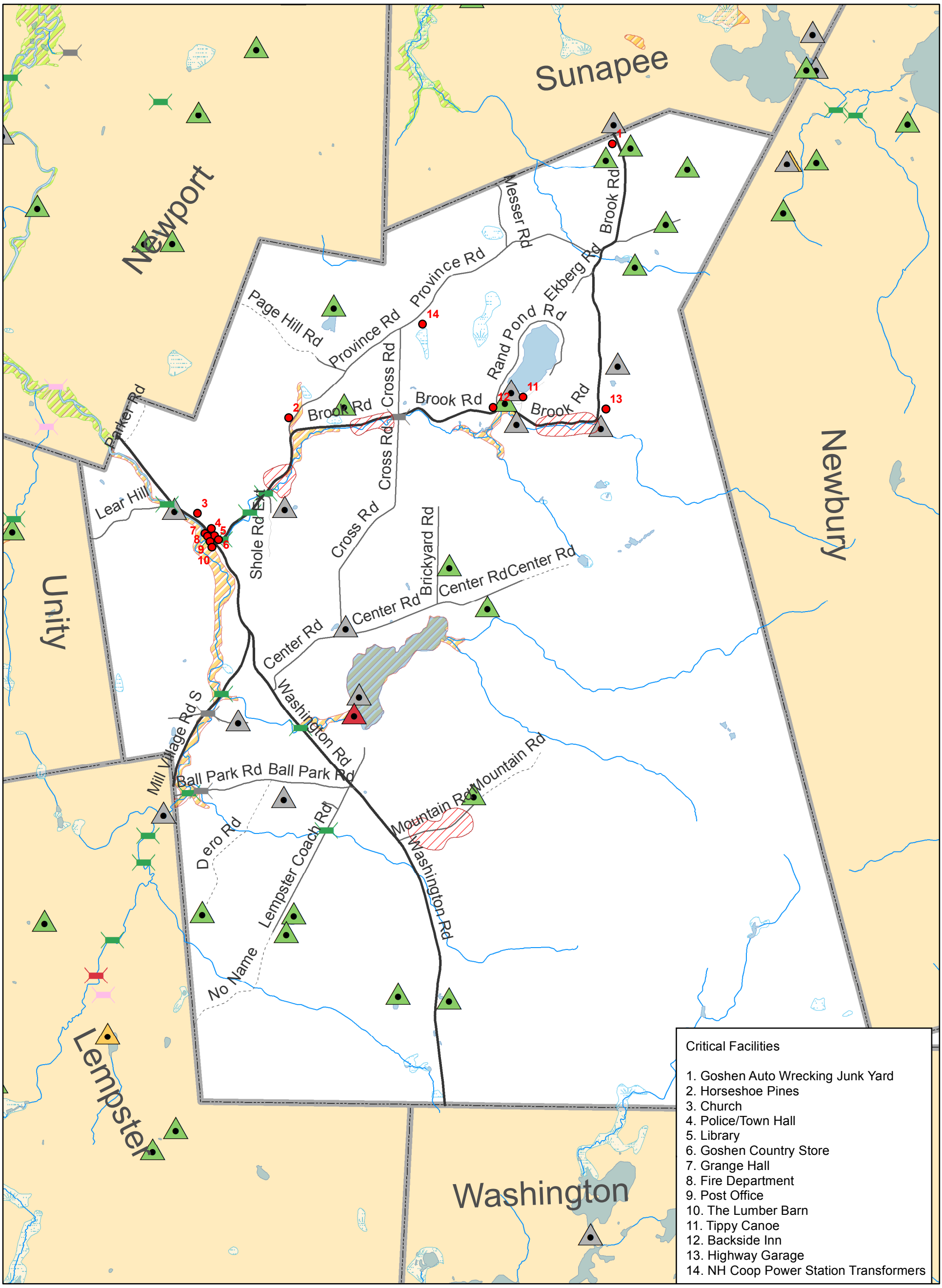
- Review Fluvial Erosion Hazard Data and revise draft plan

APPENDIX D:

Maps of Hazard Areas and Critical Facilities

Goshen, NH Hazard Mitigation Planning Base Map 2013

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION



Critical Facilities

Roads
- Federal
- Local
- Not Maintained
- Private
- State

Dam Condition
- No Hazard Class Specified
- High Hazard
- Significant Hazard
- Low Hazard
- Non-Menace

Bridge Condition
- Other
- Black
- Green
- Pink
- Red

Flood Hazard Areas (FEMA)
- 100-Year - Zone A
- 100-Year - Zone AE
- Erosion

N W E S

0 0.5 1 2 Miles

EMERGENCY ACTION PLAN (EAP)

Gunnerson Lake Dam (Site D2)
NH Dam #095.25

Goshen, NH
(High Hazard Dam)

Prepared by:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Water Division
Dam Bureau
Maintenance Section

Last Updated 06-15-2011

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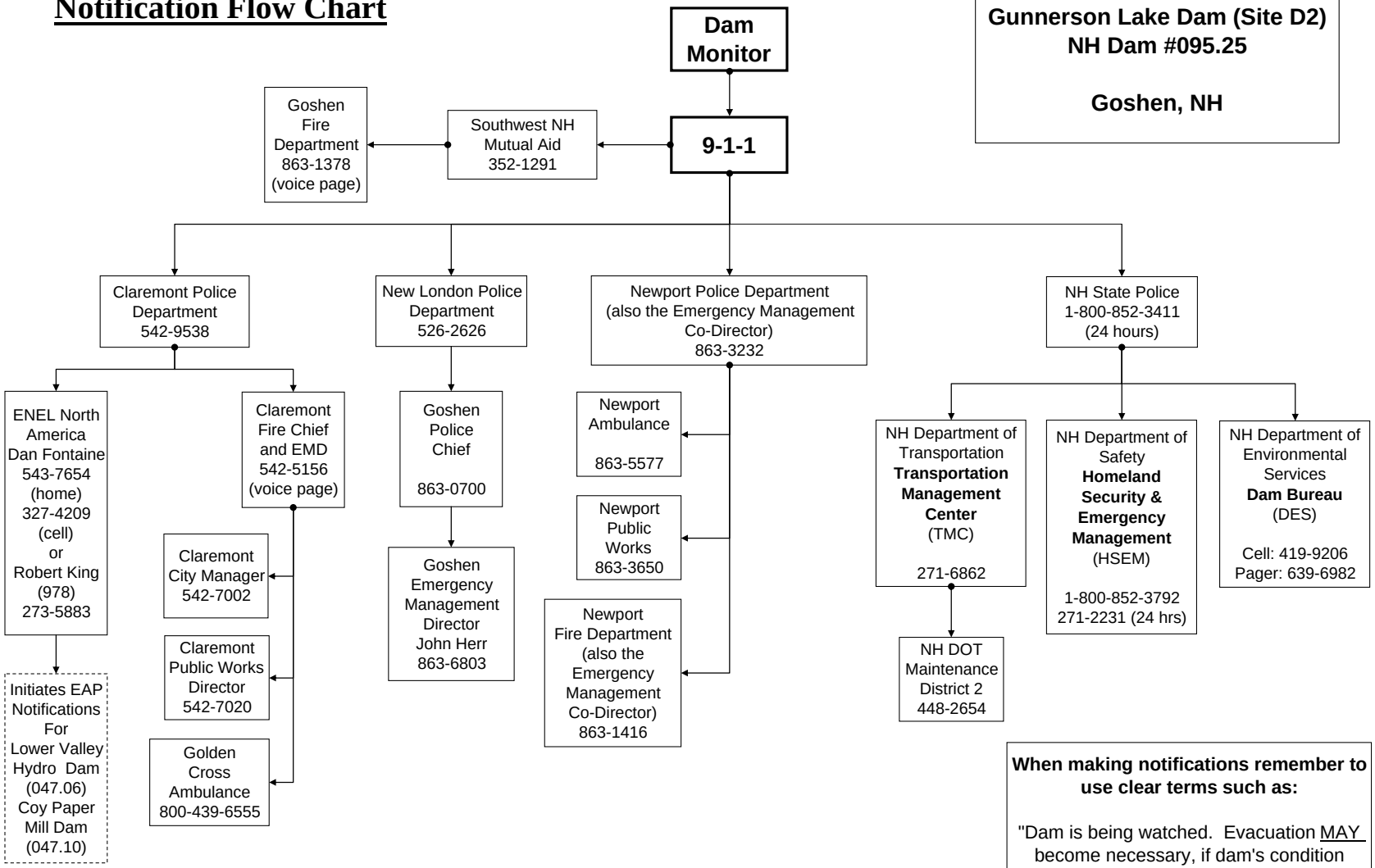
Appendix C	Inundation Map
Appendix D	Training and Testing
Appendix E	Local Evacuation Procedure
Appendix F	Posting of the Plan
Appendix G	Documentation
Appendix H	Record of Changes and Additions

SECTION 1
Notification Flow Chart

Gunnerson Lake Dam (Site D2)
NH Dam #095.25

Goshen, NH



When making notifications remember to use clear terms such as:

"Dam is being watched. Evacuation MAY become necessary, if dam's condition worsens."

"Evacuation should begin IMMEDIATELY."

Revision Date: 06-15-2011

SECTION 2 (NH Dam #095.25)
General Responsibilities

Gunnerson Lake Dam (Site D2) in Goshen, New Hampshire is owned and operated by the New Hampshire Department of Environmental Services Water Division (NHDES-WD), Dam Bureau. The Emergency Action Plans (EAPs) for this dam have been developed under guidelines outlined in the NHDES-WD administrative rules, section Env-Wr 505. This section was established to ensure notification of local emergency response personnel in the event that a potentially hazardous situation develops at the dam.

Each person making calls as indicated on the Notification Flowchart is responsible for completing the appropriate Notification Checklist, in Section 3. These checklists should be completed during testing, and during any actual emergency incident. Additional copies are available by contacting the NHDES-WD, Dam Bureau (refer to Appendix D for more information regarding the testing of the plan.)

If an actual or potentially hazardous situation exists at the dams, personnel are requested to start the notification process as shown in the detailed notification procedures and flow charts included in this report. Flood inundation maps are also included in Appendix C to assist local authorities in the development of an evacuation plan in the case of dam failure.

Table 2-1 provides a reference for the responsibilities of each agency or person shown on the notification flowchart during an emergency situation at these dams.

Table 2-1
Notification Flowchart Responsibilities

Person or Agency	Responsibility
Dam Monitor	Monitor and operate the dam, phone or radio 9-1-1 if an emergency situation is developing or has developed. Initiates testing of the notification procedures.
911 Dispatch	Contacts the Claremont Police Department, the New London Police Department, the Newport Police Department (also the Emergency Management Director), and the NH State Police to alert them of the emergency situation. Participates in testing of the notification procedures.

Person or Agency	Responsibility
Southwest Mutual Fire Aid	Contacts the Goshen Fire Department. Participates in testing of the notification procedures.
Goshen Fire Department	Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont Police Department	Contacts the Claremont Fire Department (also the Emergency Management Director), and the owner(s) of the Lower Valley and Sweetwater Hydro (Coy Paper Mill) Dams. Participates in testing of the notification procedures.
Lower Valley and Sweetwater Hydro Dams	Initiates EAP notifications for those dams. Participates in testing of the notification procedures.
Claremont Fire Department (also the Emergency Management Director)	Contacts the Claremont City Manager, the Claremont Public Works Director, and the Golden Cross Ambulance service. Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont City Manager	Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont Public Works Director	Provides emergency response as necessary. Participates in testing of the notification procedures.
Golden Cross Ambulance	Provides emergency response as necessary. Participates in testing of the notification procedures.
New London Police Department	Contacts the Goshen Police Department. Participates in testing of the notification procedures.
Goshen Police Department	Contacts the Goshen Emergency Management Director. Provides emergency response as necessary. Participates in testing of the notification procedures.
Goshen Emergency Management Director	Provides emergency response as necessary. Participates in testing of the notification procedures.

Person or Agency	Responsibility
Newport Police Department (also the Emergency Management Co-Director)	Contacts the Newport Fire Department (Emergency Management Co-Director), the Newport Public Works Department, and the Newport Ambulance. Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Fire Department (also the Emergency Management Co-Director)	Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Public Works Director	Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Ambulance	Provides emergency response as necessary. Participates in testing of the notification procedures.
NH State Police	NH State Police will contact the NHDOS (HSEM), NHDES (after hours use the DES call sheet), and NHDOT (TMC). The State Police may also aid in road closures. Participates in testing of the notification procedures.
NHDOT Traffic Management Center (TMC)	TMC personnel will alert the District 2 offices of the emergency situation. Participate in testing of the notification procedures.
NHDOT District 2	District 2 highway personnel will close all impacted state highways and provide for detours as necessary. Participates in testing of the notification procedures.
NH Department of Safety Homeland Security & Emergency Management (HSEM)	Provides help or assistance to local communities as necessary. Participates in testing of the notification procedures.
NHDES-WD Chief Engineer or his designee	Provides instructions to dam monitor, start notification procedure.

Any questions concerning actions to be taken or notifications to be made should be addressed to:

Emergency Action Plan Coordinator New Hampshire Department of Environmental Services Water Division, Dam Bureau, Maintenance Section 29 Hazen Drive Concord, NH 03302-0095 603-271-3406 *damsafety@des.nh.gov*

SECTION 3 (NH Dam #095.25)
Notification Procedures

Each person making calls as indicated on the Notification Flowchart is responsible for completing the appropriate Notification Checklist provided in this Section. In this section there is a generic Notification Checklist which may be used for reporting. DES also provides Notification Checklists specific to each agency in the Notification Flowchart with responsibility for notifying others.

These checklists should be copied from this section and completed during testing, and during any actual emergency incident. Additional copies are available by contacting the NHDES-WD, Dam Bureau (refer to Appendix D for more information regarding the testing of the plan.)

DES can also provide the generic Notification Checklist in electronic format (MS Word) so that it can be used and modified electronically and emailed directly to the address provided below to make the process of reporting paperless.

Please return completed checklists to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406

Or scan signed version and send to:

damsafety@des.state.nh.us

If an actual or potentially hazardous situation exists at the dam, personnel are requested to start the notification process as shown in the detailed notification procedures and flow charts included in this report. A flood inundation map is also included in Appendix C to assist local authorities in the development of an evacuation plan in the case of dam failure.

State-Owned Dam
Notification Checklist

NH Dam #_____ NH Dam Name _____

Reporting Agency (Dispatch Service) _____

(This checklist to be filled out during any emergency condition notification and during testing of the EAP – refer to the Notification Flow Chart for contact responsibilities, see Section 1)

Date:	***Time:***	***Call Received from:***
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**		***EAP Test _____***

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***

Dispatcher Name/Signature: _____

Submit completed checklist via email to damsafety@des.nh.gov, or mail to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Operations & Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
(603) 271-3406

DAM MONITOR
Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

(to be filled out during any emergency condition notification and during testing of the EAP)

Monitor's Name:		
Date:	***Time:***	
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**		***EAP Test _____***

PARTY CONTACTED	*TIME*	*PERSON CONTACTED*
1. 911		

Signature:_____

Southwest Mutual Fire Aid Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:		
Date:	***Time:***	***Call Received from:***
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**		***EAP Test _____***

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Goshen Fire Department		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

Claremont Police Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:		
Date:	***Time:***	***Call Received from:***
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**		***EAP Test _____***

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Lower Valley and Sweetwater Hydro Dam Owner(s)		
2. Claremont Fire Chief and Emergency Management Director		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

Claremont Fire Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:			
Date:	***Time:***	***Call Received from:***	
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**			***EAP Test*** _____

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Claremont City Manager		
2. Claremont Public Works Director		
3. Golden Cross Ambulance		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

New London Police Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:			
Date:	***Time:***	***Call Received from:***	
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**			***EAP Test*** _____

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Goshen Police Department		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

Goshen Police Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:		
Date:	***Time:***	***Call Received from:***
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**		***EAP Test _____***

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Goshen Emergency Management Director		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

Newport Police Department & Emergency Management Co-Director Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
(to be filled out during any emergency notification incident and during testing of the EAP)

Dispatcher's Name:			
Date:	***Time:***	***Call Received from:***	
Check if: Actual Emergency _____ **Remember to use clear terms such as:** **"Evacuation MAY become necessary, if dam's condition worsens"** **or** **"Evacuation should begin immediately"**			***EAP Test _____***

PARTY CONTACTED	***TIME***	***PERSON CONTACTED***
1. Newport Fire Department (also the Emergency Management Co-Director)		
2. Newport Public Works Director		
3. Newport Ambulance		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

SECTION 4 (NH Dam #095.25)
Preventive Actions

The Gunnerson Lake Dam (Site D2) is not continuously manned by NHDES-WD. Therefore, during high water conditions and routinely throughout the year, the NHDES-WD personnel will carefully inspect the dam in order to identify any potential problems. Frequency of dam monitoring will be determined by the NHDES-WD. An inspection checklist is included in this section.

NHDES-WD personnel will initiate notification if a potentially hazardous situation is developing which could threaten the integrity of the Gunnerson Lake Dam (Site D2). This warning notification informs emergency response personnel that a dangerous situation exists, and that evacuation may become necessary.

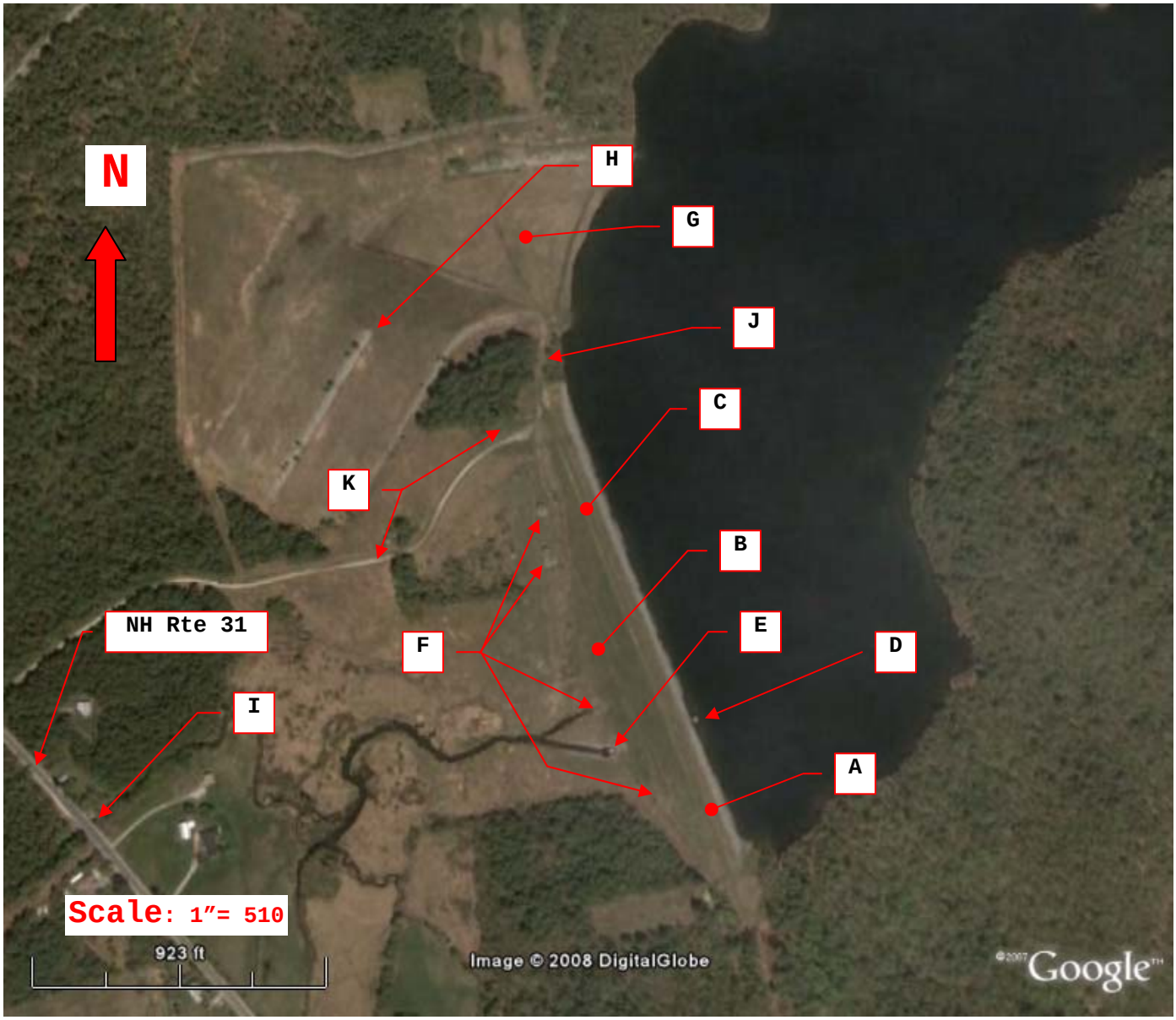
If a dangerous situation develops during normal flow conditions, NHDES-WD relies on the flood control dam riser to lower the water level and alleviate pressure behind the dam. No power is necessary to operate the pond drain at this dam. Any deficiency will be closely monitored to detect further deterioration, and recorded on the form. If any of these conditions occur during high flow conditions, NHDES-WD personnel will closely monitor the dam. Debris around the outlet riser will be removed.

During periods of anticipated high runoff, the NHDES-WD personnel will inspect the dam for signs of stress. If the water elevation is approaching the top of the dam, and especially if more rainfall or runoff is expected, NHDES-WD personnel will make frequent return trips to the dam, until the pond level begins to drop.

If an emergency condition exists, and dam failure or overtopping is imminent or has occurred, the NHDES-WD personnel will immediately initiate notification of emergency personnel and the site will be monitored continuously until the emergency condition has subsided.

Conditions which warrant close monitoring of the dam include the development of seepage, the sudden increase in existing seepage, prolonged overtopping of the dam, especially if overtopping is more than a few inches, especially when it results in erosion of the embankment material. Dam Bureau personnel shall attempt to monitor the dam during these situations, but if high water conditions are occurring throughout the State or region, DES may not be able to closely monitor the situation. In such instances, local emergency responders and personnel may contact DES staff to assist in assessment of the situation. DES contact numbers are listed on the notification flowchart. DES may also be contacted through the NH State Police.

Figure 4-1: Sketch of Gunnerson Lake Dam (Site D2)



Components of Dam:
A = Dam embankment upstream slope
B = Dam embankment downstream slope
C = Dam crest
D = Outlet riser
E = Outlet of 30" reinforced concrete pressure pipe
F = Embankment drains
G = Vegetated spillway
H = Stone dike
I = 1st Crossing, Rte 31
J = Natural ground
K = Right side access road and recreational park.

DAM INSPECTION CHECKLIST

Dam Name/Town:	
Dam Number:	
Inspected by:	Date:

Item	Comments
SPILLWAY General Condition Cracks? Leaning? Seepage?	
GATES/ STOPLOG BAYS General Condition Gate mechanism condition	
EMBANKMENT CREST Visual Settlement? Misalignment? Cracking?	
EMBANKMENT UPSTREAM SLOPE Erosion? Condition of Ground Cover? Longitudinal/Vertical Cracks? Settlement, depressions, bulges? Trees, shrubs, other woody vegetation? Adequate riprap protection? Other comments	
EMBANKMENT DOWNSTREAM SLOPE Erosion? Condition of Ground Cover? Longitudinal/Vertical Cracks? Settlements, depressions, bulges? Soft spots or boggy areas? Movement at or beyond toe? Boils at Toe? Other comments	
SEEPAGE Location: Does seepage contain fine soil particles? Approximate amount (hint: garden hose full blast = approximately 5 gallons per minute.)	
ABUTMENT CONTACTS General Condition Cracks? Leaning?	
OTHER COMMENTS	

APPENDICES

Appendix A	Project Description
Appendix B	Impact of Breach
Appendix C	Inundation Map
Appendix D	Training and Testing
Appendix E	Local Evacuation Procedure
Appendix F	Posting of the Emergency Action Plan (EAP)
Appendix G	Documentation
Appendix H	Record of Changes and Additions

APPENDIX A (NH Dam #095.25)
Project Description

Gunnerson Lake Dam is located in the Town of Goshen, New Hampshire. The dam was constructed for flood control purposes. The drainage area for Gunnerson Lake consists of 5.5 square miles (3,520 acres) of gently to steeply sloping wooded terrain.

Gunnerson Lake is classified as a high hazard structure, the failure of which would result in any of the following: probable loss of life; significant economic loss; major damage to town, city, and Class I and II state highways and interstate highways.

Gunnerson Lake Dam is an earthen embankment flood control dam. The dam has a structural height of 62 ft and an overall length of approximately 2,140 ft. There is a 450' vegetated emergency spillway located to the right of the dam. The principal spillway for the dam consists of a concrete riser with a low level 30-inch R.C.P. outlet pipe. There is also a pond drain for the lake. The following two pages provide an inspection checklist and a site sketch.

Table A-1
Basic Data – Gunnerson Lake Dam (Site D2)

DESCRIPTION	DATA	COMMENT
Impoundment Area	96.2 acres	
Drainage Area	5.5 sq mi	
Maximum Storage	1,900 ac-ft	Storage with Pond level at Top of dam
Spillway Freeboard	16 ft	Distance from the top of the highest inlet in riser to the top of the dam
Dam Height	62 ft	Lowest Elevation at Downstream Side to Top of dam
Design Flow	15,255 cfs	PMP outflow
Discharge Capacity	18,270 cfs	Top of Dam no ops

APPENDIX B (NH Dam #095.25)
Impact of Breach

The effects of a Gunnerson Lake Dam failure during the 100 yr flood were analyzed by the NHDES-WD Dam Bureau, December 1997, using the BOSS DAMBRK version 3.0, dated 1988-92. This software is based upon highly optimized versions of the "National Weather Service Dam-Break Flood Forecasting Computer Model," developed by D. L. Fread. Input for the model consists of storage characteristics of the reservoir, selected geometry and roughness coefficients for the downstream channel.

Initially two hypothetical dam-break scenarios were analyzed; the sunny-day breach and the flood event breach. It was determined that the storm day failure resulted in a more severe flood with higher peak flows and flood elevations downstream of the dam. Therefore, inundation mapping was completed for failure during the 100 year flood.

The possibility of multiple dam failures of Lower Valley Hydro and Sweetwater dams on the Sugar River was also analyzed. However, the failure of these dams did not significantly increase the flooding in impacted areas (see Scenario 2 on page B-3.)

The breach assumptions are listed in the table below.

Dam Breach Conditions	
Initial Water Surface Elevation	1236 ft NGVD (0.5 ft over riser crest elevation)
Peak Inflow to the Lake 100 year storm (HydroCAD analysis)	4,931 cfs
Mechanism of Breach	Piping failure
Piping Center Elevation	1220 ft NGVD
Final Breach Bottom Elevation	1187 ft NGVD (elevation of the downstream pipe outlet)
Lake Elevation at Time of Breach	1241.5 ft NGVD (max. elevation 100 year flood inflow reaches - based on initial water surface elevation stated above)
Average width of Breach	200 ft
Side Slope of Breach	1 Vertical : 0.25 Horizontal
Time to Dam Failure in hours	0.8 hr
Flow depth over emergency spillway	1.57 ft

Scenario 1 - Gunnerson Lake Dam Failure Results

The flood event simulation performed for Gunnerson Lake dam assumed that inflow into the impoundment was approximately equal to the 100 year flood, and that Gunnerson Lake dam fails because of piping through the embankment (internal erosion.) The peak discharge from the assumed Gunnerson Lake dam breach is approximately 58,220 cfs at a point immediately downstream of the dam.

The effects of the dam breach were computer modeled in four reaches. The first reach was from Gunnerson Lake dam to just upstream of the bridge at Route 31 in the Town of Goshen. The second reach extends from this point to just upstream of the bridge at Route 10. The third reach continued the dam failure routing through the Town of Goshen to a point just past the Newport town line (approximately 3.14 miles downstream of the dam.) The fourth reach included the analysis from this point on through the Towns of Newport and Claremont to the confluence of the Sugar River with the Connecticut River. This reach includes the Lower Valley Hydro dam and the Sweetwater Hydro dam in the analysis as well as many bridges.

This assumed failure of Gunnerson Lake dam would cause probable loss of life and considerable damage to the Towns of Goshen, Newport and Claremont. Table B-1 below provides a reference for some critical cross section locations downstream of Gunnerson Lake dam. For the complete inundation area and cross section locations, refer to the inundation maps in Appendix C of this document.

TABLE B-1

Downstream Distance from Gunnerson Lake Dam (Miles)	Inundation Map Page #	Peak Discharge (cfs)	Due to Gunnerson Lake Dam Failure - Rise above		Location Description
			NLW (ft)	100 yr (ft)	
0.1	1	58,177	+13	+9.5	Just downstream of the dam
0.39	1	55,382	+22.4	+13.9	Route 31 bridge

TABLE B-1

Downstream Distance from Gunnerson Lake Dam (Miles)	Inundation Map Page #	Peak Discharge (cfs)	Due to Gunnerson Lake Dam Failure - Rise above		Location Description
			NLW (ft)	100 yr (ft)	
1.04	1	29,794	+48	+34	Route 10 bridge
1.97	1	19,343	+13	+4	Snowmobile bridge w/ chain link fencing
2.24	1	19,279	+18	+8.5	Near Post Office & Brook Rd
2.52	1	19,276	+30	+15.5	Bridge at Lear Hill Rd
3.58	2	23,683	+17.3	+7.4	Near Coon Brook Bridge
5.53	2	18,017	+14	+7	Near development off Unity Rd
7.35	2	17,331	+19	+11	Near golf course
8.31	3	16,540	+20	+11	Elm St Bridge
8.74	3	17,612	+18	+11	Belknap Ave Bridge
9.32	3	17,402	+18.5	+11	Oak St Bridge
10.5	3	14,924	+16	+11	Near Parlin Airport
11.71	4	14,986	+15	+7	2nd Oak St Bridge Crossing
14.12	5	14,945	+15.1	+9	Rte 11 Bridge
20.61	6	13,522	+9	+4	
22.01	7	13,503	Dam overtopped		Lower Valley Hydro dam
24.97	7	13,065	Dam overtopped		Sweetwater Hydro dam
25.54	8	13,059	+12	+3	Connecticut River

Scenario 2 - Multiple (Lower Valley & Sweetwater Hydro) Dam Failure Results

This scenario assumes that Gunnerson Lake dam breaches under the same conditions described in the previous section. The flood wave from the breach of Gunnerson dam was routed downstream on the Sugar through Lower Valley Hydro and Sweetwater dams in Claremont. In the modeling, it was assumed the initial water level at these dams was at the crest of the spillway and that the dams would fail when the water level reaches just over the top of the dams. The resulting peak elevations from the assumed dam failure were less than one foot above the breach elevations in Scenario 1 (Gunnerson dam failing alone.) Because the increase from a multiple dam failure is small, it is not shown on the inundation map.

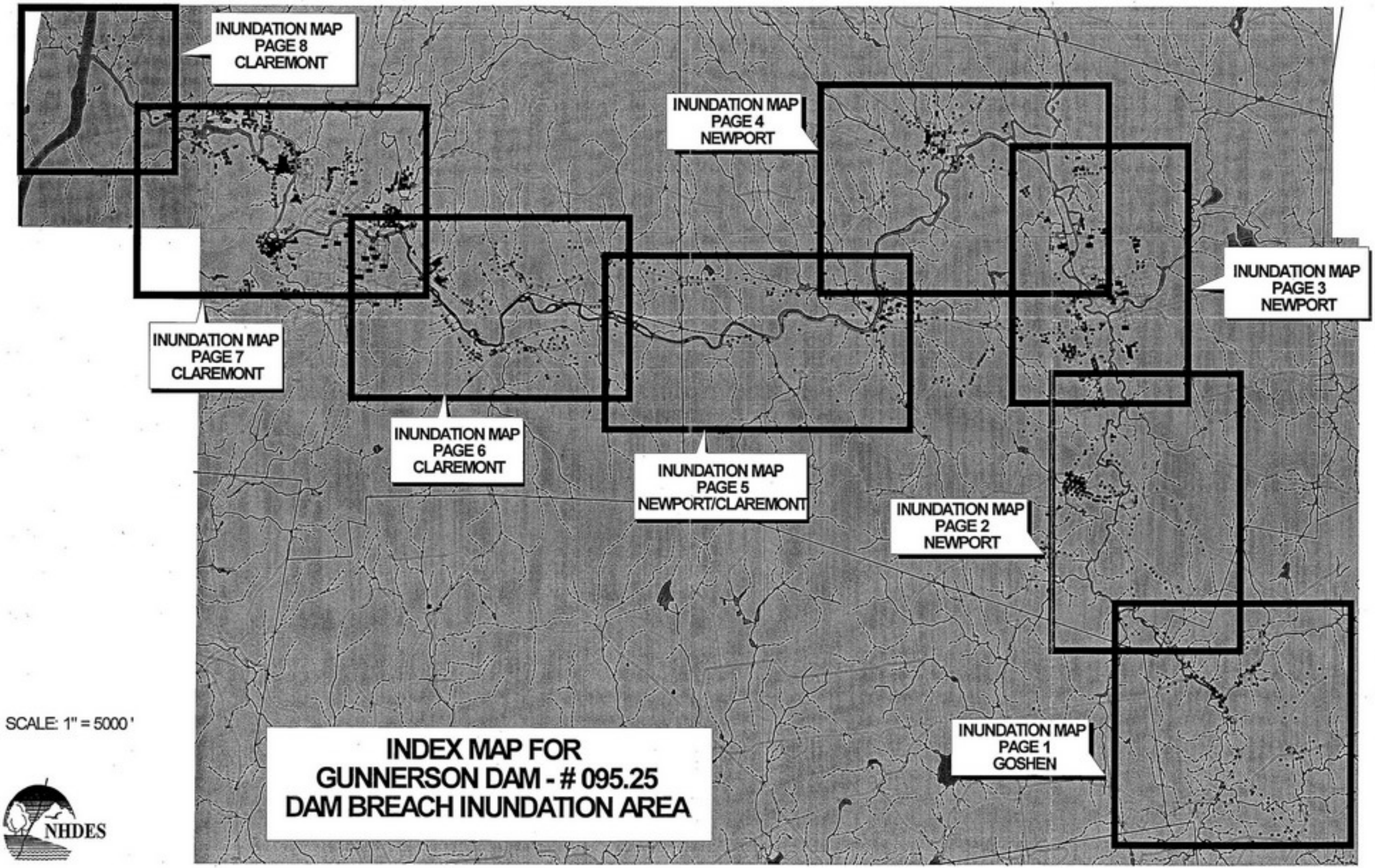
Impact to Bridges

The assumed dam breach scenarios would impact many bridges and homes in Goshen, Newport and Claremont. The inundation area is shown on the inundation maps in Appendix C. The information in this section may be used in conjunction with the inundation maps in Appendix C by the local communities in their development of a local evacuation plan.

APPENDIX C (NH Dam #095.25)
Inundation Map

The map on the following page is for use only in emergency planning. The purpose of these inundation maps is to delineate and quantify the extent of the likely inundation area in the event of a dam-break at the Gunnerson Lake Dam (Site D2). The actual inundation area may vary, depending on the conditions existing at the time of dam failure, and the degree of failure. The map represents the approximate limits of the area inundated by a failure of the dam. All structures in and near the inundation area may not be represented on this map.

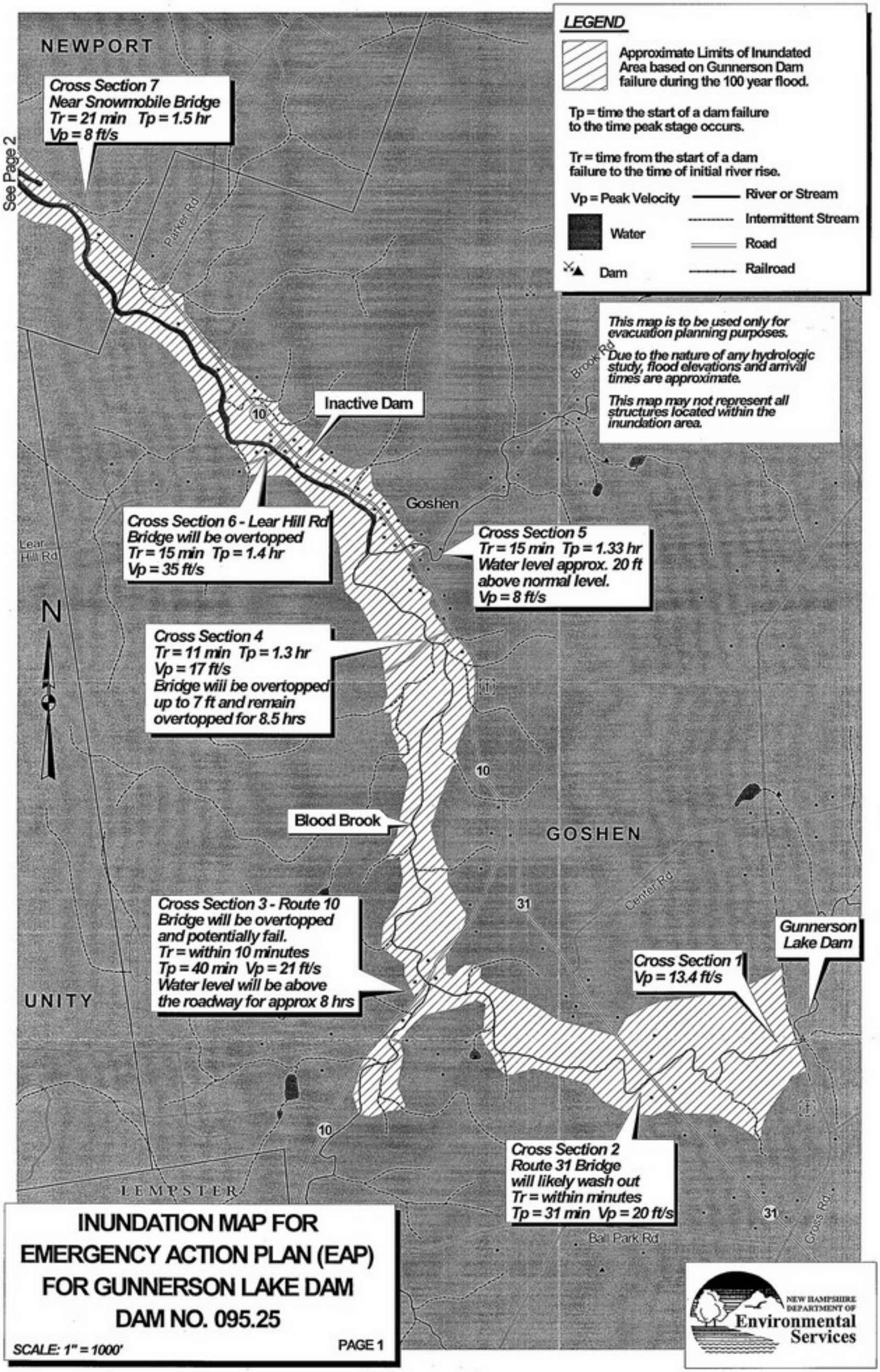
This inundation mapping is approximate and in most instances is limited to the accuracy of 20 foot USGS contour maps. The inundation area shown is based upon the assumed dam break conditions described in Appendix B. The dam break conditions in the event of an actual dam failure may vary based upon the specific failure conditions.



INDEX MAP FOR GUNNERSON DAM - # 095.25 DAM BREACH INUNDATION AREA

SCALE: 1" = 5000'

NHDES

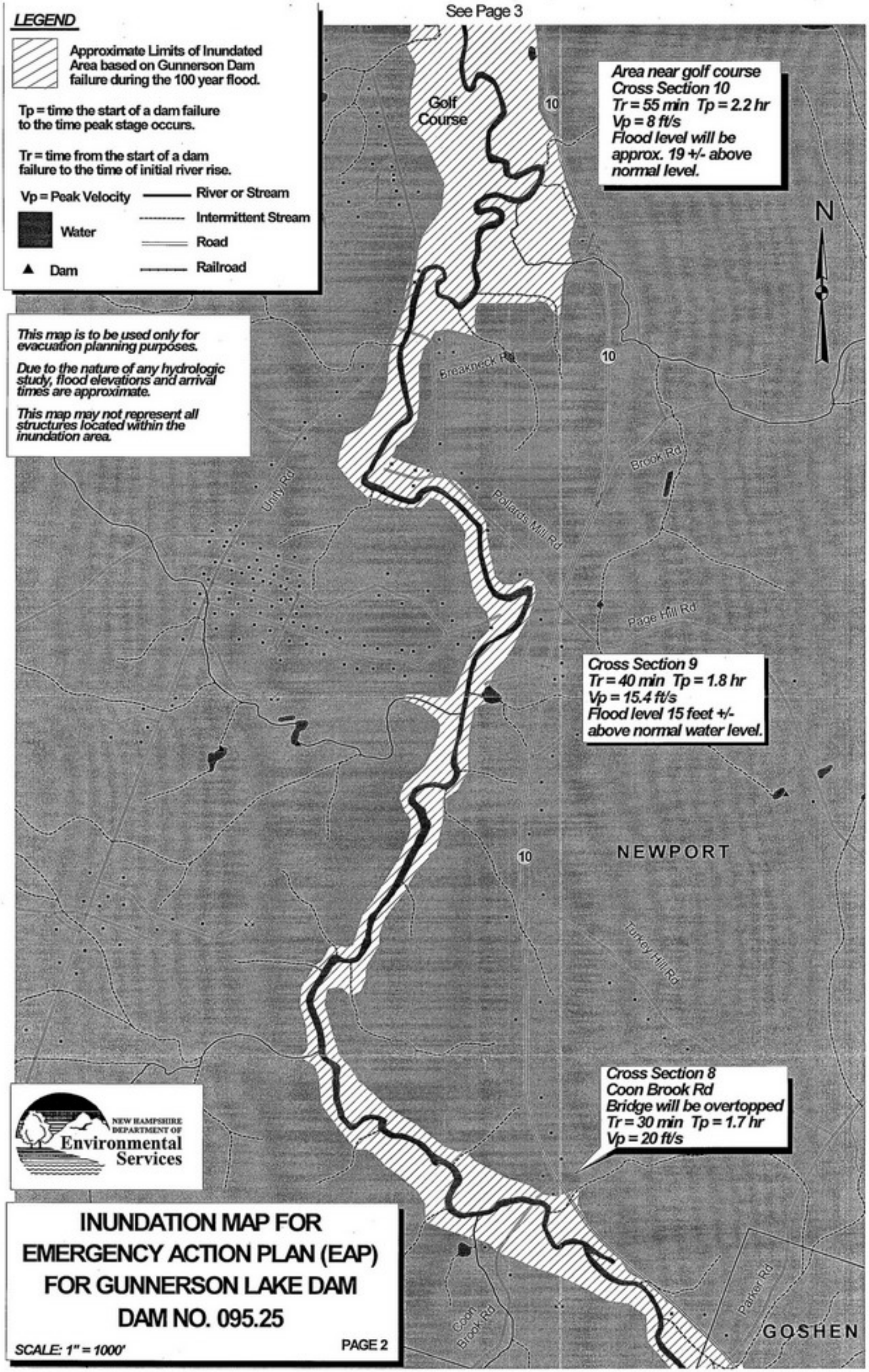


INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 1

See Page 3



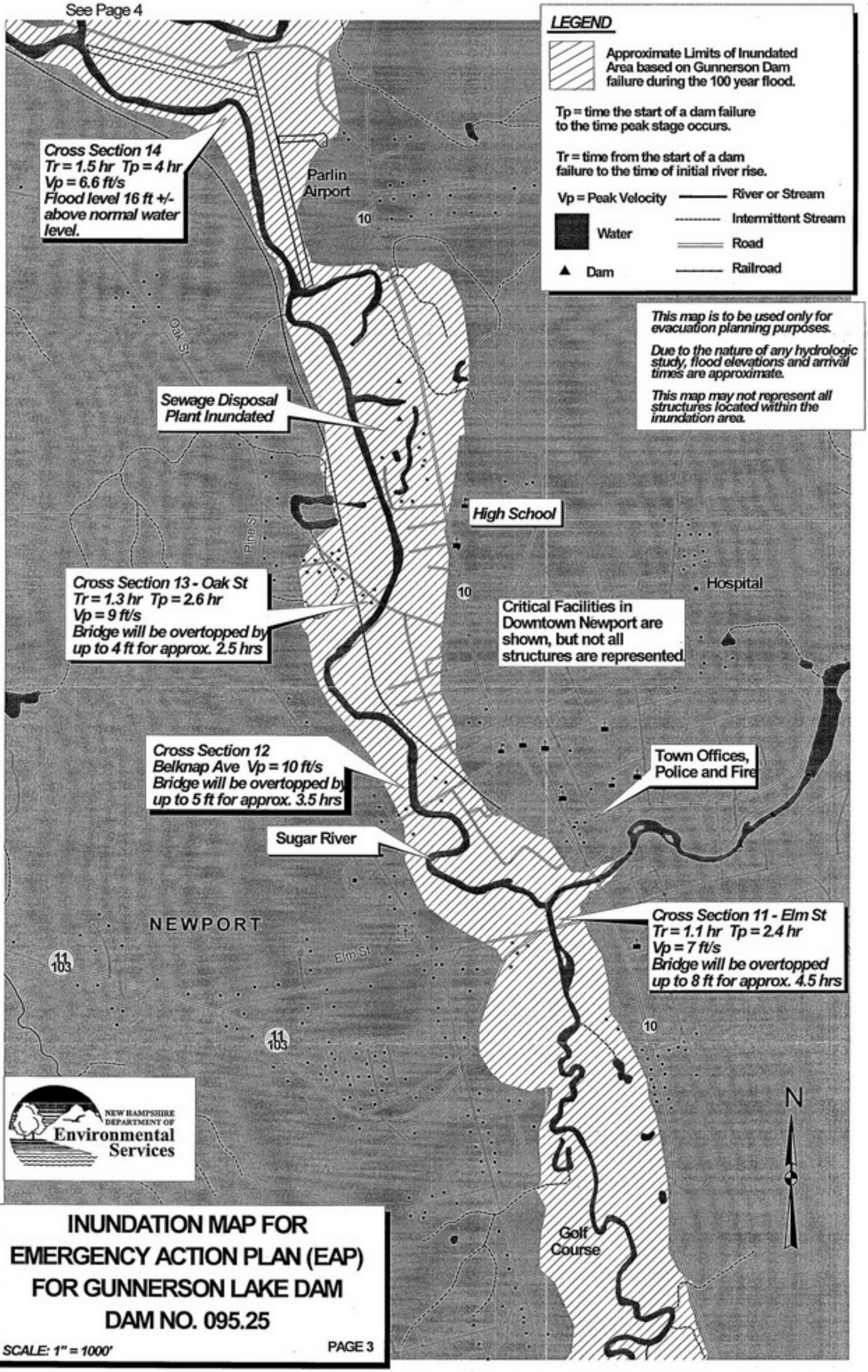
INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 2

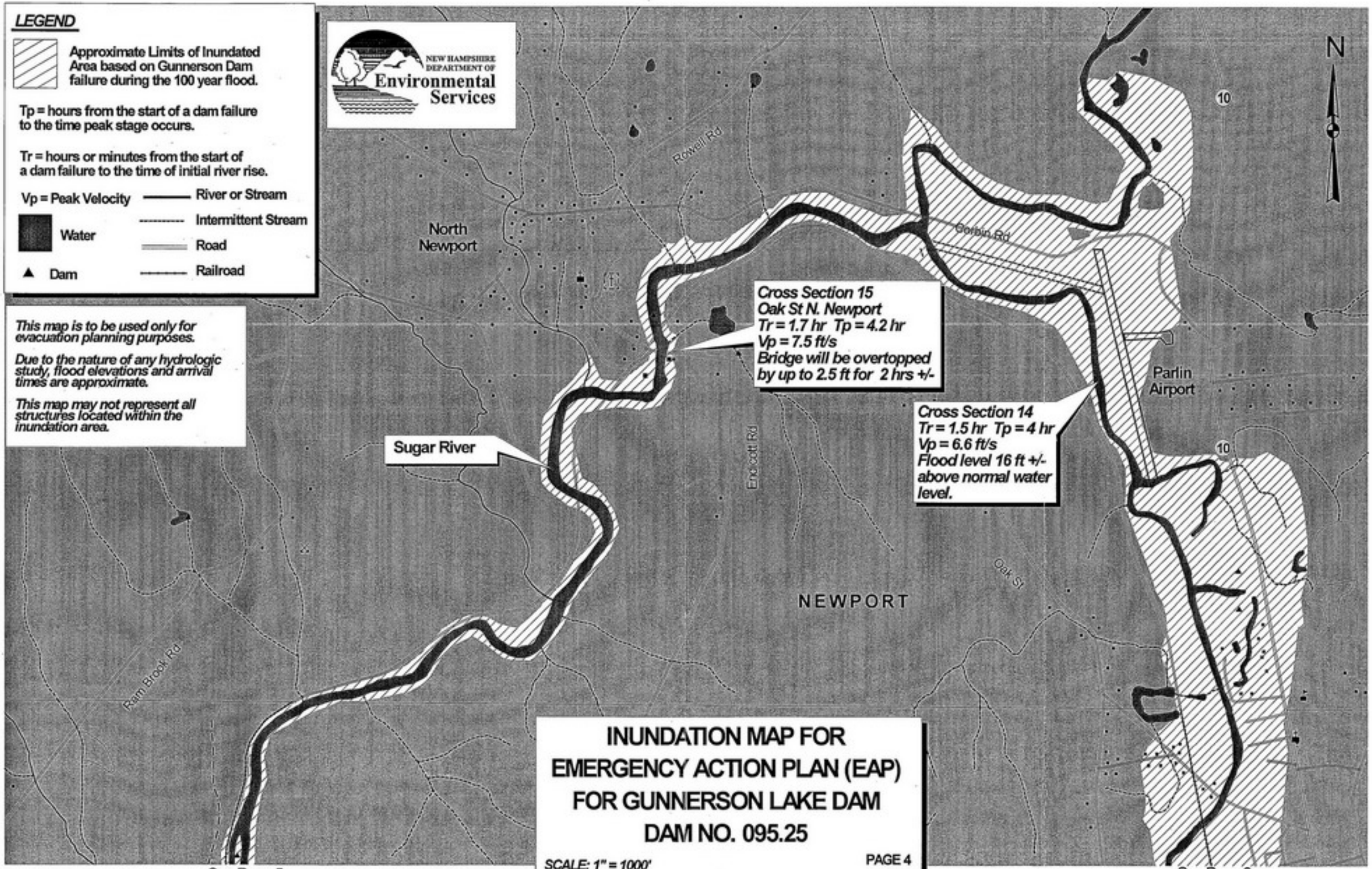
See Page 1

See Page 4



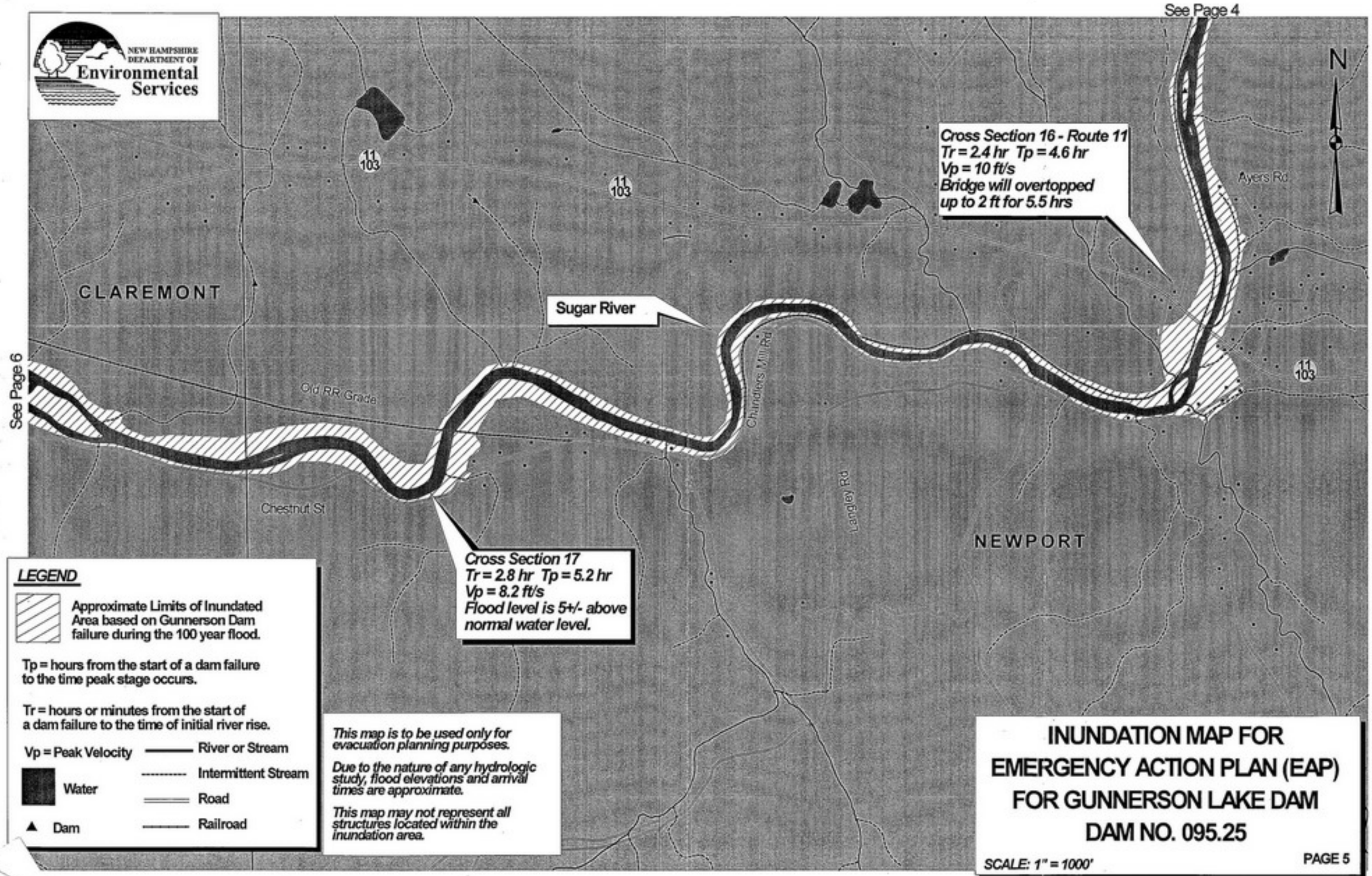
INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

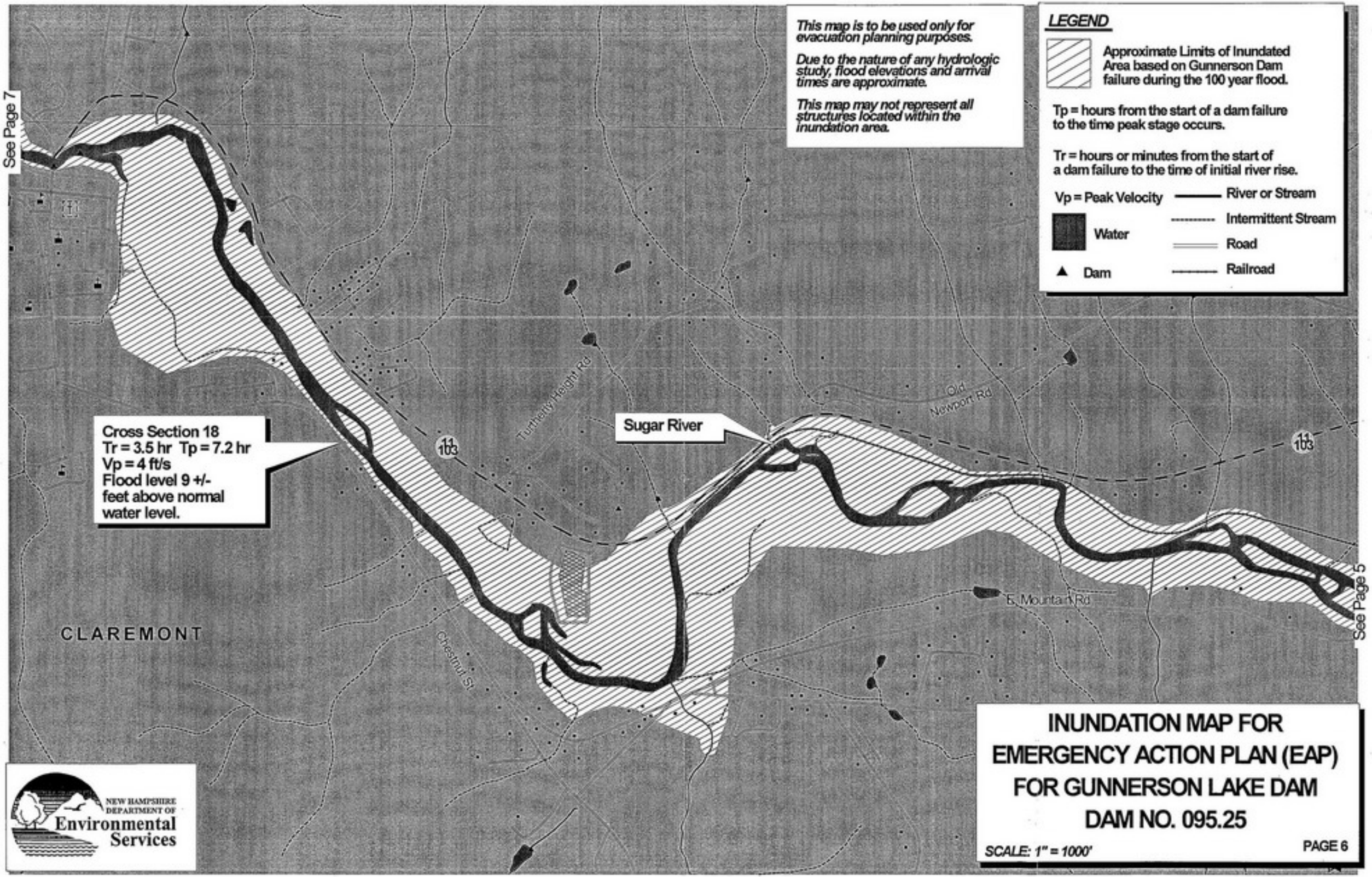
SCALE: 1" = 1000'



INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

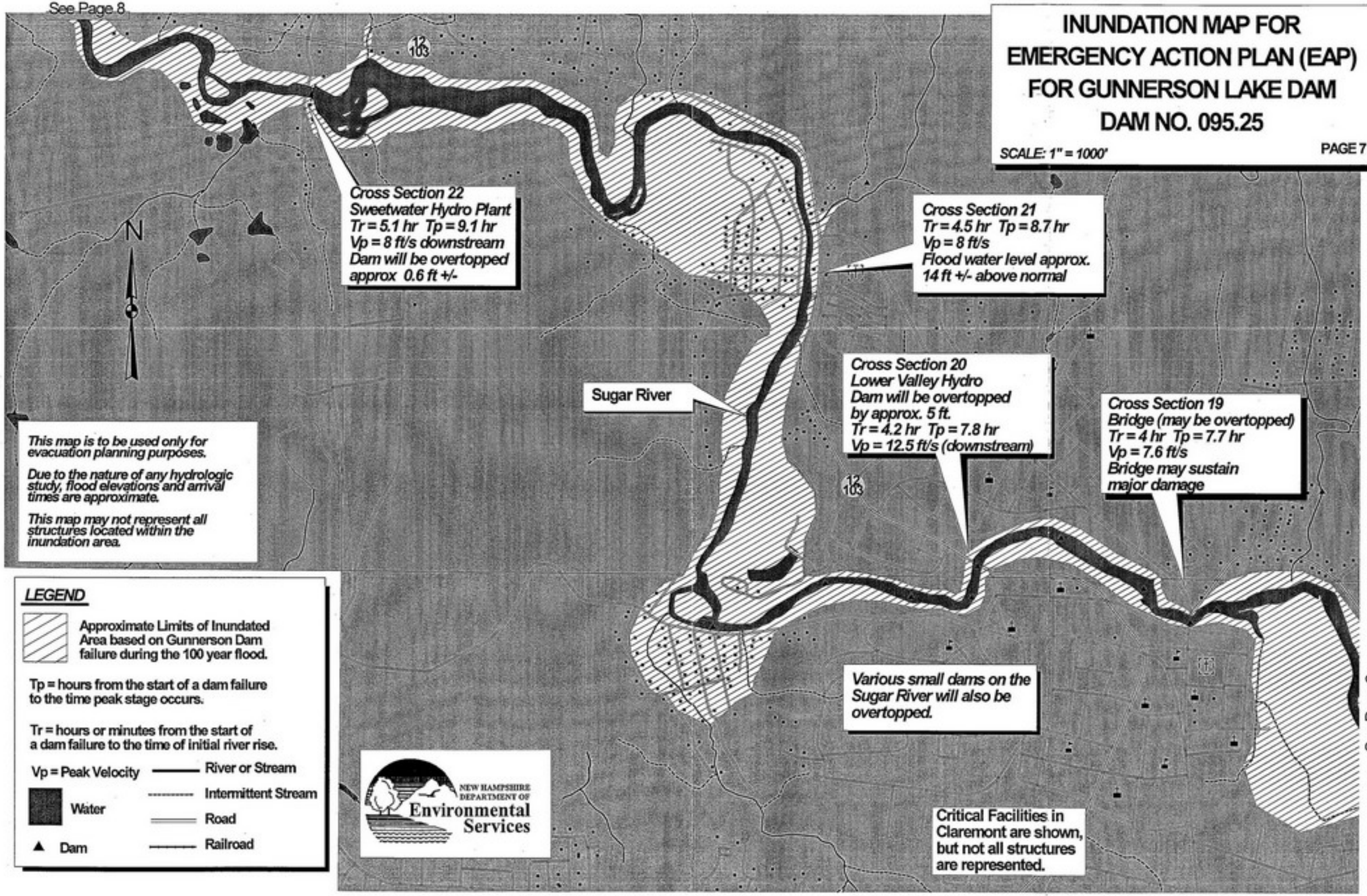

See Page 4
NEW HAMPSHIRE DEPARTMENT OF Environmental Services
N
Cross Section 16 - Route 11
Tr = 2.4 hr Tp = 4.6 hr
Vp = 10 ft/s
Bridge will overtopped
up to 2 ft for 5.5 hrs
Ayers Rd
11
103
CLAREMONT
Sugar River
Chandlers Mill Rd
Old RR Grade
See Page 6
Langley Rd
Chestnut St
NEWPORT
Cross Section 17
Tr = 2.8 hr Tp = 5.2 hr
Vp = 8.2 ft/s
Flood level is 5+/- above
normal water level.
LEGEND
Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.
Tp = hours from the start of a dam failure to the time peak stage occurs.
Tr = hours or minutes from the start of a dam failure to the time of initial river rise.
Vp = Peak Velocity
River or Stream
Intermittent Stream
Water
Road
Dam
Railroad
This map is to be used only for evacuation planning purposes.
Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.
This map may not represent all structures located within the inundation area.
INUNDATION MAP FOR
EMERGENCY ACTION PLAN (EAP)
FOR GUNNERSON LAKE DAM
DAM NO. 095.25
SCALE: 1" = 1000'
PAGE 5


This map is to be used only for evacuation planning purposes.
Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.
This map may not represent all structures located within the inundation area.
LEGEND
Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.
Tp = hours from the start of a dam failure to the time peak stage occurs.
Tr = hours or minutes from the start of a dam failure to the time of initial river rise.
Vp = Peak Velocity
River or Stream
Intermittent Stream
Water
Road
Dam
Railroad
See Page 7
See Page 5
Cross Section 18
Tr = 3.5 hr Tp = 7.2 hr
Vp = 4 ft/s
Flood level 9 +/-
feet above normal
water level.
Sugar River
Turnerville Heights Rd
Old Newport Rd
E. Mountain Rd
Chestnut St
103
CLAREMONT
NEW HAMPSHIRE DEPARTMENT OF Environmental Services
INUNDATION MAP FOR
EMERGENCY ACTION PLAN (EAP)
FOR GUNNERSON LAKE DAM
DAM NO. 095.25
SCALE: 1" = 1000'
PAGE 6

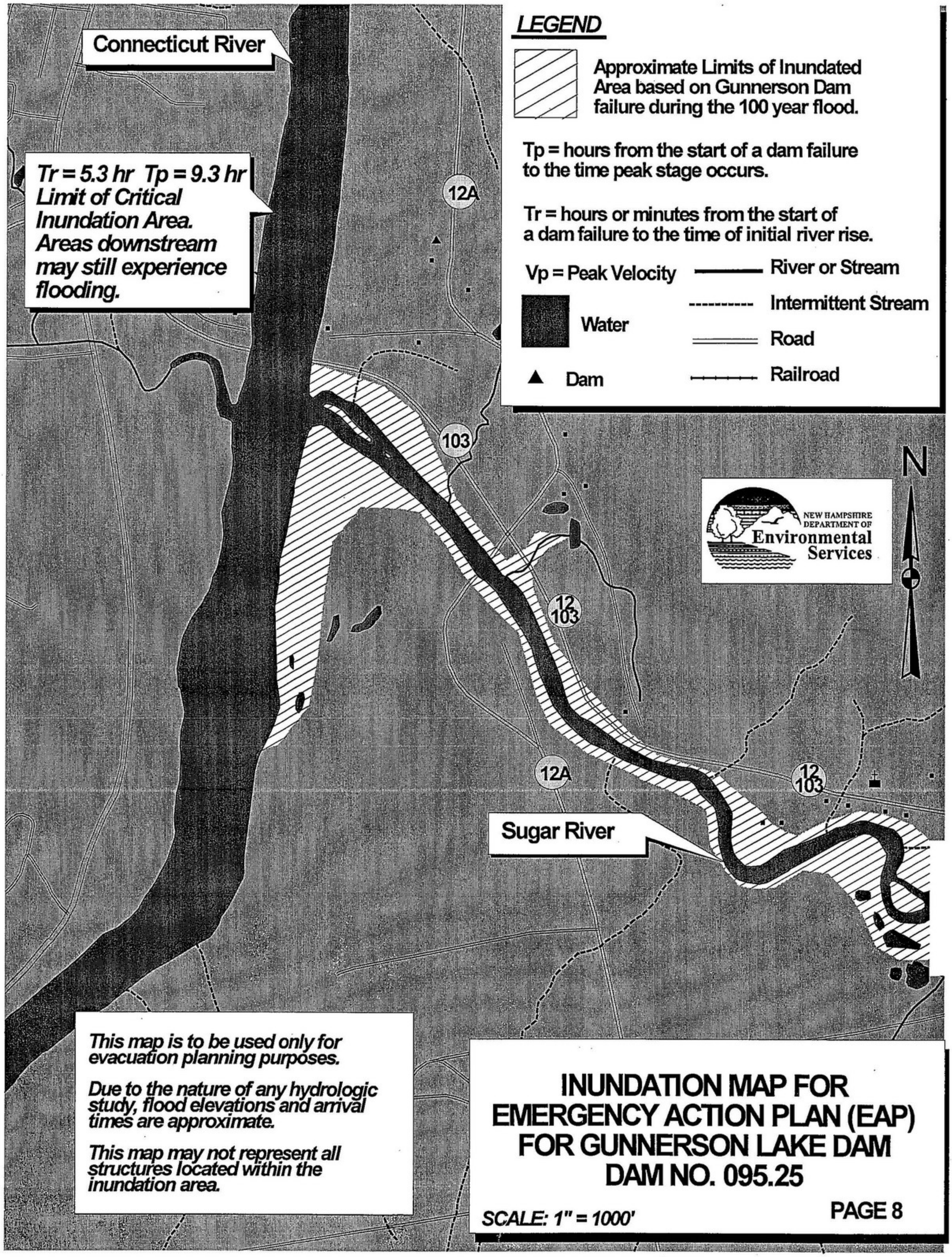
See Page 8

INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'



See Page 6


Connecticut River
Tr = 5.3 hr Tp = 9.3 hr
Limit of Critical Inundation Area.
Areas downstream may still experience flooding.
12A
103
12
103
12A
12
103
Sugar River
LEGEND
Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.
Tp = hours from the start of a dam failure to the time peak stage occurs.
Tr = hours or minutes from the start of a dam failure to the time of initial river rise.
Vp = Peak Velocity
River or Stream
Intermittent Stream
Water
Road
Dam
Railroad
NEW HAMPSHIRE DEPARTMENT OF
Environmental Services
N
This map is to be used only for evacuation planning purposes.
Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.
This map may not represent all structures located within the inundation area.
INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25
SCALE: 1" = 1000'
PAGE 8

APPENDIX D (NH Dam #095.25)
Training and Testing

D.1 Training
The dam is monitored by:

New Hampshire Department of Environmental Services Water Division, Dam Bureau, Maintenance Section 29 Hazen Drive Concord, NH 03302-0095 603-271-3406 *damsafety@des.nh.gov*

The dam monitors have several years experience in the operation and maintenance of this specific dam and dams of similar size, configuration and age. The dam monitors have had constant dialogue with NHDES-WD Dam Safety inspectors as well as the Dam Maintenance design engineers.

D.2 Testing

Once every four years for Significant Hazard dams, and once every two years for High Hazard dams, the owner shall conduct or arrange to have conducted a test of the emergency notification procedure. The owner or designee will initiate the test by calling 9-1-1, and indicating **"This is a test of the Emergency Action Plan for the Gunnerson Lake Dam (Site D2) in Goshen, New Hampshire."**

Each person responsible for making calls, as indicated on the Notification Flowchart, will make contacts as indicated, stressing that this is a test of the procedures. Each person is requested to complete the appropriate checklist, included in Section 3, and return it to:

Emergency Action Plan Coordinator New Hampshire Department of Environmental Services Water Division, Dam Bureau, Maintenance Section 29 Hazen Drive Concord, NH 03302-0095 603-271-3406 *damsafety@des.nh.gov*

The owner is responsible for monitoring the test and collects a copy of the notification checklists noting any large discrepancy in the times calls were received by the different organizations/agencies. The results of the test shall be reported to the NHDES-WD Dam Bureau. If the test indicates that changes are necessary to ensure proper and complete notifications, the owner will update the notification flowchart, as necessary, and mail updated pages to all EAP holders.

APPENDIX E (NH Dam #095.25)
Local Evacuation Procedure

Please refer to local authorities for evacuation procedures.

APPENDIX F (NH Dam #095.25)
Posting of the Emergency Action Plan (EAP)

All persons and agencies listed below have been issued a copy of the EAP, and shall be provided with an up-to-date copy of the plan.

NH Bureau of Emergency Communications (911)
Attn: Operations Supervisor
110 Smokey Bear Boulevard
Concord, NH 03305
(Copy of the flowchart only.)

NH Dept. of Safety - State Police
Headquarters/Communications
33 Hazen Drive
Concord, NH 03301
1-800-852-3411

NH Dept. of Transportation,
Transportation Management Center (TMC)
110 Smokey Bear Boulevard
Concord, NH 03301
Ph 271-6862 Fax 271-8626
Email TMC@dot.state.nh.us
(Copy of the flowchart only.)

NH Dept. of Transportation - District 2
8 Eastman Hill Road
Enfield, NH 03748
448-2654

NH Dept. of Safety Homeland Security and Emergency Management (HSEM)
33 Hazen Drive
Concord, NH 03305
1-800-852-3792, 271-2231
(Copy of the flowchart and inundation map.)

NH Dept. of Environmental Services (DES)
29 Hazen Drive
PO Box 95
Concord, NH 03301-0095
271-3406
419-9206 (c) 639-6982 (pager)

(continued)

Southwest New Hampshire Mutual Aid
32 Vernon Street
Keene, NH 03431
352-1291

Goshen Fire Department
PO Box 411
Goshen NH 03752
863-1378

Claremont Police Department
1 Police Court
Claremont NH 03743
542-9538

Victor Engel
ENEL North America, In.
1 Tech Drive – Suite 220
Andover, MA 01810-2452
(978) 681-1900 x811

Claremont Fire Department
100 Broad Street
Claremont NH 03743
542-5156

Claremont City Manager
58 Opera House Square
Claremont NH 03743
542-7002

Claremont Public Works Director
8 Grandview Street
Claremont NH 03743
542-7020

Golden Cross Ambulance
1 Lincoln Heights
Claremont NH 03743
800-439-6555

(continued)

New London Police Department
375 Main Street
New London NH 03257
526-2626

Goshen Police Department
PO Box 68
Goshen NH 03752
863-0700

John Herr
Goshen Emergency Management Director
267 Center Road
Goshen NH 03752
863-6803

Newport Police Chief/Emergency Management Co-Director
59 Main Street
Newport NH 03773
863-3232

Newport Fire Chief/Emergency Management Co-Director
11 Sunapee Street
Newport NH 03773
863-1416

Newport Public Works Director
15 Sunapee Street
Newport NH 03773
863-3650

Newport Ambulance
11 Sunapee Street
Newport NH 03773
863-5577

APPENDIX G (NH Dam #095.25)
Documentation

The following sheets include signed Acknowledgment Forms and any letters relative to implementation of the Emergency Action Plan.

ACKNOWLEDGMENT FORM

I certify that I have received the latest copy of the
Emergency Action Plan

for

Gunnerson Lake Dam (Site D2)
Goshen, NH
(NH Dam No. 095.25)

dated 11/17/2010

and acknowledge the role of this agency in the event of an emergency and during testing of the plan.

Signed: _____ Date: _____

Representing: _____
(Name of Agency)

Please return to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

APPENDIX H (NH Dam #095.25)
Record of Changes and Additions

Table H-1 documents pages which have been modified or added.

Table H-1
Record of Changes and Additions – Gunnerson Lake Dam (Site D2)

Page Number	Modified By	Date Of Revision	Description/Reason For Modification
	KRF	11-17-10	Correct owner, address, and phone number for downstream dams (Lower Valley Hydro and Sweetwater Hydro Dams)

APPENDIX E:

FEMA Approvals and Town Adoption of Hazard Mitigation Plan

Town of Goshen, New Hampshire
Board of Selectmen
A Resolution Adopting the Goshen Hazard Mitigation Plan Update 2015

WHEREAS, the Town of Goshen 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 updated plan; and WHEREAS, several planning meetings to develop the hazard mitigation plan update were held in September through October 2013 and then presented to the Board of Selectmen for review and discussion on NOV. 30, 2015; and WHEREAS, the Goshen Hazard Mitigation Plan Update 2015 contains several potential future projects to mitigate the hazard damage in the Town of Goshen; and WHEREAS, the Board of Selectmen held a public meeting on NOV. 30, 2015 to formally approve and adopt the Goshen Hazard Mitigation Plan Update 2015.

RESOLVED by the Town of Goshen Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Goshen;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen by the Emergency Management Director.

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town this 30 day of NOV, 2015: Town of Goshen Board of Selectmen

Robert J Bell

ED PERSON

William J Ball

Attest

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

FEMA

JAN 08 2015

Robert Bell, Chairman
Board of Selectmen
Town of Goshen
54 Mill Village Road North
Goshen, NH 03752

Dear Mr. Bell:

Thank you for the opportunity to review the Town of Goshen, New Hampshire Hazard Mitigation Plan Update 2015. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I has evaluated the plan for compliance with 44 C.F.R. Pt. 201. The plan satisfactorily meets all of the mandatory requirements set forth by the regulations.

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

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

The Town of Goshen, New Hampshire Hazard Mitigation Plan Update 2015 must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of January 6, 2016** in order to maintain eligibility for mitigation grant funding. We encourage the Town to continually update the plan's assessment of vulnerability, adhere to its maintenance schedule, and implement, when possible, the mitigation actions proposed in the plan.

JAN 08 2016

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,

Paul F. Ford
Regional Administrator

PFF: mh

cc: Beth Peck, New Hampshire State Hazard Mitigation Officer
Jennifer Gilbert, Asst. New Hampshire State NFIP Coordinator
Parker Moore, State Hazard Mitigation Planner
John Herr, EMD, Goshen
Adam Ricker, Assistant Planner, UVLSRPC

Enclosure