Dover, NH
Multi-Hazard
Mitigation Plan Update
2012

Prepared for New Hampshire Homeland Security & Emergency Management

By
Strafford Regional Planning Commission
Rochester, NH 03867

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Final

Multi-Hazard Mitigation Plan Update

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The 2005 Dover Hazard Mitigation Committee
New Hampshire Homeland Security Emergency Management (HSEM)
City of Dover

The 2012 City of Dover Multi-Hazard Mitigation Planning Team

Thirteen people have attended meetings and/or been instrumental in completing this plan:

• Perry Plummer	Fire Chief/EMD
• Dean Peschel	Environmental Projects Manager
• Dan Barufaldi	Economic Development Director
• Tony Colarusso	Police Chief
• Bill Boulanger	Superintendent of Public Works & Utilities
• Dave White	City Engineer
• Richard Driscoll	Assistant Fire Chief
• Steve Bird	City Planner
• Thomas Clark	Building Official
• Julia Chase	NH Homeland Security Emergency Management
• Kyle Pimental	SRPC Regional Planner
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Cover: Cocheco River flooding outdoor deck of Kelly's Row; 2006
Photo Credit: Richard Driscoll, Assistant Fire Chief, Dover Fire & Rescue

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Executive Summary

The Dover Multi-Hazard Mitigation Plan was compiled to assist the City of Dover in reducing and mitigating future losses from natural and man-made hazardous events. The plan was developed by Strafford Regional Planning Commission (SRPC) and participants from the City of Dover Multi-Hazard Mitigation Team. The Plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.

This plan addresses the following hazards that affect the City:

- Flooding (River & Dam Breach)
- Wind (Tornado & Hurricane)
- Drought
- Wildfire
- Radon Air/Water
- Extreme Winter Weather
- Earthquakes
- Extreme Heat

This plan also provides a list of Critical Facilities and Key Resources (CF/KR) categorized as follows: Emergency Response Services (ERS), Non-Emergency Response Facilities (NERS), Facilities and Populations to Protect (FPP) and Potential Resources (PR). In addition, this plan addresses the City's involvement in The National Flood Insurance Program (NFIP).

The planning process included reviewing other City Hazard Plans, technical manuals, federal and state laws as well as research data. Combining the elements from these plans, the Team was able to produce this integrated multi-hazard plan. The Dover Multi-Hazard Mitigation Plan is considered a work in progress. There are three situations, which will prompt revisiting this plan:

- *First, as a minimum, it **will** be **reviewed annually or after any emergency event** to assess whether the existing and suggested mitigation strategies were successful. This review will focus on the assessment of the Plan's effectiveness, accuracy and completeness in monitoring of the implementation strategy. The review will also address recommended improvements to the Plan as contained in the FEMA plan review crosswalk and address any weaknesses the City identified that the Plan did not adequately address.*

- *Second, the Plan will be thoroughly **updated** every **five years.** The public will be allowed and encouraged to participate in that revision process.*

- *Third, if the City adopts any major modifications to its land use planning documents, the jurisdiction will conduct a Plan review and make changes as applicable.*

Public involvement was encouraged throughout this process and will continue to be stressed in future updates. In the pre-meeting, City officials were given a recommended list of people to invite and participate in the process. A press release was issued which

encouraged public involvement and it was also stressed that public attendance was recommended. Finally, once conditional approval for this plan had been received, a public hearing was held before the City Council to formally adopt the Plan. The public will have the opportunity for future involvement as the Plan will be periodically reviewed and the public will be included in all future reviews/updates to this plan. The public notice was and will be given by such means as: press releases in local papers, posting meeting information on the City website (if available), sending letters to federal, state, and local organizations impacted by the Plan, and posting notices in public places in the City. There will also be a public hearing before the annual review and before the five year update is sent to FEMA to ensure that public comments and revisions will be considered.

Once final approval was met, copies of the Plan were distributed to the City, HESM, and FEMA; the Plan was then distributed as these entities saw fit. Copies of the Plan remain on file at Strafford Regional Planning Commission (SRPC) in both digital and paper format.

Chapter I: Multi-Hazard Planning Process

A. Authority and Funding

Dover's Multi-Hazard Mitigation Plan was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA), Section 322, and Mitigation Planning, signed into law by President Clinton on October 30, 2000. This multi-hazard plan will be referred to as the "Plan". Dover's Multi-Hazard Mitigation Plan was prepared by the Dover Multi-Hazard Mitigation Planning Team with the assistance and professional service of Strafford Regional Planning Commission (SRPC) under contract with New Hampshire Homeland Security Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition). This plan was funded, in part, by HSEM through grants from FEMA (Federal Emergency Management Administration). Funds from city dues and matching funds for team member's time were also part of the funding formula.

B. Purpose & History of the FEMA Mitigation Planning Process

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

> *"establish a national disaster hazard mitigation program –*
>
> - *To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and*
> - *To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster."*[1]

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

> *"As a condition of a receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government."*[2]

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

[1] Disaster Mitigation Act (DMA) of 2000, Section 1, b1 & b2
[2] Disaster Mitigation Act (DMA) of 2000, Section 322a

Dover's Multi-Hazard Mitigation Plan is a planning tool to use to reduce future losses from natural and man-made disasters as required by the Disaster Mitigation Act of 2000; this plan does **not** constitute a section of the City's Master Plan, but sections and certain elements may be incorporated if the City Council and Planning Board so chooses. The Multi-Hazard Mitigation planning process resulted in significant cross talk regarding all types of natural and man-made hazards by team members.

The DMA places new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving Hazard Mitigation Grant Program (HMPG) project grants. Local governments must review yearly and update this plan every five years to continue program eligibility.

C. Jurisdiction

This plan addresses only one jurisdiction – the City of Dover, NH. Once approved by the Planning Team, the Plan was forwarded to HSEM and FEMA for Conditional Approval. Upon review and conditional approval by HSEM and FEMA, the City Council held a public hearing, to consider public comments, and signed a Resolution to Adopt the Plan.

D. Scope of the Plan

A community's multi-hazard mitigation plan often identifies a vast number of natural hazards and is somewhat broad in scope and outline. The scope and effects of this plan were assessed based on the impact of hazards on: *Critical Facilities and Key Resources (CF/KR); current residential buildings; other structures within the City; future development; administrative, technical and physical capacity of emergency response services; and response coordination between federal, state and local entities.*

E. Multi-Hazard Planning Process

The planning process consisted of ten specific steps. Many factors affected the ultimate sequence of the planning process: length of meetings, community preparation and attendance, and other community needs. All steps were included but not necessarily in the numerical sequence listed. The list of steps is as follows:

Step 1: Establish and Orient a Hazard Mitigation Planning Team
Step 2: Set Hazard Goals
Step 3. Identification of Hazards and Critical Facilities
Step 4: Assessing Vulnerability – Estimating Potential Losses
Step 5: Analyze Development Trends
Step 6: Existing Mitigation Strategies and Proposed Improvements
Step 7: Develop Specific Mitigation Measures
Step 8: Prioritized Mitigation Measures
Step 9: Mitigation Action Plan
Step 10: Adopt and Implement the Plan

F: Involvement
(Public, Neighboring Communities, Agencies, Non-profits and other interested parties)

Public involvement was stressed during the initial meeting and community officials were given a list of potential team members. These included the city council, the conservation commission, the planning board, the school board, the zoning board, the police department, the fire department, the library trustees, and the tax collector. Local business owners, interested organizations, and residents of Dover were also invited to participate. Community officials were urged to contact as many people as they could to participate in the planning process. A public notice, stressing the public nature of the process, was also sent to area newspapers.

Public Announcement
City of Dover Hazard Mitigation Planning Committee

Strafford Regional Planning Commission has begun the update process for Dover's Local Hazard Mitigation Plan and the first meeting of the Dover Hazard Mitigation Planning Committee has been scheduled for Thursday, October 14th at 9:00 am. The first meeting will include: a brief background of the Hazard Mitigation Planning process, necessary updates for the current 2005 Dover Hazard Mitigation Plan, and first steps for reviewing recent natural hazard events, such as the 2006 flood. All citizens, businesses, officials and interested parties are invited. If you are unavailable to attend, please forward any ideas or concerns to: Kyle Pimental, Regional Planner, Strafford Regional Planning Commission, 994-3500 or kpimental@strafford.org or to Perry Plummer, Emergency Management Director at 516-6150 or perry.plummer@ci.dover.nh.us. This update of the 2005 Dover Hazard Mitigation Plan is funded by FEMA under contract to Strafford Regional Planning Commission, and is a collaborative planning process with the City of Dover.

G: Narrative Description of the Process and Methodology

The Plan was developed with substantial local, state and federal coordination; completion of this new multi-hazard plan required significant planning preparation. All meetings were geared to accommodate brainstorming, open discussion and an increased awareness of potential hazardous conditions in the City.

Meeting 1, October 14, 2010

Present at this initial Hazard Mitigation meeting were eleven persons including: Dave White (City Engineer), Tom Clark (Building Officer), Richard Driscoll (Assistant Fire Chief), Dean Peschel (Environmental Projects Manager), Bill Boulanger (Superintendent of Public Works & Utilities), Dan Barufaldi (Economic Development Director), Perry Plummer (Fire Chief), Steve Bird (City Planner), Tony Colarusso (Police Chief), Kyle

Pimental (Strafford Regional Planning Commission), and Michelle Auen (Strafford Regional Planning Commission).

Kyle explained the evolution of the Multi-Hazard Mitigation planning and the steps necessary to complete the process. Using a full-color Geographic Information (GIS) map prepared by Kyle, the City boundaries, 100-year flood zone, development that has occurred over the last six years were identified and discussed.

A Packet of information was provided for each attendee that included: the Agenda, The City of Dover, Background for All Hazard Mitigation Policies and Implementation, and the new format for the Multi-Hazard Mitigation Plan for Dover.

The team went through updated Hazard Mitigation Plan for suggestions, edits, and formatting. The team also filled in missing blanks on Statistics of Interest table. The team also went over Chapter 3 and identified new Hazardous. The team worked collaboratively filling out the Multi-Threat Analysis. The team also updated new potential hazardous in the Multi-Hazard Threat Analysis including: Public Health, Hazardous Material Threat, and Extended Power Outages. The team worked jointly filling out the Matrix that gives scores to the potential Hazardous. This will provide information on the severity and relative threat in which it will be ranked.

The team was asked in general to provide an analysis of past and future development trends on the Tax parcel map. The team also commented on the base map and identified areas that have flooded in recent years.

The homework for the next meeting is to identify past hazardous, which includes the date, year, and location. Other homework included gathering historic data and town history.

The next meeting was set to follow October 28th, 2010 at 9AM.

Meeting 2, October 28, 2010

Present at this Hazard Mitigation meeting were ten persons including: Tom Clark (Building Officer), Richard Driscoll (Assistant Fire Chief), Bill Boulanger (Superintendent of Public Works & Utilities), Dan Barufaldi (Economic Development Director), Perry Plummer (Fire Chief), Steve Bird (City Planner), Tony Colarusso (Police Chief), Mike Creigan (Citizen), Kyle Pimental (Strafford Regional Planning Commission), and Michelle Auen (Strafford Regional Planning Commission).

Kyle explained the evolution of the Multi-Hazard Matrix and went over the rankings. The team agreed that the relative threat most likely to occur in Dover is flooding due to heavy rains, followed by extreme winter storm events.

The Team also analyzed Past Hazard Events and filled in the remarks column. The team remarked on past hazards including: flooding, fires, hurricanes, tornado, windstorm, ice storm, and snowstorm. The impacts on the town were identified within the city.

The team discussed the Critical Facilities Table. It was established that a grid with a table would be presented on the map, each layer showed individually to make it more lucid for the reader.

Lastly the team looked over Chapter 5: Existing Mitigation Strategies and Proposed Improvements. The team documented what had been completed over the past four years, since the original plan had been adopted. The team discussed the challenges of funding and what projects were deemed completed and which ones still needed more time to finish.

In general much was accomplished at this meeting: categorize the Multi-Hazard Matrix suitable for Dover; Past Hazard Events identified and described; and Mitigation Strategies Improvements were identified. The team was reminded of the next meeting set for December 9, 2010 at 9:30AM.

Meeting 3, December 9, 2010

Present at this Hazard Mitigation meeting were eight persons including: Tom Clark (Building Officer), Richard Driscoll (Assistant Fire Chief), Bill Boulanger (Superintendent of Public Works & Utilities), Dean Peschel (Environmental Projects Manager), Dan Barufaldi (Economic Development Director), Steve Bird (City Planner), Tony Colarusso (Police Chief), and Kyle Pimental (Strafford Regional Planning Commission).

The team identified all critical facilities that were missing and looked at past hazard events and risk assessment. The team looked over the Prior Mitigation Plans Proposed Mitigation Action.

The team came up with Potential Mitigation Strategies using the STAPLEE method. The STAPLEE method was developed by FEMA to determine the effectiveness in accomplishing the goals set forth in the plan. STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic, and Environmental aspects of a project and is commonly used by the public for making planning decisions. Each proposed mitigation strategy was then evaluated and assigned a score based on the criteria each categories was discussed and awarded the following scores: Good=3; Average=2; Poor=1.

The team also looked through the City's recently adopted capital improvements plan and pulled out projects they thought would be useful for the Plan. Each project was ranked, given a time frame, and the responsibility and oversight of each project was determined.

The final meeting was scheduled for March 2, 2011

Meeting 4, March 2, 2011

Present at this Hazard Mitigation meeting were seven persons including: Tom Clark (Building Officer), Eric Hagman (Dover Fire), Perry Plummer (Fire Chief), Dan

Barufaldi (Economic Development Director), Steve Bird (City Planner), Tony Colarusso (Police Chief), and Kyle Pimental (Strafford Regional Planning Commission).

Kyle received final edits from the group. Went over any last minute changes and requested the final pieces of information needed to finish the update. Looked over the final past hazards map to include any other potential flooding areas and made sure all the potential projects were included in the Plan.

Kyle informed the team he would be submitting the Plan to FEMA as soon as possible and would email them with the final details.

**Kyle also met separately with Bill Boulanger on March 9, 2011 and March 29, 2012 to discuss his edits and suggestions because he was unable to attend the final group meeting.

Cocheco River flooding in downtown Dover; 2007

Meeting Agendas

Meeting 1 – October 14, 2010

1. Call to order. Introductions.
2. Go through updated Hazard Mitigation Plan. Formatting. Edits. Suggestions.
3. Look for information on Dover's History and Past Development Trends. Update Current and Future Development Trends. Update Map.
4. Fill in missing blanks on Statistics of Interest Table.
5. Go over Chapter 3 and Identify/Hazard Identification
    a. Fill out Multi-Hazard Threat Analysis
    b. Update Hazards. Man-made (hazardous material spill, acts of terrorism). Other Hazards (epidemic/pandemic, extended power failure).
6. Mark up Base-Map
    a. Past Events/Past & Potential Events
7. Questions?
8. Adjournment

Meeting 2 – October 28, 2010

1. Call to order. Introductions.
2. Finish Multi-Hazard Matrix. Make adjustments in rankings.
3. Go over Past Hazard Events. Fill in table.
4. Go over Critical Facilities Table. Discuss what would like to be shown on the map.
5. Look though Chapter 5, 6,and 7. Discuss what needs to be updated?
6. Questions?
7. Adjournment

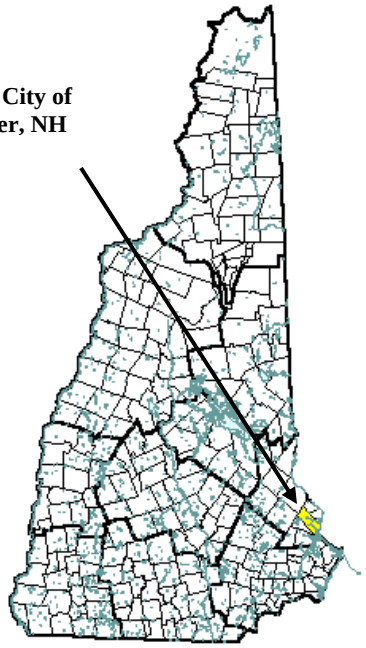
Meeting 3 – December 9, 2010

1. Introductions.
2. Finalize risk assessment and potential losses.
3. Fill out mitigation strategy table.
    a) Rank strategies with STAPLEE method
    b) Categorize each strategy by feasibility.
4. Brainstorm for new mitigation strategies.
5. Discuss implementation schedule.
6. Questions?
7. Adjournment.

Meeting 4 – March 2, 2011

1. Introductions.
2. Review Plan.
3. Collect edits and changes.
4. Provide a list of remaining information.
5. Discuss submitting the Plan to FEMA.
6. Questions?
7. Adjournment.

Chapter II: Community Profile



A. Introduction

The City of Dover is located in the center of the Seacoast region and is the easterly gateway to the White Mountains and Lakes region of New Hampshire. It is about 12 miles Northwest from Portsmouth, 40 miles east of Concord. The City of Somersworth is to the northeast; Eliot, Maine is to the east, from which it is separated by the eastern branch of the Piscataqua River; and the Town of Madbury is to the southwest.

The City of Dover covers a total area of 29.05 square miles, with a land area of 26.73 square miles and a water area of 2.31 square miles. The principal watersheds are the Cochecho River, which has its source in New Durham, and the Bellamy River, which rises in Barrington. These two rivers take a southeasterly course through the city, where the Cocheco River unites with the Salmon Falls River. The City extends along a four-mile long peninsula to the south between the Salmon Falls and Bellamy Rivers. Where the land ends the rivers merge to form the Piscataqua River. Dover has 50 miles of water frontage. Of the total land area in Dover, the Cocheco watershed comprises over 52%, while the Bellamy watershed comprises about 37%. The Salmon Falls/Piscataqua River watersheds and the Johnson Creek/Oyster River watershed make up the remaining 11%.

There are no mountains or high hills within the city boundary as it lies within a coastal plain. The average elevation is 80 feet. The highest place in the city is Garrison Hill, about 284 feet, on the border with the Town of Rollinsford. From the top of the hill, a bird's-eye view of the city can be obtained. In the southern part of the city, there are several gentle swells of lands, which provide a delightful view of Little Bay area, adjacent shores and distant mountains.

Incorporated: 1623

Origin: For the first fifty years of New Hampshire history, Dover was one of only three communities established in what is now New Hampshire. Settled in 1623 on the banks of the Piscataqua River, Dover was first called Hilton's Point, named after Edward Hilton, who procured for himself the "Dover and Squamscot Patent" in 1629. The town was also known by the Indian names of Newichwannock (place of wigwams) and Cocheco; and briefly called Bristol and Northam before permanently becoming Dover. The settlement was an independent government until 1641, when residents agreed to be annexed to Massachusetts; the town returned to New Hampshire when provincial status was restored by King George II in 1741. Dover's location on the Piscataqua and Cocheco Rivers made it a thriving center of trading and manufacturing. Dover was incorporated as a city in 1855.

Villages and Place Names: Bellamy, Cocheco, Gates Corner, Sawyers, Wentworth Terrace

Population, Year of the First Census Taken: 1,998 residents in 1790

Population Trends: Population change for Dover totaled 11,119 over 50 years, from 15,874 in 1950 to 26,993 in 2000. The largest decennial percent change was a 21 percent increase between 1950 and 1960, and the population has grown less than 15 percent each decade since. The 2008 Census estimate for Dover was 28,609 residents, which ranked seventh among New Hampshire's incorporated cities and towns.

Population Density and Land Area, 2008 (*NH Office of Energy & Planning*): 1,070.3 persons per square mile of land area, the eighth highest among the cities and towns. Dover contains 26.7 square miles of land area and 2.3 square miles of inland water area.

Source: Economic & Labor Market Bureau, NH Employment Security, 2009.
http://strafford.org/towns/towncensus/dover2009.pdf

B. Dover's History & Past Development Trends

In 1960s and 1970s, Dover added an average of about 150 new residents per year. During the 1980s, Dover experienced a faster population growth due to strong employment growth at the regional level. Dover added over 250 new residents per year. From 1990 to 2000, population growth in Dover slowed and increased by 7.4 percent to 26,884, adding 1,842 residents. This is attributable partly to the loss of the Pease base closing and cutbacks at the shipyard. According to the Census 2000, the median age in Dover is 35.5, with 20.8 percent of the population under the age of 18 and 13.7 percent age 65 and older. The total number of households is 11,573, with an average size of 2.26 persons. Of those, 6,496 are family households, with an average size of 2.87 persons.

As of April 1, 2000, there were 11,924 total housing units. Dover's housing units increased by 29.8%, adding 2596 units during the last decade. Since 1990, the pace of new units authorized by building permits has averaged approximately 50 new units per year. Unlike the trend for the region, the housing inventory shows that almost half of houses in Dover are owner-occupied and half are renter-occupied. It is projected that between 1995 and 2005, there will be 3,200 units added, 1,450 single family detached and 950 multi-family. The addition of residential units will require about 3,400 acres of land and will be distributed in the current residential zones. According to the Dover Master Plan, Economic and Land Use Analysis Chapter, the city will need 200 acres of industrial land, 150 acres of Office/Institute land, 50 acres of Retail/Commercial land in the future to accommodate the nonresidential development in the next decade.

With the exception of flooding all other identified hazards in this Plan are either regional or citywide hazards; therefore, new development will occur within the defined hazard areas. Development in flood plain or flood prone areas will be restricted in accordance with state and local flood plain management and other ordinances and environmental regulations.

C. Current & Future Development Trends

City of Dover, New Hampshire Master Plan: 2007 Update to the Land Use Analysis Chapter.

Dover's land use pattern is well established, with little remaining undeveloped land within its urban core. This core is surrounded by land zoned residential, commercial and industrial, which contains both upland and wetland.

Based on estimates provided by DemographicsNow, Dover had a 2006 population of 29,068, which represents an increase of 2,180 (8%) since 2000. This is slightly higher than the 7.3% growth rate that Dover experienced between 1990 and 2000. Dover remains the State's seventh most populated community, and the second most populated in Strafford County. After the 2000 census, the New Hampshire Office of Energy and Planning projected that by 2010; Dover's population would be 29,310. Presuming that the current growth rate of 364 people a year will move to the city between 2007 and 2010, this number would be shy by 1207 people.

While the growth projections above may seem high for Dover, many communities in the region are anticipating a similar population increase. Of all New Hampshire communities in the region (All of Strafford County, Brookfield and Wakefield of Carroll County, and Exeter, Hampton, Newmarket, Northwood, Nottingham, and Portsmouth of Rockingham County) Dover ranked 16th out of 21 communities. In fact, of all the communities in the study region during the previous 20 years, all have seen annual population gains, except for the City of Portsmouth, which has lost population each year.

Economically, Dover acts as a hub for surrounding towns in Maine and New Hampshire. This is a homogeneous area, with many people working and shopping for goods and services in communities other than the one they live in. The region also attracts workers from other areas of New Hampshire, Maine and Massachusetts and serves as home for many people who commute out of the area on a daily basis. The most comparable

geography to use in analyzing trends is the Census Bureau's Portsmouth-Dover-Rochester Metropolitan Statistical Area (MSA).

In 2007, projects such as a 100,000 square foot medical office; a fourth hotel and restaurant along Indian Brook Drive will bring even more non-residential development to the Exit 9 corridor. In addition there has been the approval of the mixed-use development along Dover Point Road and Durham Road. The Durham Road project is slated to open phase 1 (45,000 square feet retail) in 2007, with the future build out reaching 82,000. The Dover Point project is expected to exceed 150,000 square feet of non-residential uses by 2012. All told, the City of Dover has approved 2,528,802 square feet of non-residential buildings over the previous 10-year period.

Cocheco River flooding Henry Law Park; 2007

Table 2.1 Statistics of Interest to Multi-Hazard Mitigation Planning

Table 2.1: Statistics of Interest to Multi-Hazard Planning					
City of Dover Karen Lavertu, City Clerk/Tax Collector 288 Central Avenue Dover, NH 03820		Phone Fax Email Website	603-516-6020 603-516-6666 k.lavertu@dover.nh.gov http://www.dover.nh.gov		
Population	2008	2000	1990	1980	1970
City of Dover	28,609	26,993	25,420	22,377	20,850
Strafford County	121,914	112,676	104,348	85,324	70,431
Elderly Population (% over 65)	13.7%				
Median Age	35.5				
Regional Coordination					
County	Strafford				
Regional Planning Commission	Strafford Regional Planning Commission				
Watershed Planning Region	Salmon Falls - Piscataqua Rivers				
Tourism Region	Seacoast				
Municipal Services & Government					
City Council	Yes; Elected				
Planning Board	Yes; Appointed				
Library Trustees	Yes; Appointed				
Zoning Board	Yes; Appointed				
Conservation Commission	Yes; Appointed				
Master Plan	Yes; 2009 (most recent) – updated annually				
Emergency Operation Plan (EOP)	Yes; 2009				
Zoning & Land Use Ordinances	Yes; 2010 (most recent)				
Subdivision Regulations	Yes;				
Capital Improvements Plan	Yes; 2010 (November) – updated annually				
Building Permits Required	Yes				
Flood Ordinance	Yes				
Percent of Local Assessed Valuation by Property Type, 2008					
Residential Buildings	74.4%				
Commercial Land & Buildings	24.3%				
Other (including utilities)	1.3%				
Emergency Services					
Emergency Warning System(s)	No				
Police Department	Yes; Full-time				

Table 2.1: Statistics of Interest to Multi-Hazard Planning	
Fire Department	Yes; Full-time
Fire Stations	Yes; 3
Emergency Medical Services	Municipal
Established EMD	Yes
Nearest Hospital	Wentworth-Douglass, Dover (Local, 134 staffed beds)
Utilities	
Public Works Director	Yes; Community Service Director
Water Works Director	Yes;
Water Supplier	City of Dover
Electric Supplier	PSNH
Natural Gas Supplier	Unitil Northern Utilities
Cellular Telephone Access	Yes
High Speed Internet	Yes
Telephone Company	Fairpoint; Bayring
Public Access Television Station	Yes
Pipeline(s)	(2)
Transportation	
Evacuation Routes	Seabrook Property Management Plan
Nearest Interstate	Spaulding Tpk., Exits 6-9; I-95, Exit 5
Railroad	Boston & Maine (Northern Railroad, Amtrak)
Public Transportation	Yes
Nearest Airport	Skyhaven, Rochester
Nearest Commercial Airport	Manchester-Boston Regional (43 miles); Pease
Housing Statistics, 2008	
Total Housing Units	13,240
Single-Family Units	5,976
Residential Permits (Net change)	16
Multi-Family Units	6,823
Residential Permits (Net change)	63
Manufactured Housing Units	441
Income (1999)	
Per capita Income	$23,459
Median Household Income	$43,873
Median Earnings Male	$37,876

Table 2.1: Statistics of Interest to Multi-Hazard Planning	
Median Earnings Female	$27,329
Families below the poverty level	4.8%
Other	
Web site	http://www.dover.nh.gov
Local Newspapers	Fosters
911 GIS data available	Yes
Assessed structure value 2009	$1,817,822,950
National Flood Insurance Program	Yes; 4-15-1980
(2) Repetitive Losses	1) Knox Marsh Lane – Old Madbury Lane Apartments 2) Intersection of Prospect Street & Snows Court – Single Family House
Information found in Table 2.1 was derived from local input or the Economic & Labor Market Information Bureau, NH Employment Security, 2009.	

Cocheco River flooding Henry Law Park; 2007

Chapter III: Hazard Identification

A. Description of the Hazards

The first step in hazard mitigation is to identify hazards; the Team determined that:

- 7 hazards that are **most** likely to affect Dover are: Flood (Heavy Rains), Severe Winter Storm (Ice Storms), Nor'easters, Hurricane, Severe Wind Storms, Extended Power Outage, and Severe Thunderstorms & Lightning.

- 5 hazards that **may** affect Dover are: Hazardous Material Threat, Extreme Heat, Public Health Threat, Tornadoes (Downbursts), and Erosion and Mudslides

- 5 hazards that are **less likely** to affect Dover are: Flood (Dam Breach), Radon, Wildfire, Earthquake, and Drought.

Table 3.1 provides estimates of the level of impact each listed hazard could have on humans, property and business and averages them to establish an index of "severity". The estimate of "probability" for each hazard is multiplied by its severity to establish an overall "relative threat" factor. This matrix also shows the frequency of future occurrence (based on a 25-year window).

Based on this matrix, the most significant disaster threat to Dover is Flooding due to heavy rains. The second most likely disaster is the risk of a hazardous material threat and the third is flooding due to a dam breach.

Road closure at the corner of Fourth Street and Snow Court due to flooding; 2006

Table 3.1: Multi-Hazard Threat Analysis

Hazards that are most likely to significantly affect Dover (7)							
Hazards that may affect Dover (5)							
Hazards that are less likely to affect Dover (5)							
Column	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Scoring 1 = Low	**Probability of death or injury**	**Physical losses and damages**	**Interruption of service**	**Likelihood of this occurring within 25 years**	**Average of Human, Property & Business Impact**	**Relative Threat**	**Mitigation Strategies that apply to all hazards: MH**
2 = Moderate					Columns	Columns	
3 = High					A + B + C/3	D x E	
Hazard	**Human Impact**	**Property Impact**	**Business Impact**	**Probability**	**Severity**	**Risk Severity x Probability**	**Specific Strategy Number (Table 8.1)**
Flood (Heavy Rains)	2	3	3	3	3.67	11.00	4-7, 12,13; MH
Severe Winter Storm (Ice Storms)	2	3	3	3	3.67	11.00	MH
Nor'easters	2	3	3	3	3.67	11.00	MH
Hurricane	2	3	3	3	3.67	11.00	MH
Severe Wind Storms	2	3	3	3	3.67	11.00	MH
Extended Power Outage	2	2	3	3	3.33	10.00	11; MH
Severe Thunderstorms & Lightning	1	3	3	3	3.33	10.00	MH
Hazardous Material Threat	2	2	2	3	3.00	9.00	MH
Extreme Heat	1	1	1	3	2.00	6.00	MH
Public Health Threat	2	2	2	2	2.67	5.33	MH
Tornadoes (Downbursts)	2	2	2	2	2.67	5.33	MH
Erosion and Mudslides	1	2	1	2	2.00	4.00	13; MH
Flood (Dam Breach)	1	2	2	1	2.00	2.00	MH
Radon	1	1	1	1	1.33	1.33	MH
Wildfire	1	1	1	1	1.33	1.33	MH
Earthquake	1	1	1	1	1.33	1.33	MH
Drought	1	1	1	1	1.33	1.33	14; MH

B. Risk Assessment

The next step in hazard mitigation planning was to identify the location of past hazard events and, if possible, what facilities or areas were impacted. The team used Table 3.1, Multi-Hazard Threat Analysis, to identify potential threats and prioritize their threat potential. The team then used a base map that included the 100-year floodplain, political boundaries, water bodies, the road network and aerial photos to locate all of the past hazard events on the base map. This step in the Planning process serves as a stepping-stone for predicting where future hazards could potentially occur. The Team identified past events in Dover and listed them in Table 3.2, Historic Hazard Identification.

C. Dover National Flood Insurance Program (NFIP) Status

Dover has been a participant in the National Flood Insurance Program since April 15, 1980. There are 48 policyholders in the City. Seventeen claims were made since participation began with $86,391 in insured losses. There are two repetitive loss properties insured under the NFIP. They are located on (1) Knox Marsh Lane – Old Madbury Lane Apartments and (2) at the Intersection of Prospect Street & Snows Court – Single Family House. There are 214 parcels with structures in the Dover floodplain, with a total value of $30,016,754.

63 Snows Court

Old Madbury Lane Apartments

The property at 63 Snows Court is located next to the Cocheco River and when the area does experience severe storm events that building, which is a split level single family home as shown in the Google Maps/street level photo, does get four feet of water or more in the basement which was finished.

The apartment buildings/property at the end of the Old Madbury Lane are located next to the Bellamy river and when the area does experience severe storm events the lower level apartments flood with several feet of water.

In 2005, the City amended their floodplain development ordinance. As noted in the ordinance[3]: the City of Dover recognizes the need to minimize the potential loss of life and property during periods of flooding by regulating the alteration and/or the development of those areas of special flood hazard identified by the Federal Emergency

[3] Dover Code, Floodplain Development, Chapter 113 [Amended 04-20-05]

Management Agency. The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the County of Strafford, NH," dated May 17, 2005 or as amended, together with the associated Flood Insurance Rate Maps dated May 17, 2005 or as amended, which are declared to be a part of this ordinance and are hereby incorporated by reference.

The City has continued to work with elected officials and FEMA to correct existing compliance issues. Dover has continued communication with FEMA to discuss NFIP issues and continues to monitor designated flood areas throughout the city. In the future, the City will look into developing a fluvial erosion assessment to improve the floodplain management in the community after the geomorphic assessment is completed on the Cocheco River. The City, along with Woodard & Curran, has also conducted a study on whether or not water pumped from Willand Pond is safe for drinking water. So far the study has shown that water can be pumped from 2 wells at the pond and treated at the Treatment Plant on Lowell Ave. This would help eliminate some of the drainage and flooding issues many residents have seen around the pond over the past few years. Willand Pond could also be considered another auxiliary fire aid.

D. Probability of Future Potential Disasters

Dover is prone to a variety of natural hazards. These include: flooding, severe wind events (downbursts, hurricane, tornado), wildfire, drought, ice storms, and severe winter storms.

The City of Dover developed along waterways as the Cocheco River and Bellamy River provided mills with power and transportation. As a result of this development pattern, a lot of buildings and populated settlements were within and adjacent to the floodplains. In the history of the city, some devastating floods have occurred. Flood safety is a significant concern for the City. In 1896 a tremendous flood hit Dover. The flood caused $300,000 damages in ten hours with five bridges destroyed and several buildings ruined. In 1996, excessive rainfalls caused road closures, flooded residences, and erosion problems in the city

Table 3.2 provides more information on past and potential hazards in Dover.

Flooding in the City of Dover; 2007

Table 3.2: Historic Hazard Identification

Blue = Past Events **Red = Recent & Potential Hazards**

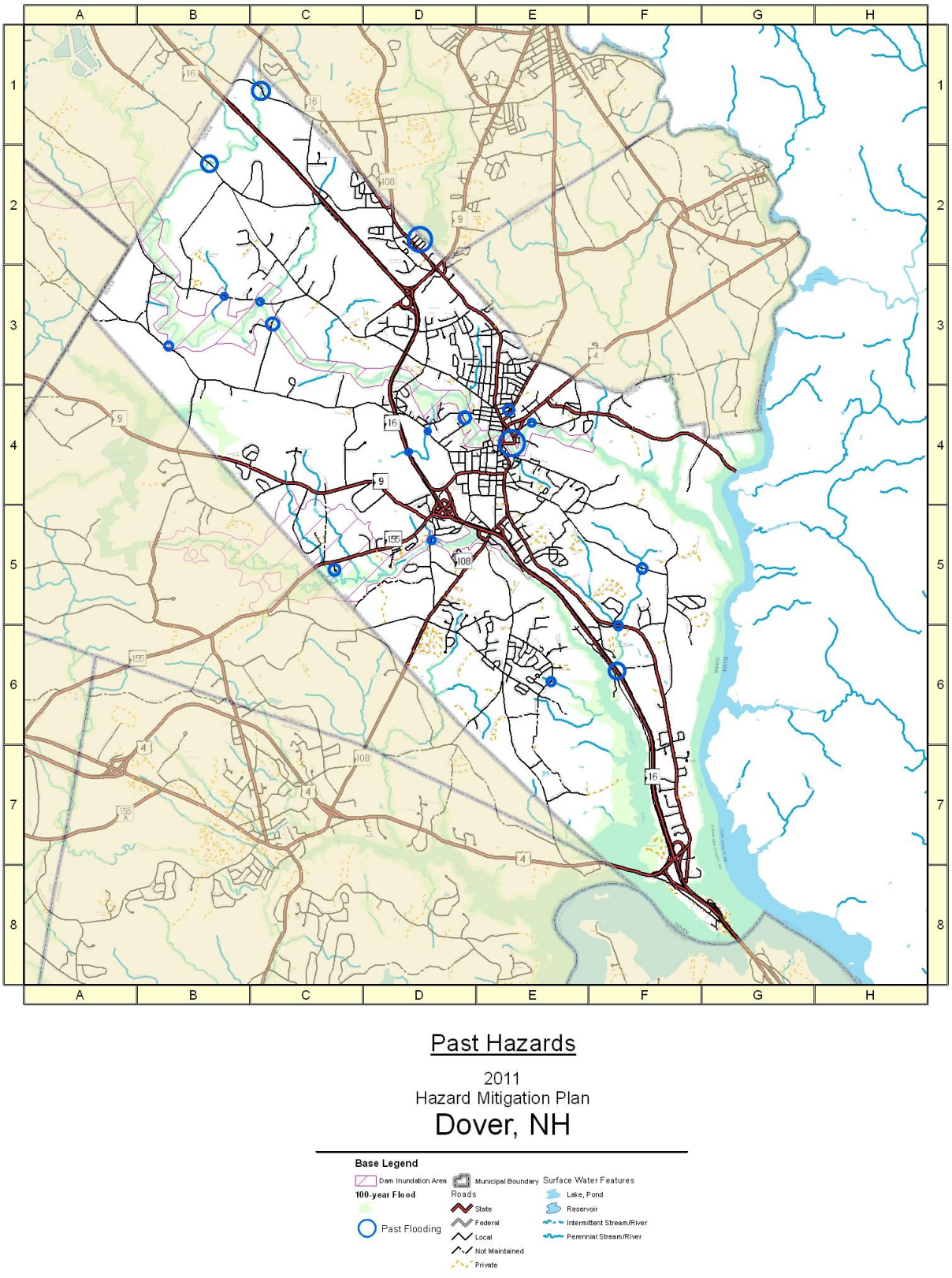
Hazard	Date	Location	Remarks	Source
Past or Potential Flooding Hazards: Riverine flooding is the most common disaster event in the State of New Hampshire (aside from frequent inconveniences from rather predictable moderate winter storms). Significant riverine flooding impacts upon some areas in the State in less than ten year intervals. The entire State of New Hampshire has a high flood risk.				
Flooding	**1896**	**Cocheco River**	**Flood of Cocheco River and ice jam did $300,000 damage in ten hours in Dover. Five bridges were destroyed. Several buildings were ruined. No loss of life.**	**2005 Hazard Mitigation Team**
Flooding	**1996**	**Southeast New Hampshire from October 20th through the 26th.**	**Precipitation fell at the rate of 1 to 2 inches per hour causing road closings, flooded residences, damage to low lying public facilities and general erosion problems throughout the affected area. Forty-one communities in eight counties were impacted. Dover received funding of $37,524 for water & sewer repair, cleaning catch basins and responding to life & safety.**	**2005 Hazard Mitigation Team**
Flooding	**May 2006**	**Belknap, Carroll, Hillsborough, Merrimack, Rockingham, and Strafford Counties.**	**Road closures. Property damage.**	**FEMA Disaster Declaration #1643** *(Individual Assistance)* **& Local Knowledge**
Flooding	**April 2007**	**Grafton, Hillsborough, Merrimack, Rockingham, and Strafford Counties.**	**Road closures.**	**FEMA Disaster Declaration #1695** *(Individual and Public Assistance)* **& Local Knowledge**
Past or Potential Wildfire Hazards: New Hampshire is heavily forested and is therefore vulnerable to wildfires, particularly during periods of drought.				
There have been no major wildfires on record in the City of Dover. The damage is unlikely due to the limited availability of contiguous open space.				

Hazard	Date	Location	Remarks	Source
Past or Potential Tornado, Downburst (Wind Shear) & Hurricane Hazards: Tornados are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. A downburst is a severe localized wind blasting down from a thunderstorm. Downburst activity is very prevalent throughout the State, yet most go unrecognized unless significant damage occurs. Hurricanes develop from tropical depressions, which form off the coast of Africa. New Hampshire's exposure to direct and indirect impacts from hurricanes is real, but modest, as compared to other states in New England.				
Hurricane of 1938	**September 1938**	**City-wide**	**High winds and rain destroyed large stands of trees all the way up to the White Mountains and flash flooding was problematic in Massachusetts, Vermont and New Hampshire. The Sherman School in Dover was destroyed.**	**2005 Hazard Mitigation Team**
Wind Storm	**February 2010**	**Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties.**	**Power out 4-8 days in some areas. Major property damage. Schools were closed for a few days.**	**FEMA Disaster Declaration #1892** *(Public Assistance)* **& Local Knowledge**
Past and Potential Severe Winter Weather Hazards: Severe weather in New Hampshire may include heavy snowstorms, blizzards, Nor'easters, and ice storms. Generally speaking, New Hampshire will experience at least one of these hazards during any winter season. Most New Hampshire communities are well prepared for such hazards.				
Ice Storm	**January 1998**	**NH - Statewide.**		**FEMA Disaster Declaration #1199**
Ice Storm	**December 2008**	**Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties.**	**Power outages for over a week in some areas. Property damage.**	**FEMA Disaster Declaration #1812** *(Public Assistance)* **& Local Knowledge**
Snowstorm	**March 1993**	**New England**	**Snow removal.**	**FEMA Emergency Declaration #3101**
Snowstorm	**March 2001**	**Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford Counties, NH**	**Dover received $60,097 for snow removal costs.**	**2005 Hazard Mitigation Team & FEMA Emergency Declaration #3166.**

Hazard	Date	Location	Remarks	Source
Snowstorm	March 2003	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford Counties, NH		FEMA Emergency Declaration #3177. *(Public Assistance)*
Snowstorm	March 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan	Incident Period: January 22nd – 23rd. Public Assistance for 48 hours. Minor impact.	FEMA Emergency Declaration #3207 *(Public Assistance)*
Snowstorm	December 2008	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan	Incident Period: December 11th. Public Assistance for 48 hours. Minor Impact.	FEMA Emergency Declaration #3297 *(Public Assistance)*

Tree down on Lakeview Drive during a winter storm in 2009.

Historic & Potential Hazards Map



Chapter IV: Critical Facilities & Key Resources (CF/KR)

With team discussion and brainstorming, Critical Facilities and Key Resources (CI/KR) within Dover were identified and mapped for the multi-hazard plan. The "ID" number in the following list is also represented in the CI/KR map located in the Appendices. Facilities located in adjacent towns were not mapped.

Emergency Response Facilities (ERF)			
ERF's are primary facilities and resources that may be needed during an emergency response.			
Primary Facilities			
ID	**Facility Name**	**Type of Facility**	**Address**
	City Hall	Emergency Operations Center (backup)	288 Central Ave
	State Shed	Emergency Fuel Facility	Indian Brook Drive
	Dover Public Works Garage	Emergency Fuel Facility (diesel only)	271 Mast Road
	Dover Police Department	Police Station	46 Locust Street
	Dover Fire Station	Fire Station	9-11 Broadway
	Dover Fire Station	Fire Station	27 Durham Road
	Dover Northside Fire Station	Emergency Operation Center	262 Sixth Street
Major Highways or Roadways			
	Route 16		
	Route 9		
	Route 4		
	Route 108		
Bridges (includes all overpasses)			
	Sixth Street over Blackwater Brook	City Maintained	
	Watson Road over Cocheco River	City Maintained	
	NH16, SP TPK over Long Hill Road	State Owned	
	Somersworth INT'CG over NH16, SP TPK	State Owned	
	Glenwood Ave over NH16, SP TPK	NHDOT	
	NH16, SP TPK SB over Cocheco River	NHDOT	
	NH16, SP TPK NB over Cocheco River	NHDOT	
	Sixth Street over NH16, SP TPK	NHDOT	
	Tolend Road over NH16, SP TPK	NHDOT	
	NH9 over BMRR	State Owned (Division 6)	
	Whittier Street over Cocheco River	City Maintained	
	NH16, SP TPK SB over BMRR	NHDOT	
	NH16, SP TPK NB over BMRR	NHDOT	
	Bellamy Road over Bellamy River	City Maintained	
	Washington Street over BMRR	City Maintained	
	NH9, NH155, Silver over NH16, SP TPK	NHDOT	
	Fourth Street over Cocheco River	City Maintained	
	Cataract Ave over NH16, SP TPK	NHDOT	
	Oak Street over RR	State Owned (Rollinsford)	
	Makem Bridge	City Maintained	
	Central Ave over Cocheco River	City Maintained	
	Chestnut Street over Cocheco River	City Maintained	
	NH108 over Bellamy River	City Maintained	

Emergency Response Facilities (ERF)			
	Central Ave over Cocheco River	City Maintained	
	NH16, SP TPK SB over Central Ave	NHDOT	
	NH16, SP TPK NB over NH108	NHDOT	
	Pan Am [BMRR] over Broadway	Pan Am	
	Washington Street over Cocheco River	City Maintained	
	Recreational Trail over Cocheco River	City Maintained	
	Spur Road over NH16, SP TPK	NHDOT	
	Gulf Road over Fresh Creek	State Owned	
	US4 over Bellamy River	State Owned	
	NH16, SP TPK over New Bellamy Lane	NHDOT	
	US4 WB over NH16, SP TPK	NHDOT	
	Gulf Road over Salmon Falls River	State Owned	
	Road over Little Bay [Redlist]	State Owned	
	US4, NH16, SP TPK NB over Little Bay, Rd	State Owned	General Sullivan
	US4, NH16, SP TPK SB over Little Bay, Rd	State Owned	General Sullivan
Telephone Facilities			
	Garrison Cell Tower	Cell Tower	Garrison Ave
	City Hall	Combiner Antenna	288 Central Ave
	Repeater – Cell Tower	Repeater	Mast Road
	Repeater	Repeater	100 Liberty Way
	Repeater	Repeater	Varney Brook Pump St.

Non-Emergency Response Facilities (NERF)			
NERF's are facilities that although critical, not necessary for the immediate emergency response effort; considered essential for everyday operation.			
ID	**Facility Name**	**Type of Facility**	**Address**
	Water Treatment Plant	Water Treatment Facility	Lowell Avenue
	Griffin Water Treatment Plant	Water Treatment Facility	Mast Road
	Water Treatment Plant	Water Treatment Facility	French Cross Road
	Dover Wastewater Treatment Facility	Water Treatment Facility	Middle Road
	Substation	Power Station	75 Cocheco Street
	Substation	Power Station	Drew Road at Back River Road
	River Street Pump Station	Pump Station	River Street

Facilities and Populations to Protect (FPP)			
FPP's are facilities that need to be protected because of their importance to the City and to residents who may need help during a hazardous event			
ID	**Facility Name**	**Type of Facility**	**Address**
Historic Buildings/Schools/Day Cares			
	Wentworth House	Historic	795 Central Ave
	Garrison Hill Tower	Historic	Abby Sawyer Memorial Highway
	Dover Public Library	Historic	61 Locust Street
	St. Mary's Church	Historic	25 Third Street
	St. Charles Church	Historic	
	First Parish Church	Historic	218 Central Ave

Facilities and Populations to Protect (FPP)			
	William Hale House	Historic	3 Hale Street
	Michael Reade House	Historic	43 Main Street
	Friends Meeting House	Historic	141 Central Ave
	Sawyer Building	Historic	Portland Ave & Main St
	Sawyer Woolen Mills	Historic	1 Mill Street
	St. Thomas Episcopal Church	Historic	5 Hale Street
	US Post Office Main	Historic	133 Washington St
	Woodman Institute	Historic	182 Central Ave
	Samuel Wyatt House	Historic	7 Church St
	Tuttle Farm	Historic	Dover Point Road
	NH Children's Museum	Historic	
	Dover High School	School	25 Alumni Drive
	Dover Alternative School	School	50 Alumni Drive
	St. Thomas Aquinas High School	School	199 Dover Point Rd
	Portsmouth Christian Academy at Dover	School	26 Seaborne Drive
	Dover Middle School	School	16 Daley Drive
	St. Mary Academy	School	222 Central Ave
	Horne Street Elementary	School	78 Horne Street
	Woodman Park Elementary	School	11 Towle Ave
	Garrison Elementary	School	50 Garrison Road
	St. Mary Academy Preschool Kindergarten	School	110 Locust Street
	Cocheco Arts & Technology Academy	School	
	My School Kindergarten	School/Day Care	118 Locust Street
	Happy Helpers Preschool Education Center	School/Day Care	6 Heather Lane
	Bunnies & Blocks Kindergarten/Preschool	School/Day Care	7 Nelson Street
	Dover Children's Center	School/Day Care	61 Locust Street
Commercial and Economic Impact Areas			
	Crosby Drive Industrial Park	Commercial/Economic Area	
	Industrial Park, Industrial Park Drive	Commercial/Economic Area	
	Progress Drive	Commercial/Economic Area	
	Enterprise Park • Liberty Way, Education Way, Venture Drive	Commercial/Economic Area	
	Downtown Business District	Commercial/Economic Area	
	Miracle Mile Business District	Commercial/Economic Area	
Nursing Homes/Assisted Living/Residential Facilities			
	Riverside Rest House	Nursing Home	
	Wentworth Home	Nursing Home	
	Saint Ann House	Nursing Home	
	Dover Rehabilitation and Living Center	Nursing Home	
	Langdon Place	Nursing Home	
	Bellamy Fields	Assisted Living	
	Watson Fields	Assisted Living	
	Wadley House	Assisted Living	
	Dover Children's Home	Youth Residential Facility	
	Our House for Girls	Youth Residential Facility	
	My Friend's Place	Homeless Shelter	

Potential Resources (PR)			
PR's are potential resources that could be helpful for emergency response in the case of a hazardous event.			
ID	**Facility Name**	**Type of Facility**	**Address**
Food/Water/Retail			
	Shaws	Supermarket	851 Central Ave
	Hannaford	Supermarket	833 Central Ave
	Hannaford	Supermarket	Durham Rd / Rte. 108
	Janetos	Market	77 Main Street
Medical Facilities			
	Wentworth Douglass	Hospital	789 Central Ave
	Wentworth Homecare & Hospice	Visiting Nurse Associations & Hospice	113 New Rochester Rd
	Avis Goodwin Community Health Center	Community Health Center	19 Old Rollinsford Rd
	Frisbie Memorial [Rochester]	Hospital	11 Whitehall Road
	Division of Emergency Medical Services Office of Community & Public Health [Epping]	Other Resources	37 Pleasant Street
Equipment/Hazardous Material Facility			
	Recycling Center	Hazardous Material Facility	265 Mast Road
	UPS	Hazardous Material Facility	92 Industrial Park Drive
	Airgas	Hazardous Material Facility	136 Industrial Park Drive
	Turbocam	Hazardous Material Facility	5 Faraday
	Pentair	Hazardous Material Facility	47 Crosby Road
	C and A Design	Hazardous Material Facility	180 Crosby Road
	Hirel System	Hazardous Material Facility	140 Crosby Road - 2
	Tape O Corporation	Hazardous Material Facility	37 Crosby Road
	Pace	Hazardous Material Facility	29 ½ Littleworth Road
	PSNH	Hazardous Material Facility	75 Cocheco Street
	CYN Environmental	Hazardous Material Facility	Progress Street
	Conproco Corporation	Hazardous Material Facility	17 Production Drive
	Cramer Fabrics Inc.	Hazardous Material Facility	Venture Drive
	Churchhill Medical Systems	Hazardous Material Facility	87 Venture Drive
	OFI Quality Fabrications	Hazardous Material Facility	Innovation
	Fosters Daily Democrat	Hazardous Material Facility	150 Innovation
	J&E Specialty	Hazardous Material Facility	519 Central Ave
	Wentworth Douglas Hospital	Hazardous Material Facility	789 Central Ave
	Fairpoint	Hazardous Material Facility	57 St. Thomas Street
Dams			
	Watson Waldron Dam – Cocheco River	Active – Low Hazard Classification	
	Central Ave Dam – Cocheco River	Active – Low Hazard Classification	
	Sawyer Mill Upper Dam – Bellamy River	Active – High Hazard Classification	
	Redden Pond Dam – Redden Pond	Active – Low Hazard Classification	
	Thornwood Commons Pond – Varney Brook	Active – Significant Hazard Classification	
Airport/Helipad			
	Liberty Mutual Helipad	Helipad	
	Wentworth Douglass Helipad	Helipad	
	Industrial Park Drive	Helipad	
	Dover High School (Softball Field)	Helipad	
	Bellamy Fields	Helipad	
Recreational Facilities			

Potential Resources (PR)		
	Fish Ladder Park	Pocket Parks
	Immigrants Park	Pocket Parks
	Tuttle Square Park	Pocket Parks
	Waldron Courtyard	Pocket Parks
	Alden Woods Children's Playground	Tot Lots
	Overlook Drive Children's Playground	Tot Lots
	Amanda Howard Park	Neighborhood Parks
	Applevale Park	Neighborhood Parks
	Hancock Park	Neighborhood Parks
	Morningside Park	Neighborhood Parks
	Park Street Park	Neighborhood Parks
	Spruce Lane	Neighborhood Parks
	Bellamy Park	Community Parks
	City of Dover Community Trail	Community Parks
	Cocheco River Walk	Community Parks
	Dover Skate Park	Community Parks
	Garrison Hill Park	Community Parks
	Guppey Park	Community Parks
	Henry Law Park	Community Parks
	Joe Parks Riverwalk and Gardens	Community Parks
	Long Hill Memorial Park	Community Parks
	Maglaras Park	Community Parks
	Rotary Gardens and Pavilion at Henry Law Park	Community Parks
	Waterfront Park at Dover Landing	Community Parks
	Willand Pond Park	Community Parks
	Dover High School	School/Parks/Fields
	Dover Middle School	School/Parks/Fields
	Garrison Elementary School	School/Parks/Fields
	Home Street School	School/Parks/Fields
	Woodman Park	School/Parks/Fields
	Shaw's Lane Ballfields	City Athletic Fields
	Softball Field at Guppey Park	City Athletic Fields
	Sullivan Field and Playground	City Athletic Fields
	Dover Ice Arena	City Recreation Facilities
	Dover Indoor Pool	City Recreation Facilities
	Jenny Thompson Outdoor Pool	City Recreation Facilities
	Recreation Department Facilities at McConnell Center	City Recreation Facilities
	Senior Center at McConnell Center	City Recreation Facilities
	Hilton State Park	State Park
	Beckwith Ballfields	Private Fields and Facilities
	Cocheco Country Club	Private Fields and Facilities
	Dover Little League Ballfields	Private Fields and Facilities
	Portsmouth Christian Academy	Private Fields and Facilities
	Saint Thomas Aquinas High School	Private Fields and Facilities

Water Resources (WR)		
Auxiliary Fire Aid		
	Facility Name	Type of Facility
	Garrison Water tower	Fire Aid
	Willand Pond	Fire Aid
	Long Hill Road Planned Water Tower	Fire Aid [Still in design phase]
Cisterns		
	Upper Factory	Cistern
	115 Industrial Park	Cistern

Chapter V. Multi-Hazard Effects in Dover

A. Identifying Vulnerable Structures

Damages from floods can be more predictable than damages from other disasters, so it is important to identify the critical facilities and other structures that are most likely to be damaged by these events. To do this, structures falling within the FEMA flood map for the City are reviewed; Dover has approximately 110 structures within the FEMA floodplain and 1 CF/KR within the floodplain (County Farm Bridge) with no assessed potential loss value.

Because the FEMA flood maps are not always the most accurate when providing areas of potential threat, the group decided to look at the critical facilities and key resources within the flood areas they mapped as part of the risk assessment. In Dover, there were 11 CR/KR within the potential and past flood areas (PPFA) that were identified in the risk assessment for a potential loss value estimate of $113,627,614.00 at 100%.

Critical Facilities & Key Resources in PPFA

Bridges		
1) Watson Rd over Cocheco River		$4,350,000.00
2) Sixth Street over Blackwater Brook		$160,000.00
3) Atlantic Ave over Fresh Brook		$525,000.00
4) Bellamy Rd. over Bellamy		$340,000.00
5) General Sullivan Bridge [Hilton Dr]		$95,700,000.00
	Subtotal	$101,075,000.00[4]
Historic Buildings		
6) NH Children's Museum [estimated]		$25,614.00
7) Sawyer Woolen Mill		$9,552,900.00
	Subtotal	$9,578,514.00
Food/Water/Retail		
8) Kelley's Row Restaurant		$738,200.00
Commercial and Economic Impact Areas		
9) Downtown Business District		Could Not Be Determined
Pump Station/Auxiliary Fire Aid		
10) River Street Pump Station		$2,235,900.00
11) Isinglass Recharge Facility		Could Not Be Determined
	Total	**$113,627,614.00**

[4] The approximate assessed value for the bridges was calculated by multiplying $1,000.00 per square foot of bridge. This estimate was provided by the Bridge Design Bureau at NHDOT and includes all cost (engineering, consulting and in-house design, construction, etc.) to build a new bridge.

B. Calculating the Potential Loss

Assessed Value of All Structures (only)			
	2009	1% damage	5% damage
Residential	$1,239,259,100	$12,392,591	$61,962,955
Manufactured	$23,478,900	$234,789	$1,173,945
Commercial	$502,218,200	$5,022,182	$25,110,910
Tax Exempt	$52,866,750	$528,667	$2,643,337
Total	$1,817,822,950	$18,178,229	$90,891,147
Source: Department of Revenue Administration; 2009 Report			

It is difficult to ascertain the amount of damage that could be caused by a natural or man-made hazard because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. Therefore, we have used the assumption that hazards that impact structures could result in damage to either 0-1% or 1-5% of Dover's structures, depending on the nature of the hazard and whether or not the hazard is localized.

Based on this assumption, the potential loss from any of the identified hazards would range from **$0 to $18,178,229** or **$18,178,229 to $90,891,147** based on the 2009 Dover city valuation, which lists the assessed value of all structures in Dover to (see chart above).

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

The Hazards

The *New Hampshire State Natural Hazard Mitigation Plan, October 2000 Edition* (NHOEM 2000) defines a comprehensive set of hazards that may affect the state and recommends that municipalities consider these hazards in their local planning efforts. Some of the definitions given below for hazards addressed in this plan follow from the definitions given in the state plan and are presented as categorized in that plan.

1) Extended Power Outages…….……..…$0 to $18,178,229

When discussing extended power failure in this plan, it is referring to power failure that can last for a period of days or weeks. Many things can cause power failure: downed power lines (due to storm, wind, accident, etc); failure of public utilities to operate or failure of the national grid. Extended power failure can present not only lighting difficulties but also heating, water supply and emergency services.

Extended power outages have occurred in Dover, both as a result of local line damage from high winds and severe storms. If a major and/or extended power outage occurs and lasts for more than a week, a significant hardship on individual residents could result, particularly those citizens who are elderly or handicapped.

Due to the localized and individual nature of the effects of an extended power failure, the potential loss value is estimated to be between 0% - 1% of the total value of all structures.

2) Flood (Dam Breach)……..……..…...$0 to $18,178,229

All of the dams in Dover have a low or significant hazard classification, which means they have a relatively low hazard potential because of the size and location. Failure or misoperation of any number of these dams would represent a significant hazard potential and economic loss to structures and property but no probable loss of lives.

The estimate above represents the potential damage based on 0% - 1% of the total structure value.

3) Flood (Heavy Rains)……...$0 to $18,178,229

The Cocheco River and Bellamy River run through the City of Dover and are vulnerable to flooding year round. General flooding is caused by significant rain events. Usually one single event is not sufficient to cause flooding. Moderate temperature, seasonally rapid melting of the snow pack, and moderate to heavy rain combined will cause the river to overflow its banks.

The estimate above represents potential damage to roads, culverts, and nearby structures and is based on 0% to 1% of the total structure value.

4) Severe Winter Storms (Ice Storms & Nor'easters)….……$0 to $18,178,229

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snowstorms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in Dover in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly, and increased traffic accidents. Damage caused as a result of this type of hazard varies according to wind velocity, snow accumulation, duration and moisture content. Seasonal accumulation can also be as significant as an individual snowstorm.

Winter snow and ice storms often cause trees to fall creating widespread power outages by downing power lines. Road closures are also often a result of snow accumulations, ice storms and downed power lines.

Heavy snow and ice storms can also cause widespread damage to forested areas. The December 2008 ice storm knocked out power for as many as 400,000 customers throughout the State (five times larger than those who lost power in the ice storm of 1998, which was previously the most devastating storm on record). Ice storms in Dover could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

Due to the widespread nature of an event of this kind, the potential loss value is estimated to be between 1% and 5% of the total assessed value of all structures in the city.

5) Severe Thunderstorms & Lightning…….$0 to $18,178,229

Severe lightning as a result of summer storms or as a residual effect from hurricanes and tornadoes has occurred in Dover. Due to the possibility of trees being toppled by lightning onto power lines and creating sparks and the fact that many of the buildings in Dover are considerably old, lightning is a significant disaster threat. Lightning could do damage to specific structures, injure or kill an individual but the direct damage would not be widespread.

Although lightning is a potential problem, the City reports few occurrences, none of which were severe. Based on this factor and the localized nature of lightning strikes, the potential loss value was determined to be 0-1% of the total assessed structure value.

6) Extreme Temperatures……..$0 to $18,178,229

In New England, temperature extremes are quite common. Winter temperatures can fall well below freezing and summer temperatures, laden with high humidity can soar to nearly 100°F. In the past, there was more concern about extreme cold temperatures, but with improved heating systems and local communications, most New Hampshire residents are able to cope with extreme cold. Extreme cold temperatures that can last for extended periods of time have had an adverse effect on mobile homes and some residential housing due to the age of the building and the inability to retain heat. Both City officials and the community as a whole should be concerned and should look after its citizens to ensure that extreme temperatures do not create a life or property threatening disaster.

7) Radon……..……Structure Loss Value Cannot Be Estimated

Radon, a naturally occurring radioactive gas with carcinogenic properties, is a common problem in many states. New Hampshire is one of them.

Data collected by the NH Office of Community and Public Health's Bureau of Radiological Health indicate that one third of the houses in New Hampshire have indoor radon levels that exceed the US Environmental Protection Agency's "action level" of four picocuries per liter for at least some portion of the year. Radon may also enter homes dissolved in drinking water from drilled wells. High levels of radon in water from individual drilled wells are a common occurrence in New Hampshire.

In New Hampshire, homes with high levels of airborne radon are most prevalent in southeast portion of the State. The only health effect that has been definitively linked with radon exposure is lung cancer. Lung cancer would usually occur years (5-25) after exposure.

8) Hurricane……..……..$0 to $18,178,229

Hurricanes are severe summer storms of tropical origin characterized by massive downpours of rain in combination with winds in excess of seventy-five miles per hour. Hurricane season begins in June and ends in October. Historically, a hurricane in 1938 caused significant damage in Dover and statewide. While Hurricanes can occur virtually any time between June and October the highest history has shown that the greatest risk for New England is during the month of September.

Possible damage may include felled trees, downed power lines, structural damage from wind or water, secondary damage from wind-driven debris, blocked roads, overflowing or clogged sewer lines and storm drains, flooding caused by high river water or storm runoff, train derailments from washouts, and traffic accidents. Loss of lives and personal injuries are limited because of the advanced warning capabilities. The potential loss value was determined to be 0-1% of the total assessed structure value.

9) Severe Wind Storms……...……$0 to $18,178,229

Isolated wind storms and down drafts have occurred in the pass within the City. These wind events are unpredictable; winds of this magnitude could fall timber, which in turn could block roadways, down power lines and impair emergency response.

The effect of isolated high winds would most likely be localized in nature; therefore, the potential loss value due to hazards of this type was determined to be between 0% and 1% of the total assessed structure value.

10) Public Health Threat…….…..Structure Loss Value Cannot Be Estimated

Dover's provides its citizens and tourists alike the opportunity for summer and winter recreation activities, which often brings visitors into the City. Because of the influx of residents from neighboring towns or even states, there is a threat of enabling infection and viruses to be transmitted from outside the city borders. Because of these factors, an epidemic or pandemic could present a possible threat to Dover. With the occurrence of worldwide pandemics such as SARS, H1N1 and Avian Flu, Dover could be susceptible to an epidemic and subsequent quarantine.

11) Hazardous Material Threat…….…..$0 to $18,178,229

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines. Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Small delivery vehicles, often traveling at fast speeds, and carrying materials to residents use Dover's highways (particularly Routes 4, 9, 16, 108, 125, 155); the contents of these vehicles are rarely known. Tractor-trailers hauling fuel, propane and other hazardous materials also travel through Dover on a constant basis.

The City of Dover has a major methane gas line that runs through it. This pipeline originates in Rochester NH at the Waste Management facility on Rochester Neck Road and ends on the campus of the University of New Hampshire and supplies product to the University to use for heat and hot water on the campus.

This line runs parallel to the Spaulding Turnpike within the State of NH right of way from the northern border approximately 5 miles before turning west to our city border with Madbury along the Pam Am rail line which carries both freight and passenger rail cars.. Any event including this line will lead to a major disruption of vehicle or rail traffic along with evacuations of residents who live along this gas line.

The potential loss value is estimated at 0% and 1% of the assessed value, based on the premise that a hazardous material vehicular accident could occur but it would be localized by nature.

12) Wildfire…….…..$0 to $18,178,229

Wildfire is defined as an uncontrolled and rapidly spreading fire. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Due to the windstorms in recent years, there is an abundance of limbs and branches on the forest floor. City forests are susceptible to wildfire during periods of drought. The cause of fire may include arson, lightning, and burning of debris. The damage may include burned trees, destroyed ecosystems, property damage, and loss of lives. Fire can break out anywhere in the city. If the fire is detected and put under control immediately after breakout, the damage may be minimized. The estimate above represents potential damage based on 0% to 1% of the total structure value.

13) Tornado (including Downbursts).…….……$ 0 to $18,178,229

Tornadoes are severe storms associated with severe thunderstorms and characterized by winds in excess of two hundred miles per hour and concentrated at a narrow vortex, often accompanied by violent lightening, peripheral high winds, severe hail, and severe rain. Tornados are not common in New Hampshire; however, given the high population density of the southeastern portion of the state the risks associated with a tornado are very high.

Possible damage may include felled trees, downed power lines, structural damage, blocked roads, secondary damage from wind driven debris, fires caused by lightning or downed power lines, and traffic accidents. Loss of life and mass casualties may happen.

Due to the rareness of tornadoes in New Hampshire, the likelihood of an event of this type is low. If a tornado or downburst were to occur, the affects would be localized; therefore the potential loss value was determined to be between 0% and 1%.

14) Erosion, Landslide, Mudslide……..…$0 to $18,178,229

Land subsidence, the loss of surface elevation due to removal of subsurface support, occurs in nearly every state in the United States. Subsidence is one of the most diverse forms of ground failure, ranging from small or local collapses to broad regional lowering of the earth's surface. The causes (mostly due to human activities) of subsidence are as diverse as the forms of failure, and include dewatering of peat or organic soils, dissolution in limestone aquifers, first-time wetting of moisture-deficient low-density soils (hydrocompaction), natural compaction, liquefaction, crystal deformation, subterranean mining, and withdrawal of fluids (ground water, petroleum, geothermal).

No major subsidence accidents were identifiable for the City of Dover. In fact, statewide subsidence risk data in the NH GRANIT GIS system shows no subsidence risk for Dover area.

The estimate above represents the potential damage to roads, culverts and stream banks and is based on 0% to 1% of the total structure value.

15) Earthquake……..…$0 to $18,178,229

The State of New Hampshire itself lies in an area of the Northeastern United States that has a "Moderate" risk from seismic activity. To date, more than 200 earthquakes have shaken New Hampshire during the twentieth century. The 1882 tremor in Concord shook the buildings in Dover and Pittsfield. On April 19, 2002, a 5.1 earthquake centered near Plattsburgh, NY affected New Hampshire. The tremor was felt in Dover, but did not cause any damage.

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, and avalanches. There have been just two earthquakes that registered a 5.50 or higher on the Richter scale in New Hampshire's history. They took place just four days apart from each other in December 1940, near Ossipee Lake. It is well documented that there are fault lines running throughout New Hampshire, but high magnitude earthquakes have not been frequent in New Hampshire history. Therefore, the potential loss value due to earthquakes was determined to be between 0% and 1% of the total assessed structure value.

16) Drought……...……$0 to $18,178,229

Droughts are characterized by prolonged periods of lack of rain. The ground water table and surface water may drop to very low levels. Droughts may last for months, years, or decades in extreme cases. Damage caused by drought may include dryness of vegetation and structure with an increase of fire hazard, crop loss, lack of adequate potable water, and soil erosion by wind. Firefighting may be hampered by a lack of water, and without adequate water flow, the city sewers may not function. If the river were to become dry, the Waste Water Treatment Plant may not be able to discharge treated wastewater. Impact on local agriculture could be severe.

The cost of drought is difficult to calculate, as any cost would primarily result from an associated fire risk and diminished water supply. Therefore, the potential loss value due to drought was determined to be between 0% and 1% of the total assessed structure value.

17) Terrorism…….....$0 to $18,178,229

Terrorism is a fear throughout our country and our world, and Dover is no different. There are six major transportation routes that pass through Dover (NH Routes 4, 9, 16, 108, 125, & 155) and the City's Downtown Business District is heavy with small businesses and the City has a relatively large commercial industry. A likely "target" that was discussed for a terrorist attack may be the Water Treatment Plant, as the effect on residents would be severe. However remote the possibility, terrorism is identified as a possible hazard for the City.

Dover Police Command Vehicle

Chapter VI: Multi-Hazard Goals and Existing Mitigation Strategies

A. Multi-Hazard Mitigation Goals

Before identifying new mitigation actions to be implemented, the Team established and adopted the following multi-hazard goals. These goals were based on the State of New Hampshire Natural Hazards Mitigation Plan that was prepared and is maintained by HSEM.

1. *Improve upon the protection of the general population, the citizens of the City and guests, from all natural hazards.*

2. *Reduce the potential impact of natural disasters on the City's Critical Support Services and infrastructure.*

3. *Reduce the potential impact of natural disasters on Critical Facilities in the city.*

4. *Improve Emergency Preparedness.*

5. *Improve the City's Disaster Response and Recovery Capability.*

6. *Reduce the potential impact of natural disasters on the City's economy.*

7. *Reduce the potential impact of natural disasters on the natural environment.*

8. *Reduce the potential impact of natural disasters on specific historic treasures and interests, as well as other tangible and intangible characteristics that add to the quality of life of the citizens and guests.*

9. *Identify, introduce, and implement cost effective hazard mitigation measures and to raise the awareness of, and acceptance of hazard mitigation generally.*

10. *Work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals*

B. Types of Mitigation Strategies Developed

The Hazard Mitigation Committee reviewed the goals established in the first meeting and derived actions that will serve as a guide in developing future projects. Following is described the general procedure by which these actions were identified and prioritized.

Initial List of Actions

The Hazard Mitigation Committee established an initial list of mitigation actions through holding a brainstorming session. As a springboard the Committee reviewed the expansive list of categorized actions included in the hazard mitigation plan for the Town of Gorham, NH (Chapter 6, pp. 27-32), one of two example plans available to the Committee as a resource. That list contains approximately 120 items grouped according to eight objectives, and the Committee agreed that those eight categories were well considered and comprehensive and that they should use them as a framework for brainstorming. The Committee first eliminated all Gorham-specific projects. Then, the Committee eliminated those that would not be applicable to the City of Dover. The next step was to review the remaining actions from the Gorham list and to eliminate those that seemed infeasible due to expected high cost or to logistical difficulties.

Actual costs of the potential actions were not estimated for this process. The Committee felt that funding and expertise for performing Benefit-Cost Analysis and also deadlines for federal funding applications precluded a more detailed analysis at the time. In terms of the cost, therefore, the Committee members effectively used their experience and expertise to judge whether an action was "likely too costly" or "possibly doable," expecting that much of the funding for eventually chosen actions would come from the City budget.

Finally, the Committee added to the list their own ideas resulting from brainstorming actions within the eight categories from the Gorham plan.

- Programs/Policies
- Training
- Public Education
- GIS Projects
- Amendments To Emergency Action Plan
- Engineering Studies
- Structural Projects
- Equipment Purchase

In this final step the Committee eliminated one of these objectives: GIS Projects. This objective was eliminated, because the Committee felt that existing in-house GIS capabilities were sufficient and that those few GIS-based actions brainstormed had already been identified and sufficiently addressed through other City planning mechanisms, such as the CIP process. Following is the resulting list of actions that were the raw material for the final feasibility and prioritization evaluation.

Programs and Policies

1. Ensure that the owners of the underground high-pressure gas lines maintain sniffer monitoring.
2. Maintain public safety mutual aid agreement with Mutual Aid Compact members.
3. Update land use regulations to reduce erosion and runoff according to EPA Phase II Stormwater Regulations.
4. Review and update current regulations regarding flood.
5. Update and enforce existing safety codes in public buildings – fire extinguishers, appropriate exit signs, MSDS labels in place, etc.
6. Establish a list of maintenance duties conducted by Community Services, Fire, Police, Water and Sewer, schools, Department of Transportation, etc.
7. City Executive Department should be required to review the Hazard Mitigation Plan in preparation of Capital Improvements Plan.
8. City Executive Department should brief the incoming city council members on the Hazard Mitigation Plan in conjunction with CIP.
9. The City department heads should review the Hazard Mitigation Plan and consider their needs in their annual department budget.
10. Identify a central place with a/c in the City for elderly people to go in extreme hot weather.
11. Work with private companies or hospitals to provide cool places for heat relief.

Training

1. Continue education and training in response to chemical emergencies for Fire Department, Emergency Medical Services, Police Department and Community Services Department.
2. Maintain training for natural gas fires.
3. Establish riverine rescue; maintain ice rescue training for the Mutual Aid Team.
4. Maintain the training for Fire Department in collapsed building rescue.
5. Maintain the training for Fire and Police departments in emergency response (fires, wild land fires, hazardous materials, rescues, flood, terrorism, etc.)
6. Train all city employees for emergency response procedures.
7. Small boat operation and safety training for Community Services.
8. Require that department heads review training plans annually to address issues related to Hazard Mitigation.

Public Education

1. Promote and publish locations for elderly people to go in extreme hot weather.
2. Education for the elderly, daycares to be prepared for, and what to do during natural disaster.

Amendments to the Emergency Action Plan

1. The City EAP was reviewed and updated in May 2001
2. Update existing sewer lines, manholes, and fire hydrants, storm drainage systems.
3. Update and maintain information on bridges, highways, streets, and sidewalks.
4. Map possible river and lake access points for small rescue craft.

Engineering Studies

1. Continue annual drainage system analysis on a section-by-section basis.
2. Continue with sewer overflow prevention to ensure inflow and infiltration is eliminated from sewer system.
3. Do need assessment for rescue small craft.
4. Perform earthquake risk analysis on schools and all city buildings.

Structural Projects

1. Fix drainage characteristics of Broadway Street and Central Avenue Oak Street and Pierce Street.
2. Recommend to State to fix drainage characteristics of Knox Marsh Road, where stream runs under the road in the vicinity of the New Meadows Apartment and Eastern Aero Devices.
3. Fix drainage characteristics in the area of Locust Street - Central Avenue intersection.

Equipment Purchase

1. Multipurpose vehicle for mobile command/communication center
2. 6" portable pump
3. Shoulder-building machine with attachment for filling sand bags ("roadside shoulder machine")

FEASIBILITY AND PRIORITIZATION

The Hazard Mitigation Committee next met to consider each of the actions in the previously proposed list for its status according to the following criteria: potential for filling a gap in existing mitigation measures, relative cost, feasibility given current resources and expertise, and timeliness of need considering the risk level. By this evaluation two additional actions, both from the Programs and Policies objective, were removed from the list. The Committee removed (4), concluding that current flood-related regulations were sufficient, and (6), finding that a list of maintenance duties was already being compiled.

The last step, prioritization of actions, was accomplished by having each Committee member rank actions within each objective according to relative cost, immediacy of need, and potential mitigation gain. Member rankings were then averaged, and ranks were assigned accordingly. Again, actual dollar amounts were not estimated for costs and

benefits. Data and expertise for such an analysis were not readily available at the time of preparation of this plan.

The final, prioritized list of mitigation actions is presented in Table 6.1 along with indications of who is responsible for the performance of the particular action, what the funding source may be, and when the action may take place. The projects should be incorporated into the City Master Plan or Capital Improvement Plan, when appropriate.

C. Mitigation Strategies Currently Underway in Dover

Description of Existing Programs

Emergency Action Plan

The purpose of this Plan is to make each organization and department aware of its responsibility in all hazard emergency operations. This Plan, upon being implemented by the city government, will provide the basis for coordinating protective actions prior to, during and after any type of disaster. The Plan has functional annexes to cover the following topics: direction and control, communications, public warning, radiological emergencies, law enforcement, fire suppression, rescue, evacuation, resources management, health and medical care, shelter and feeding, emergency public information, recovery and mitigation. The Plan covers the entire city.

2012 UPDATE: The City has since adopted the current Emergency Operations Plan on October 14, 2009.

Dover Host Plan

The Plan is part of the New Hampshire Radiological Emergency Response Plan (NHRERP) and contains the planning information and procedures specific to the City of Dover.

Information that is common to all Emergency Planning Zones (EPZs) and host communities can be found in Volume 20, "Seabrook Station Local Radiological Emergency Response Plan". Together these volumes provide Dover with the capability for a rapid and coordinated response to the host evacuees due to an emergency at Seabrook Station (SS). The plan covers the entire city. The plan is under a two-year revision cycle and is currently in the evaluation phase of Revision Number 12.

2012 UPDATE: The City has since adopted Revision Number 14.

Storm Drain Maintenance

Dover Department of Public Works (Community Services) is responsible for catch basins, culverts cleaning, ditch maintenance, structure upkeep and maintenance for the entire city in compliance with Phase II Storm Water Regulations.

State Dam Program

The Department of Environmental Services has a superior Dam Maintenance and Safety Inspection program.

Tree Maintenance Program
PSNH and NHDOT have tree maintenance programs to clear trees and tree limbs from power line and roadways.

Emergency Backup Power
The Northside Fire Station acts as the primary Emergency Operations Center (EOC) with the Police/City Hall as the backup EOC with an emergency generator. The Middle School and Public Works Building also have emergency generators. The total capacity of the emergency shelters is 10,600. The service area covers the entire City. The City will provide emergency generators for all buildings to be used as emergency shelter in the future. There is a limited use for residents.

Hazardous Materials Response Team
The City of Dover is a member of the START Hazardous Materials Emergency Response Team, a regional effort to combine resources to mitigate hazardous materials incidents. The cooperative effort serves to properly train and equip the members of the team to handle hazardous material incidents in the City of Dover in accordance with OSHA and EPA guidelines. The team covers the entire city. On-going training, education and acquisition of resources are important for the team.

Shore Land Protection Act
City Zoning Chapter 170-27, conservation district includes a 100' setback from tidal (waters, rivers and ponds) and 50' from streams and brooks. Chapter 170-28.1, riverfront residential overlay district applies to single-family residential district within 250' of any tidal water body. It requires lot sizes three times the minimum lot size required by Article 170-16 and sets a minimum shoreland frontage requirement. The act applies to all water bodies in the city. The zoning ordinance is enforced by the zoning administrator and has been effective in controlling development along the rivers.

Wellhead Protection Program
City Zoning Chapter 170-28.3. The groundwater protection district includes wellhead protection areas around existing and potential municipal wells and the aquifers associated with them. Uses and lot coverage are regulated. See the groundwater protection zone map for the area covered in the city. The zoning administrator enforces the zoning ordinance. The ordinance was updated in 1999 to add another wellhead. The Planning Dept. and Conservation Commission have been working on amendments to the ordinance.

Best Management Practices
The City requires erosion control for subdivisions and site plans, and requires developers to post a letter of credit for any earth disturbing activity. The Engineering office inspects constructions. The Master Plan recommends adoption of a Model Stormwater Management and Erosion Control Regulation and state standards in Env-WS 421, which are rules for BMPs to address facilities that may generate hazardous products.

Disaster Plan

The Plan is designed to provide a fundamental document to outline the fire department's response to emergency situations. The Plan is intended to provide a single basic emergency operational plan that may be expanded to meet any natural or man-made disaster. The Plan covers the entire city, and is in need of review and revision.

2012 UPDATE: This Plan was revised and adopted in 2009.

Emergency Planning For Portable Water Supplies

The purpose of the Plan is to assess the vulnerability of the municipal water system in regards to extreme conditions or events. Additional goals of the Plan include the establishment of a system of priorities and allocations for the emergency production, distribution and use of water in the City, as well as to identify alternative sources of commercial water supplies. The Plan covers the entire city, and was last revised in February 2001.

2012 UPDATE: This Plan was revised and adopted in 2008.

Existing Protection Matrix

The Dover All Hazard Mitigation Planning Committee has developed the summary matrix of existing hazard mitigation strategies presented on the following pages. This matrix, a summary of the preceding information, includes the type of existing protection (Column 1), a description of the existing protection (Column 2), the area of town affected (Column 3), the effectiveness and or enforcement of the strategy (Column 4), the identified improvements or changes needed (Column 5), and the 2010 Update (Column 6)

Table 6.1: Existing Mitigation Strategies Matrix and Proposed Improvements

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
Floodplain Management Ordinance	Adopted FEMA regulations within the zoning ordinance.	Flooding	Prevention	City-wide	Building Inspector	The City will continue to monitor this ordinance and make any necessary changes as needed.
Building Code and Permit	Requires builder to obtain all permits prior to action.	Multi-Hazard	Prevention	City-wide	Building Inspector	City now using the 2009 International Building/Industrial Code.
Elevation Certificates Maintained	Individual required on case by case from bank.	Flooding	Prevention	City-wide	Planning	The City has maintained these records and will continue to do so regularly.
Emergency Action Plan	The purpose of this Plan is to make each organization and department aware of its responsibility in all hazard emergency operations. The Plan covers the entire city. It is currently under revision and is scheduled for completion by October 1, 2002.	Multi-Hazard	Emergency Preparedness	City-wide	EMD	Completed. Adopted 2009 revisions.
Storm Drain Maintenance	Dover Department of Public Works (Community Services) is responsible for catch basins, culverts cleaning, ditch maintenance, structure upkeep and maintenance for the entire city in compliance with Phase II Storm Water Regulations	Flooding	City Planning	City-wide	Community Service Director	Upcoming MP4/5 Permit will be adopted.

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
Road Design Standard	Above State minimum regulations.	Multi-Hazard	Prevention	City-wide	City Engineer	Meet NHDOT standards. Will continue to monitor standards and make any updates as needed.
Class B & C Dam EAP	Emergency Action Plan for all Dams classified B & C.	Multi-Hazard	Prevention	City-wide	State Department & EMD	Completed. Will continue to work with the State in making sure all Dam assessments and reporting is done on a consistent basis.
Evacuation and Notification	Evacuation and notification procedures are defined in Dover's EAP.	Multi-Hazard	Emergency Preparedness	City-wide	EMD	Completed as needed. Local media, press releases, door-to-door. Website, cable access channels also post alerts.
Emergency Backup Power	The Northside Fire Station acts as the primary Emergency Operations Center (EOC) with the Police/City Hall as the backup EOC with an emergency generator. The Middle School and Public Works Building also have emergency generators. The total capacity of the emergency shelters is 10,600. The service area covers the entire City. The City will provide emergency generators for all buildings to be used as emergency shelter in the future. There is a limited use for residents.	Multi-Hazard	Emergency Preparedness	Throughout the entire City	EMD	All three fire stations have emergency generators. The Woodman Park School has partial power. The intersections are also wired for backup power. Generators are located on Broadway, Central and Washington Street.

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
Flood Mitigation Assistance Program	FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.	Flooding	Prevention	City-wide	EMD	The City has begun contacting FEMA with potential mitigation projects to help with the reduction of flood risk and maintaining floodwater management. Discussions will continue to move forward after the completion of this update.
Hazardous Materials Response Team	The City of Dover is a member of the START Hazardous Materials Emergency Response Team, a regional effort to combine resources to mitigate hazardous materials incidents. On-going training, education and acquisition of resources are important for the team.	Hazardous Materials	Emergency Preparedness	City-wide	Fire Chief	The City has local capabilities and also members of START (Regional HazMat Team).
Shoreland Protection Act	The Act establishes minimum standards for the subdivision, use, and development of the shorelands of the state's larger water bodies.	Multi-Hazard	Prevention	City-wide	Planning	This Act was amended and adopted. It will be continually be monitored for revisions as needed.

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
Wellhead Protection Program	The groundwater protection district includes wellhead protection areas around existing and potential municipal wells and the aquifers associated with them. The ordinance was updated in 1999 to add another wellhead. The Planning Dept. and Conservation Commission have been working on amendments.	Multi-Hazard	City Planning	City-wide	Planning	Amended and adopted. This program will continue to be monitored by town officials and updates and revisions will take place when necessary.
Best Management Practices (BMP)	The City requires erosion control for subdivisions and site plans, and requires developers to post a letter of credit for any earth disturbing activity. The Master Plan recommends adoption of a Model Stormwater Management and Erosion Control Regulation and state standards in Env-WS 421, which are rules for BMPs to address facilities that may generate hazardous products.	Multi-Hazard	City Planning	City-wide	Planning	These practices remain in place and are monitored by town officials. They will continue to be revised and updated as necessary.

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
State Dam Program	The Department of Environmental Services has a superior Dam Maintenance and Safety Inspection program.	Multi-Hazard	Prevention	A (Town dams), B, and C	EMD	Completed. Will continue to work with the State Dam Program when needed.
Dover Host Plan	The Plan is part of the New Hampshire Radiological Emergency Response Plan (NHRERP) and contains the planning information and procedures specific to the City of Dover. The plan is under a two-year revision cycle and is currently in the evaluation phase of Revision Number 12.	Multi-Hazard	Emergency Preparedness	City-wide	EMD	Completed. Currently, the City has adopted Revision Number 14.
Emergency Planning for Portable Water Supplies	The purpose of the Plan is to assess the vulnerability of the municipal water system in regards to extreme conditions or events. The Plan covers the entire city, and was last revised in February 2001.	Multi-Hazard	City Planning	City-wide	Community Service Director	Completed. This plan was revised in 2008.

Existing Program/Activity	Description	Type of Hazard	Type of Activity	Area of City Covered	Effectiveness/ Enforcement	2012 update
Disaster Plan	The Plan is designed to provide a fundamental document to outline the fire department's response to emergency situations. The Plan covers the entire city, and is in need of review and revisions.	Multi-Hazard	Emergency Preparedness	Town-wide	EMD	Completed. This plan was revised in 2009.

Chapter VII: Prior Mitigation Plan(s)

A. Date(s) of Prior Plan(s)

Dover participated in a prior mitigation plan that was developed by the Dover Hazard Mitigation Planning Committee and adopted by the City Council in 2005. This Plan, the "Multi-Hazard Mitigation Plan, Dover, NH" is the updated version.

All Committee members agreed that the ranking of the actions as presented below was valid as far as it went; however, they felt that this scoring scheme does not well consider the practicality, relative cost, immediacy of need, or potential mitigation gain associated with each of the actions.

Table 7.1: Accomplishments since Prior Plan(s) Approval

Project	Responsibility/ Oversight	Funding/Support	Timeframe	2012 Update
Programs/Policies				
Update land use regulations to reduce erosion and runoff according to EPA Phase II Storm water Regulations.	Dover Planning Department	City Operating Budget	Within 9 months (by May 2004)	Completed in 2009.
Update and enforce existing safety codes in public buildings – fire extinguishers, appropriate exit signs, MSDS labels in place, etc.	Fire Department & Planning Department	City Operating Budget	By November 2004	Revisions of codes in 2009.
City Executive Department should be required to review the Hazard Mitigation Plan in preparation of Capital Improvements Plan.	Emergency Management Director	City Operating Budget	Annually (August)	Completed on an annual basis. Will continue to do so.
The City department heads should review the Hazard Mitigation Plan and consider the needs in their annual department budget.	Emergency Management Director	City Operating Budget	Annually	Completed on an annual basis. Will continue to do so.
City Executive Department should brief the incoming city council members on the Hazard Mitigation Plan in conjunction with the Capital Improvements Plan.	Emergency Management Director	City Operating Budget	Annually (January)	Completed on an annual basis. Will continue to do so.
Ensure the owners of the underground high-pressure gas lines maintain sniffer monitoring.	Community Services Superintendent of Highway & Utility	City Operating Budget	Annually	Completed on an annual basis. Will continue to do so.

Project	Responsibility/ Oversight	Funding/Support	Timeframe	2012 Update
Maintain public safety mutual aid agreement with Mutual Aid Compact members.	Fire Department, Police Department, Community Service	City Operating Budget	Annually	Completed on an annual basis. Will continue to do so.
Identify a central place with a/c in the city for elderly people to go in extreme hot weather.	Fire Department	OEM funding	2004	Not Completed. Will continue to look for options.
Work with private companies or hospitals to provide cool places for heat relief.	Fire Department	OEM funding	October 2004	Not Completed. Will continue to look for options.
Training				
Require that department heads review training plans annually to address issues related to Hazard Mitigation.	Department Heads	City Operating Budget	Annually	Completed. Will continue to pursue this option on an annual basis.
Maintain the training for Fire and Police departments in emergency response (fires, wild land fires, hazardous materials, rescues, flood, terrorism, etc.)	Department Heads	City Operating Budget/FEMA/OEM	Annually	Completed. Will continue to pursue this option on an annual basis.
Small boat operation and safety training for Fire Department.	Fire Department	City Operating Budget	Annually	Completed for both Fire and Police.
Train all city employees for emergency response.	Department Heads	City Operating Budget/OEM	Annually	Completed on an annual basis. Will continue to do so.
Continue education and training in response to chemical emergencies for Fire Department, Emergency Medical Services, Police Department and Public Works Department.	Fire Department, Police Department, Community Services	City Operating Budget	Annually	Completed on an annual basis. Will continue to do so.
Maintain training for natural gas fires.	Fire Department	City Operating Budget/NH Department of Safety Fire Academy	Annually	Completed on an annual basis. Will continue to do so.
Establish riverine rescue; maintain ice rescue training for the Mutual Aid Team.	Fire Department	City Operating Budget	Annually	Completed annually. Mutual Aid no longer has dive team [Fish & Game].
Maintain the training for Fire Department in collapsed building rescue.	Fire Department	City Operating Budget / NH Department of Safety Fire Academy	Annually	Completed on an annual basis. Will continue to do so.

Project	Responsibility/ Oversight	Funding/Support	Timeframe	2012 Update
Public Education				
Promote and publish locations for elderly people to go in extreme hot weather.	Emergency Management Director	City Operating Budget	Annually (by Fall 2004)	This effort will continue as funding and time allow.
Education for the elderly, daycares to be prepared for, and what to do during natural disaster.	Emergency Management Director	City Operating Budget	Annually	This effort will continue as funding and time allow.
Suggested Additions to the City Emergency Action Plan:				
Update existing sewer lines, manholes, and fire hydrants, storm drainage systems.	Community Services	City Operating Budget	Annually	GIS locations with EMPG funds.
Update and maintain information on bridges, highways, streets, and sidewalks.	Community Services	City Operating Budget	Annually	Complete. Bridges are maintained by the State. Street maintenance and road paving is done annually.
Map possible river and pond access points for small rescue craft.	Fire Dept.	City Operating Budget	Annually	Completed.
Engineering Studies:				
Continue with sewer overflow prevention to ensure inflow and infiltration is eliminated from sewer system.	Community Services	Capital Improvements Plan $150,000	Over 3 years	This project continues. Capital Improvements Plan [CIP] funds.
Continue annual drainage system analysis on a section-by-section basis.	Community Services	Capital Improvements Plan $250,000	For 5 years	This project continues. Storm water system follows new storm water regulations.
Do needs assessment for small rescue craft.	Police Department, Fire Department	City Operating Budget/NH Department of Transportation	Within 1 year	Completed. Purchased rescue boat though government surplus.
Perform earthquake risk analysis on schools and all city buildings.	Community Services	Capital Improvements Plan	Within 10 years	Not completed. Lack of funding.
Structural Projects:				
Fix drainage characteristics of Broadway and Central Avenue, Oak Street and Pierce Street	Community Services	CAPITAL IMPROVEMENTS PLAN $ 4 - 8 million	20 years	Not completed. Discussions have continued to take place. Would use CIP funds.
Fix drainage characteristics of Locust Street and Central Avenue.	Community Services	$250,000	6 years	Not completed. CIP funding.

Project	Responsibility/ Oversight	Funding/Support	Timeframe	2012 Update
Recommend to State to fix drainage characteristics of Knox Marsh Road.	Community Services	City Operating Budget	A few years	Not completed. Lack of funding. Will continue to pursue this project.
Equipment Purchase:				
Shoulder-building machine with attachment for filling sand bags ("roadside shoulder machine").	Community Services	Capital Improvements Plan	6 years	Not completed. Lack of funding. Will continue to pursue this purchase of equipment.
6" portable pump	Community Services	Capital Improvements Plan	6 years	Not completed. A 4" pump was installed.
Multi-purpose vehicle for mobile Command/ communication center.	Police Department	City Operating Budget	2 years	Completed.

Chapter VIII: New Mitigation Strategies & STAPLEE

A. Feasibility and Prioritization

Table 8.1 reflects the newly identified potential multi-hazard mitigation strategies as well as the results of the STAPLEE Evaluation as explained below. It should also be noted that although some areas are identified as "Multi-Hazard", many of these potential mitigation strategies overlap.

The goal of each proposed mitigation strategy is reduction or prevention of damage from a multi-hazard event. To determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy that was developed by the FEMA. The STAPLEE method analyzes the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic and **E**nvironmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies discussed in Table 8.1.

Social: ……... Is the proposed strategy socially acceptable to the community? Is there an equity issue involved that would result in one segment of the community being treated unfairly?

Technical: …… Will the proposed strategy work? Will it create more problems than it solves?

Administrative: …… Can the community implement the strategy? Is there someone to coordinate and lead the effort?

Political: ……... Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?

Legal: ……... Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?

Economic: …… What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?

Environmental: …... How will the strategy impact the environment? Will it need environmental regulatory approvals?

Each proposed mitigation strategy was then evaluated and assigned a score based on the above criteria. Each of the STAPLEE categories were discussed and were awarded the following scores: Good = 3; Average = 2; Poor = 1. An evaluation chart with total scores for each new strategy is shown in Table 8.1.

The ranking of strategies with the scores displayed in the following pages was merely a guideline for further prioritizing. The team then prioritized the strategies and prepared the action plan using additional criteria:

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

The prioritization exercise helped the committee seriously evaluate the new hazard mitigation strategies that they had brainstormed throughout the multi-hazard mitigation planning process. While all actions would help improve the City's multi-hazard and responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation strategies are implemented.

B. The Team's Understanding of Multi-Hazard Mitigation Strategies

The Team determined that any strategy designed to reduce personal injury or damage to property that could be done prior to an actual disaster would be listed as a potential mitigation strategy. This decision was made even though not all projects listed in Tables 8.1 and 9.1 (Implementation Plan) are fundable under FEMA pre-mitigation guidelines. The Team determined that this Plan was in large part a management document designed to assist the City Council and other city officials in all aspects of managing and tracking potential emergency planning strategies. For instance, the team was aware that some of these strategies are more properly identified as readiness issues. The Team did not want to "lose" any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

Table 8.1: Potential Mitigation Strategies & STAPLEE

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (1) Police Dispatch Radio Replacement – A new radio system and console are needed to replace the existing Motorola Gold Elite System, which is 11 years old. Motorola is no longer manufacturing replacement parts and will only be available for the next few years. The system is essential to communicate to Police, Fire, EMS, and Community Services.	Multi-Hazard	Police Department	Emergency Preparedness	3	3	3	3	3	3	3	21
* (2) Police Facility Design and Construction – Design, engineering and construction of a plan to construct a new police facility. This new facility would act as a backup EOC.	Multi-Hazard	Police Department	Emergency Preparedness	3	3	3	3	3	3	3	21
* (3) South End Station generator Replacement – Essential replacement of 1991 Station generator. The life expectancy is 20 years.	Multi-Hazard	South End Fire Station	Emergency Preparedness	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (4) Bridge Replacement at Whittier Street – Bridge has been placed on state aid Bride Replacement Program for 2012. The bridge deck has been repaired with temporary fix.	Flooding; Multi-Hazard	Whittier Street	Construction	3	3	3	3	3	3	3	21
* (5) Street Reconstruction at Piscataqua and Rabbit Road – Design and reconstruction of Piscataqua and Rabbit Road.	Flooding; Multi-Hazard	Piscataqua & Rabbit Road	Construction	3	3	3	3	3	3	3	21
* (6) Street Reconstruction at Silver Street – This project would design the replacement of drainage, sidewalks, and roadway on Silver Street.	Flooding; Multi-Hazard	Silver Street	Construction	3	3	3	3	3	3	3	21
* (7) Street Reconstruction at Broadway – Design and proposed reconstruction including drainage curb, sidewalk, and road construction.	Flooding; Multi-Hazard	Broadway	Construction	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (8) EMS Computer/Software Upgrade – Upgrade of computer and current telephone modem dependent system to IP/cable network with upgraded software for managing heating and cooling systems in several municipal buildings; McConnell Center, Library, City Hall, Indoor Pool, Arena, and Public Works.	Multi-Hazard	Several Municipal Buildings	Upgrade Equipment	3	3	3	3	3	3	3	21
* (9) Pump Station Equipment Replacement and Maintenance – Equipment upgrades and replacements for several sewer-pumping stations, including backup power to at least 3 or 4 of the stations.	Multi-Hazard	Pump Station	Upgrade Equipment	3	3	3	3	3	3	3	21
* (10) Purchase up to 5 generators for the Water Treatment Plant.	Multi-Hazard	Water Treatment Plant	Purchase Equipment	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (11) 2-Way radio system upgrade. A new radio system would allow better communication with CS staff and other departments.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (12) 3” & 4” Pump and Hoses. Community Services staff uses these pumps to pump from flooded areas to non-flooded areas during emergency events.	Flooding	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (13) Atlantic Avenue Reconstruction. This road is a main artery in and out of the city. Reconstruction is to replace the major drainage component of the road.	Flooding	Atlantic Avenue	Construction	3	3	3	3	3	3	3	21
* (14) Chainsaws. Are used during emergency situations such as trees down caused by ice and windstorms.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (15) Clam bucket for loader. Used during emergency situations such as trees down caused by ice and windstorms.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (16) County Farm Road Bridge Replacement. Would provide additional access in and out of the North End area of the City.	Multi-Hazard	County Farm Road	Construction	3	3	3	3	3	3	3	21
* (17) Message Boards. Used for evacuation plans, flooded areas, street closures and other emergency events.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (18) New Bucket Truck. The current truck is 20 yrs. old and a replacement is needed for traffic lights and tree removal during emergency events.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (19) New Wood Chipper. To provide additional resources to assist in clean up after an emergency event.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (20) Oak Street Railroad Bridge Replacement. Current bridge is only a 10-ton limit and is a major access thruway for both Dover and Rollinsford.	Multi-Hazard	Oak Street Railroad Bridge	Construction	3	3	3	3	3	3	3	21
* (21) Oak/Ham/Ela Area Reconstruction. This area sees major flooding during rain events. Incorporates drainage and road construction. Also a main artery in and out of the City.	Flooding	Oak/Ham/Ela Area	Construction	3	3	3	3	3	3	3	21
* (22) Old Colony Drainage. Two or three home have major flooding during heavy rain events and winter melting. New drainage would resolve this problem.	Flooding	Old Colony	Construction	3	3	3	3	3	3	3	21
* (23) Piscataqua Road Reconstruction. Major access for the Southern end of the City. Need of new drainage, culverts, and road reconstruction.	Flooding	Piscataqua Road	Construction	3	3	3	3	3	3	3	21
* (24) Outer Sixth Street Replace Bridge & Culvert. Major overflows during heavy rain events. Replace bridge and raise the road. Provide additional access in and out of the North End area of the City.	Flooding	Outer Sixth Street	Construction	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (25) Portable 4" Pump to be used at sewer pump stations to pump from the wet well to a gravity main during power outages.	Power Outages	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (26) Portable Generator to replace the current 20 yr. old portable generator. Will be used for both water wells and sewer pump stations.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (27) Portable Light will be used during emergency events such as flooded areas, water breaks and loss of power.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (28) Raise County Farm Road. Maintain access to the Strafford County Complex, which includes the rest home, court, hospice care and jail.	Flooding	County Farm Road	Construction	3	3	3	3	3	3	3	21
* (29) Red's Railroad Box Culvert Replacement. Existing culvert has partially collapsed and is in need of replacement. This culvert drains the urban area between Broadway and Central Avenue to Oak Street, over 100 acres.	Flooding	Red's Railroad Box Culvert	Construction	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (30) River Gauges. Would be installed on the bridges crossing the major rivers to assist emergency personnel during flooding events.	Flooding	Major Rivers	Purchase Equipment & Construction	3	3	3	3	3	3	3	21
* (31) Sewer Jet. Equipment would replace the current 8-year-old unit.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (32) St. Thomas Street Drainage. Flooding occurs in this area due to the age of the infrastructure. Needs new design/reconstruction.	Flooding	St. Thomas Street	Construction	3	3	3	3	3	3	3	21
* (33) Stand-by Power for Pump Stations. Currently there are three pump stations that do not have standby power: Spruce Drive, Strafford Road, and Cranbrook Lane. Need to upgrade standby power at Varney Brook, Wentworth Terrace, Crosby Road, Boston Harbor and County Farm Road.	Multi-Hazard	Pump Stations	Purchase Equipment	3	3	3	3	3	3	3	21
* (34) Stand-by Power for Radio Towers. The City currently has two radio towers for the SCADA system. This equipment would be used to maintain power during outages.	Multi-Hazard	Radio Towers	Purchase Equipment	3	3	3	3	3	3	3	21

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
* (35) Tire Excavator. Would be used for cleaning drainage ditch lines throughout the City.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
* (36) Tree Program. Using the City GPS and GIS program to identify all City trees. Also determine the health and potential hazards.	Multi-Hazard	City-wide	Purchase Equipment	3	3	3	3	3	3	3	21
(37) Purchase generators to power traffic lights at five critical intersections: Weeks Crossing, Central & Broadway, Central & Washington, NH9, and NH155. There is also consideration for: Glenwood & Central, Sixth and Whittier.	Multi-Hazard	Critical Intersections	Purchase Equipment	3	3	3	3	3	2 Budget Constraints	3	20
(38) Conduct a needs assessment for stormwater infrastructure.	Flooding	City-wide	City Planning; Prevention	3	3	3	3	3	2 Budget Constraints	2 Possible environmental effects	19
(39) Develop and complete a Cocheco Headwall project with drainage improvements and shoreland restabilization.	Flooding	Cocheco River Headwall	Construction; Prevention	3	3	3	3	3	2 Budget Constraints	2 Multiple required permits	19

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	E	E	Total
(40) Work off of the completed interconnection study to link municipality's water utilities together to provide emergency aid to each other and create a regional water system. **See Appendix E for Executive Summary of Seacoast NH Emergency Water System Interconnection Study.**	Multi-Hazard	City-wide	Emergency Preparedness	3	3	3	1 Problems with a regional water system	2 Who pays?	1 Budget Constraints	3	16
(41) Develop a Fact Sheet on safety measures that residents can take to lessen the effect of hazards.	Multi-Hazard	City-wide	Education & Awareness	3	3	3	3	3	3	3	21

* These mitigation strategies were developed from referencing Dover's 2012 – 2017 and 2013 – 2018 Capital Improvements Programs

Chapter IX: Implementation Schedule for Prioritized Strategies

After reviewing the finalized STAPLEE numerical ratings, the Team prepared to develop the Implementation Plan (Table 9.1). To do this, team members created four categories into which they would place all the potential mitigation strategies.

- **Category 0** was to include those items, which were "ongoing", that is those that are being done and will continue to be done in the future.

- **Category 1** was to include those items under the direct control of city officials, within the financial capability of the City using only city funding, those already being done or planned, and those that could generally be completed within one year.

- **Category 2** was to include those items that the City did not have sole authority to act upon, those for which funding might be beyond the City's capability, and those that would generally take between 13—24 months.

- **Category 3** was to include those items that would take a major funding effort, those that the City had little control over the final decision, and those that would take in excess of 24 months to complete.

Each potential mitigation strategy was placed in one of the three categories and then those strategies were prioritized within each category.

Once this was completed, the Team developed an implementation plan that outlined who is responsible for implementing each strategy, as well as when and how the actions will be implemented. The following questions were asked in order to develop an implementation schedule for the identified priority mitigation strategies.

WHO? Who will lead the implementation efforts? Who will put together funding requests and applications?

WHEN? When will these actions be implemented, and in what order?

HOW? How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

In addition to the prioritized mitigation projects, Table 9.1, Implementation Plan, includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

Some projects, including most training and education of residents on emergency and evacuation procedures, could be tied into the emergency operation plan and implemented through that planning effort.

Table 9.1: Implementation Plan

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
0 - 1	Develop a Fact Sheet on safety measures that residents can take to lessen the effect of hazards.	EMD	Local & Grants	The estimated cost for this project is $3,000. While the cost remains medium, it would be highly beneficial for current and future residents.	Currently underway - 2012	21
0 - 2	Pump Station Equipment Replacement and Maintenance – Equipment upgrades and replacements for several sewer-pumping stations, including backup power to at least 3 or 4 of the stations.	Community Services	Operating Budget	These stations must continue to be in top operating condition in order to prevent violations. The cost will be $75,000 each year starting in FY2013, for a total of $450,000.	Currently underway - 2012	21
0 - 3	Bridge Replacement at Whittier Street – Bridge has been placed on state aid Bride Replacement Program for 2012.	Community Services	Reserve Funding & Grant Funding	The bridge deck has been repaired with temporary fix. The cost to complete this project is $4,000,000.	Currently underway - 2012	21
0 - 4	Purchase up to 5 generators for the Water Treatment Plant.	Community Services	Operating Budget & Grant Funding	The cost of this project is referenced in the Water Facilities Plan (June 2011) and would cost $100,000 apiece.	Currently underway - 2017	21
1 - 1	Red's Railroad Box Culvert Replacement. Existing culvert has partially collapsed and is in need of replacement. This culvert drains the urban area between Broadway and Central Avenue to Oak Street, over 100 acres.	Community Services	CIP & Grant Funding	The cost of this project was pulled from an older street and drainage CIP and would cost $1,000,000.	FY2012	21
1 - 2	Tire Excavator. Would be used for cleaning drainage ditch lines throughout the City.	Community Services	CIP & Grant Funding	Replacement of 1989 rubber tired excavator. Cost will be $1,200,000.	FY2012	21
1 - 3	Stand-by Power for Pump Stations. Currently there are three pump stations that do not have standby power: Spruce Drive, Strafford Road, and Cranbrook Lane. Need to upgrade standby power at Varney Brook, Wentworth Terrace, Crosby Road, Boston Harbor and County Farm Road.	Community Services	CIP & Grant Funding	This project will be funded by the Water Treatment Plant/Well Equipment and will cost $75,000 each year starting in FY2013, for a total of $450,000.	FY2012-2017	21

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
1 - 4	Outer Sixth Street Replace Bridge & Culvert. Major overflows during heavy rain events. Replace bridge and raise the road. Provide additional access in and out of the North End area of the City.	Community Services	CIP & Grant Funding	Public Works/Bridge Improvements estimate this project to cost $1,000,000 with design and maintenance.	FY2012-2017	21
1 - 5	Police Dispatch Radio Replacement – A new radio system and console are needed to replace the existing Motorola Gold Elite System, which is 11 years old. Motorola is no longer manufacturing replacement parts and will only be available for the next few years.	Police Chief	Operating Budget & EMPG Funds	The radio system is essential to communicate with emergency Police, Fire, EMS and Community Services. The useful life is 10-15 years. The cost will be $115,000.	FY2013	21
1 - 6	South End Station generator Replacement – Essential replacement of 1991 Station generator. The life expectancy is 20 years.	EMD	Reserve Funding & EMPG Funds	The South End Fire Station is currently equipped with an emergency generator that provides power to the station during power outages. This equipment is used on a regular basis and is essential to emergency response. The cost will be $52,000.	FY2013	21
1 - 7	Message Boards. Used for evacuation plans, flooded areas, street closures and other emergency events.	Community Services	CIP & Grant Funding	Message boards will be paid for by the operating budget and will cost $30,000 apiece.	FY2013	21
1 - 8	Old Colony Drainage. Two or three home have major flooding during heavy rain events and winter melting. New drainage would resolve this problem.	Community Services	Debt Financed	Project would include the installation of drainage on Old Colony Road to prevent homes from flooding. Project would include paving of the street. The cost will be $75,000.	FY2013	21
1 - 9	Portable Light will be used during emergency events such as flooded areas, water breaks and loss of power.	Community Services	CIP & Grant Funding	Portable light will be paid for by the operating budget and will cost $30,000 apiece.	FY2013	21
1 - 10	Chainsaws. Are used during emergency situations such as trees down caused by ice and windstorms.	Community Services	CIP & Grant Funding	Chainsaws will be paid for by the operating budget and will cost $1,000 apiece including protective garments and other safety equipment.	FY2013	21

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
1 - 11	Purchase generators to power traffic lights at five critical intersections: Weeks Crossing, Central & Broadway, Central & Washington, NH9, and NH155. There is also consideration for: Glenwood & Central, Sixth and Whittier.	Community Services	Local & Grants	The City has already bought two new generators for the traffic lights. Two more will cost the City $3,000 apiece.	FY2013-2014	20
1 - 12	Conduct a needs assessment for stormwater infrastructure.	Planning Department	Local & Grants	To conduct the needs assessment, it has an estimated cost of $150,000.	FY2013-2014	19
1 - 13	Develop and complete a Cocheco Headwall project with drainage improvements and shoreland restabilization.	Community Services & Planning	Local & Grants	This project would be funded through street and drainage improvements and would cost $150,000.	FY2013-2014	19
1 - 14	Work off of the completed interconnection study to link municipality's water utilities together to provide emergency aid to each other and create a regional water system.	Community Services	Local & Grants	As referenced in the Seacoast NH Emergency Interconnection Study the cost ranges depending on which Town was going to link up with Dover (Rochester, Durham, and Portsmouth). Each cost estimate was over 1.2 million dollars.	FY2013-2014	16
1 - 15	Atlantic Avenue Reconstruction. This road is a main artery in and out of the city. Reconstruction is to replace the major drainage component of the road.	Community Services	CIP & Grant Funding	The water main has been replaced and the remainder of the project is ready for design. The cost will be $1,800,000.	FY2013-2014	21
2 - 1	Street Reconstruction at Piscataqua and Rabbit Road – Design and reconstruction of Piscataqua and Rabbit Road.	Community Services	Debt Financed	Piscataqua Road is a thoroughfare to Route 4 and in need of repair. Rabbit Road is a small road off of Piscataqua that needs improvements and due to its close proximity to the larger project it makes economic sense to combine the projects. The cost will be $200,000 in design.	FY2013-2015	21
2 - 2	3" & 4" Pump and Hoses. Community Services staff uses these pumps to pump from flooded areas to non-flooded areas during emergency events.	Community Services	CIP & Grant Funding	This project would be funded through the sewer and drainage budget and would cost $2,000 apiece.	FY2013-2015	21

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
2 - 3	Piscataqua Road Reconstruction. Major access for the Southern end of the City. Need of new drainage, culverts, and road reconstruction.	Community Services	CIP & Grant Funding	The estimated cost for this project is $1,700,000 for construction.	FY2013-2015	21
2 - 4	Police Facility Design and Construction – Design, engineering and construction of a plan to construct a new police facility. This new facility would act as a backup EOC.	Police Chief	Debt Financed & EMPG Funding	The Police Department currently occupies the ground floor of City Hall. There is no unused space and no room for expansion. Some work areas, such as the Records Bureau and the Investigations Section, are already experiencing congestion, and this problem is likely to become more pronounced over time. The cost will be $11,600,000.	FY2014	21
2 - 5	River Gauges. Would be installed on the bridges crossing the major rivers to assist emergency personnel during flooding events.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the storm water budget and will cost $5,000 apiece.	FY2014	21
2 - 6	New Wood Chipper. To provide additional resources to assist in clean up after an emergency event.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the Public Works heavy equipment budget and will cost $60,000.	FY2014	21
2 - 7	New Bucket Truck. The current truck is 20 yrs. old and a replacement is needed for traffic lights and tree removal during emergency events.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the Public Works heavy equipment budget and will cost $150,000.	FY2015	21
2 - 8	Sewer Jet. Equipment would replace the current 8-year-old unit.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the Public Works heavy equipment budget and will cost $425,000.	FY2015	21
2 - 9	Clam bucket for loader. Used during emergency situations such as trees down caused by ice and windstorms.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the Public Works heavy equipment budget and will cost $5,000 apiece.	FY2015	21

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
2 - 10	Street Reconstruction at Silver Street – This project would design the replacement of drainage, sidewalks, and roadway on Silver Street.	Community Services	Debt Financed	Roadway, sidewalks, and drainage are in poor condition and in need of replacement. The costs will be $400,000 for design in FY2013 and $3,000,000 in FY2015 for construction costs for a total of $3,400,000.	FY2013-2015	21
3 - 1	County Farm Road Bridge Replacement. Would provide additional access in and out of the North End area of the City.	Community Services	CIP & Grant Funding	A new bridge in this location would reduce traffic on Tolend Road and provide an additional route to and from Barrington and Rochester. It will cost $250,000.	FY2018/ Design	21
3 - 2	Street Reconstruction at Broadway – Design and proposed reconstruction including drainage curb, sidewalk, and road construction.	Community Services	Debt Financed	Broadway is a major artery of the City that receives heavy traffic and is in need of upgrades. It will cost $300,000.	FY2016	21
3 - 3	Portable 4” Pump to be used at sewer pump stations to pump from the wet well to a gravity main during power outages.	Community Services	CIP & Grant Funding	This project will be funded through the sewer pump station equipment budget and will cost $75,000.	FY2016	21
3 - 4	Oak Street Railroad Bridge Replacement. Current bridge is only a 10-ton limit and is a major access thruway for both Dover and Rollinsford.	Community Services	Reserve Funding & Grant Funding	Replace aging, sub-standard wood & iron bridge with new structure. It will cost $2,784,265 including design and construction.	FY2016-2017	21
3 - 5	Oak/Ham/Ela Area Reconstruction. This area sees major flooding during rain events. Incorporates drainage and road construction. Also a main artery in and out of the City.	Community Services	Debt Financed	This entire area of the city is in need of drainage repair and replacement along with street and sidewalk improvements. The cost will be $500,000.	FY2016-2017	21
3 - 6	EMS Computer/Software Upgrade – Upgrade of computer and current telephone modem dependent system to IP/cable network with upgraded software for managing heating and cooling systems in several municipal buildings; McConnell Center, Library, City Hall, Indoor Pool, Arena, and Public Works.	Community Services	Operating Budget	Upgrade provides improved reliability of communication between remote locations and control center. Increased efficiency of operating staff. The cost will be $25,000.	FY2017	21

Rank	New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Cost Effectiveness Low = <$1,000 Medium = $1,000-$5,000 High = > $5,000	Timeframe	STAPLEE Score (21 being the highest)
3 - 7	Portable Generator to replace the current 20 yr. old portable generator. Will be used for both water wells and sewer pump stations.	Community Services	CIP & Grant Funding	This project will be funded through the water capital reserve and will cost $100,000.	FY2017	21
3 - 8	Tree Program. Using the City GPS and GIS program to identify all City trees. Also determine the health and potential hazards.	Community Services	CIP & Grant Funding	This project will be funded through the operating budget in the CIP plan and will cost $20,000.	FY2018	21
3 - 9	St. Thomas Street Drainage. Flooding occurs in this area due to the age of the infrastructure. Needs new design and reconstruction.	Community Services	CIP & Grant Funding	This project will be listed in the next CIP plan and will cost an estimated $1,800,000.	FY2018	21
3 - 10	Stand-by Power for Radio Towers. The City currently has two radio towers for the SCADA system. This equipment would be used to maintain power during outages.	Community Services	CIP & Grant Funding	This equipment purchase will be funded through the water/sewer capital reserve and will cost $50,000 apiece.	FY2018	21
3 - 11	2-Way radio system upgrade. A new radio system would allow better communication with CS staff and other departments.	Community Services	CIP & Grant Funding	This project will cost an estimated $10,000.	FY2018	21
3 - 12	Raise County Farm Road. Maintain access to the Strafford County Complex, which includes the rest home, court, hospice care and jail.	Community Services	Debt Financed	This project will be listed in the next CIP plan and has an estimated cost of $500,000.	FY2019	21

Chapter X: Monitoring, Evaluation and Updating the Plan

A. Introduction

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

B. Multi-Hazard Plan Monitoring, Evaluation and Updates

To track programs and update the mitigation strategies identified through this process, the City will review the multi-hazard mitigation plan annually or after a hazard event. Additionally, the Plan will undergo a formal review and update at least every five years and obtain FEMA approval for this update or any other major changes done in the Plan at any time. The Emergency Management Director is responsible for initiating the review and will consult with members of the multi-hazard mitigation planning team identified in this plan. The public will be encouraged to participate in any updates. Public announcements will be made through advertisements in local papers, postings on the city website, and posters disseminated in town. A formal public hearing will be held before reviews and updates are official.

Changes will be made to the Plan to accommodate projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities or funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of the plan to determine feasibility of future implementation. In keeping with the process of adopting this multi-hazard mitigation plan, a public hearing to receive public comment on plan maintenance and updating will be held during the annual review period and before the final product is adopted by the City Council. Chapter XI contains a representation of a draft resolution for Dover to use once a conditional approval is received from FEMA.

C. Integration with Other Plans

This multi-hazard plan will only enhance mitigation if balanced with all other city plans. Dover will take the necessary steps to incorporate the mitigation strategies and other information contained in this plan with other city activities, plans and mechanisms, such as comprehensive land use planning, capital improvements planning, site plan regulations, and building codes to guide and control development in the City of Dover, when appropriate. The local government will refer to this Plan and the strategies identified when updating the City's Master Plan, Capital Improvements Program, Zoning Ordinances and Regulations, and Emergency Action Plan; this Plan will become a section of the Dover Emergency Management Plan, with certain chapters removed for security purposes. The City Council and the Hazard Mitigation Committee will work with city officials to incorporate elements of this Plan into other planning mechanisms, when

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

Chapter XI. Signed Community Documents and Approval Letters

A. Conditional Approval Letter from FEMA
Email received on April 11, 2012

Congratulations!

FEMA Region I has completed its review of the Dover, NH Multi-Hazard Mitigation Plan and found it approvable pending adoption. With this approval, the jurisdiction meets the local mitigation planning requirements under 44 CFR 201 **pending FEMA's receipt of the adoption documentation and an electronic copy of the final plan**. These items should be provided to your state's mitigation planning point of contact who will ensure they are forwarded to FEMA. Acceptable electronic formats include a *.doc* or *.pdf* file and may be submitted on a CD. Upon FEMA's receipt of these documents, a formal letter of approval will be issued, along with the final FEMA Checklist.

The FEMA letter of formal approval will confirm the jurisdiction's eligibility to apply for Mitigation grants administered by FEMA and identify related issues affecting eligibility, if any. If the plan is not adopted within one calendar year of FEMA's Approval Pending Adoption, the jurisdiction must update the entire plan and resubmit it for FEMA review. If you have questions or wish to discuss this determination further, please contact me at marilyn.hilliard@fema.gov or 617-956-7536.

Thank you for submitting Dover's Multi-Hazard Mitigation Plan and congratulations again on your successful community planning efforts.

B. Signed Certificate of Adoption
(Note: to be replaced with signed copy upon completion)

CERTIFICATE OF ADOPTION

City of Dover, New Hampshire
City Council
A Resolution Adopting the Dover, NH Multi-Hazard Mitigation Plan Update 2012

Plan Dated: _____
Conditionally Approved: _____

WHEREAS, the City of Dover received funding from the NH Office of Homeland Security and Emergency Management under a Flood Mitigation Assistance Project Grant and assistance from Strafford Regional Planning Commission in the preparation of the Dover, NH Multi-Hazard Mitigation Plan Update 2012; and

WHEREAS, several public planning meetings were held between October 14, 2010 and March 2, 2011 regarding the development and review of the Dover, NH Multi-Hazard Mitigation Plan Update 2012; and

WHEREAS, the Dover, NH Multi-Hazard Mitigation Plan Update 2012 contains several potential future projects to mitigate hazard damage in the City of Dover; and

WHEREAS, a duly noticed public meeting was held by the Dover City Council on _____ to formally approve and adopt the Dover, NH Multi-Hazard Mitigation Plan Update 2012.

NOW, THEREFORE BE IT RESOLVED that the Dover City Council adopts the Dover, NH Multi-Hazard Mitigation Plan Update 2012.

ADOPTED AND SIGNED this day of _____, 20__

_____
Dover City Manager

_____

City Seal or Notary
_____

Date_____

C. Final Approval Letter from FEMA

Appendices

Appendix A: Bibliography

Appendix B: Summary of Possible Multi-Hazard Mitigation Strategies

Appendix C: List of Contacts

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

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

Appendix E: Seacoast NH Emergency Water System Interconnection Study – Executive Summary (January 2006)

Appendix A: Bibliography

Documents

- Local Multi-Hazard Mitigation Planning Guide, FEMA, July 1, 2008
- Multi-Hazard Mitigation Plans
    - Town of Albany, 2010
    - Town of Goffstown, 2009
    - Town of Barrington, 2010
    - Town of New Durham, 2010
- Natural Hazard Mitigation Plan, 2004, State Hazard Mitigation Goals http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/guide/APPENDIX_D.pdf
- Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2 and Section 322a *http://www.fema.gov/library/viewRecord.do?id=1935*
- Economic & Labor Market Information Bureau, NH Employment Security, 2009; Census 2000 and Revenue Information derived from this site; *http://www.nh.gov/nhes/elmi/htmlprofiles/dover.htm*
- City of Dover Master Plan; 2010

Photos

- Richard Driscoll, Assistant Fire Chief, Dover Fire & Rescue

Appendix B: Summary of Possible Multi-Hazard Mitigation Strategies

I. RIVERINE MITIGATION

A. Prevention

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

1. **Planning and Zoning -** Land use plans are put in place to guide future development, recommending where - and where not - development should occur and where it should not. Sensitive and vulnerable lands can be designated for uses that would not be incompatible with occasional flood events - such as parks or wildlife refugees. A Capital Improvements Program (CIP) can recommend the setting aside of funds for public acquisition of these designated lands. The zoning ordinance can regulate development in these sensitive areas by limiting or preventing some or all development - for example, by designating floodplain overlay, conservation, or agricultural districts.

2. **Open Space Preservation -** Preserving open space is the best way to prevent flooding and flood damage. Open space preservation should not, however, be limited to the floodplain, since other areas within the watershed may contribute to controlling the runoff that exacerbates flooding. Land Use and Capital Improvement Plans should identify areas to be preserved by acquisition and other means, such as purchasing easements. Aside from outright purchase, open space can also be protected through maintenance agreements with the landowners, or by requiring developers to dedicate land for flood flow, drainage and storage.

3. **Floodplain Development Regulations -** Floodplain development regulations typically do not prohibit development in the special flood hazard area, but they do impose construction standards on what is built there. The intent is to protect roads and structures from flood damage and to prevent the development from aggravating the flood potential. Floodplain development regulations are generally incorporated into subdivision regulations, building codes, and floodplain ordinances.

   Subdivision Regulations: These regulations govern how land will be divided into separate lots or sites. They should require that any flood hazard areas be shown on the plat, and that every lot has a buildable area that is above the base flood elevation.

   Building Codes: Standards can be incorporated into building codes that address flood proofing for all new and improved or repaired buildings.

   Floodplain Ordinances: Communities that participate in the National Flood Insurance Program are required to adopt the minimum floodplain management regulations, as developed by FEMA. The regulations set

minimum standards for subdivision regulations and building codes. Communities may adopt more stringent standards than those set forth by FEMA.

4. **Stormwater Management** - Development outside of a floodplain can contribute significantly to flooding by covering impervious surfaces, which increases storm water runoff. Storm water management is usually addressed in subdivision regulations. Developers are typically required to build retention or detention basins to minimize any increase in runoff caused by new or expanded impervious surfaces, or new drainage systems. Generally, there is a prohibition against storm water leaving the site at a rate higher than it did before the development. One technique is to use wet basins as part of the landscaping plan of a development. It might even be possible to site these basins based on a watershed analysis. Since detention only controls the runoff rates and not volumes, other measures must be employed for storm water infiltration - for example, swales, infiltration trenches, vegetative filter strips, and permeable paving blocks.

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

B. Property Protection

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

1. **Relocation -** Moving structures out of the floodplain is the surest and safest way to protect against damage. Relocation is expensive, however, so this approach will probably not be used except in extreme circumstances. Communities that have areas subject to severe storm surges, ice jams, etc. might want to consider establishing a relocation program, incorporating available assistance.

2. **Acquisition -** Acquisition by a governmental entity of land in a floodplain serves two main purposes: 1) it ensures that the problem of structures in the floodplain will be addressed; and 2) it has the potential to convert problem areas into community assets, with accompanying environmental benefits. Acquisition is more cost effective than relocation in those areas that are subject to storm surges, ice jams, or flash flooding. Acquisition, followed by demolition, is the most appropriate strategy for those buildings that are simply too expensive to move, as well as for dilapidated structures that are not worth saving or protecting.

Acquisition and subsequent relocation can be expensive, however, there are government grants and loans that can be applied toward such efforts.

3. **Building Elevation -** Elevating a building above the base flood elevation is the best on-site protection strategy. The building could be raised to allow water to run underneath it, or fill could be brought in to elevate the site on which the building sits. This approach is cheaper than relocation, and tends to be less disruptive to a neighborhood. Elevation is required by law for new and substantially improved residences in a floodplain, and is commonly practiced in flood hazard areas nationwide.

4. **Floodproofing -** If a building cannot be relocated or elevated, it may be floodproofed. This approach works well in areas of low flood threat. Floodproofing can be accomplished through barriers to flooding, or by treatment to the structure itself.

   Barriers: Levees, floodwalls and berms can keep floodwaters from reaching a building. These are useful, however, only in areas subject to shallow flooding.

   Dry Floodproofing: This method seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such as doors, windows, etc. are closed either permanently with removable shields or with sandbags.

   Wet Floodproofing: This technique is usually considered a last resort measure, since water is intentionally allowed into the building in order to minimize pressure on the structure. Approaches range from moving valuable items to higher floors to rebuilding the floodable area. An advantage over other approaches is that simply by moving household goods out of the range of floodwaters, thousands of dollars can be saved in damages.

5. **Sewer Backup Protection -** Storm water overloads can cause backup into basements through sanitary sewer lines. Houses that have any kind of connection to a sanitary sewer system - whether it is downspouts, footing drain tile, and/or sump pumps, can be flooded during a heavy rain event. To prevent this, there should be no such connections to the system, and all rain and ground water should be directed onto the ground, away from the building. Other protections include:

   • Floor drain plugs and floor drain standpipe, which keep water from flowing out of the lowest opening in the house.
   • Overhead sewer - keeps water in the sewer line during a backup.
   • Backup valve - allows sewage to flow out while preventing backups from flowing into the house.

6. **Insurance** - Above and beyond standard homeowner insurance, there is other coverage a homeowner can purchase to protect against flood hazard. Two of the most common are National Flood Insurance and basement backup insurance.

   National Flood Insurance: When a community participates in the National Flood Insurance Program, any local insurance agent is able to sell separate flood insurance policies under rules and rates set by FEMA. Rates do not change after claims are paid because they are set on a national basis.
   Basement Backup Insurance: National Flood Insurance offers an additional deductible for seepage and sewer backup, provided there is a general condition of flooding in the area that was the proximate cause of the basement getting wet. Most exclude damage from surface flooding that would be covered by the NFIP.

C. Natural Resource Protection

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

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

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

2. **Erosion and Sedimentation Control -** Controlling erosion and sediment runoff during construction and on farmland is important, since eroding soil will typically end up in downstream waterways. Because sediment tends to settle where the water flow is slower, it will gradually fill in channels and lakes, reducing their ability to carry or store floodwaters.

3. **Best Management Practices -** Best Management Practices (BMPs) are measures that reduce non-point source pollutants that enter waterways. Non-point source pollutants are carried by storm water to waterways, and include such things as lawn fertilizers, pesticides, farm chemicals, and oils from street surfaces and industrial sites. BMPs can be incorporated into many aspects of new developments and ongoing land use practices. In New Hampshire, the Department

of Environmental Services has developed Best Management Practices for a range of activities, from farming to earth excavations.

D. Emergency Services

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

1. **Flood Warning -** On large rivers, the National Weather Service handles early recognition. Communities on smaller rivers must develop their own warning systems. Warnings may be disseminated in a variety of ways, such as sirens, radio, television, mobile public address systems, or door-to-door contact. It seems that multiple or redundant systems are the most effective, giving people more than one opportunity to be warned.

2. **Flood Response -** Flood response refers to actions that are designed to prevent or reduce damage or injury, once a flood threat is recognized. Such actions and the appropriate parties include:

    • Activating the emergency operations center (emergency director)
    • Sandbagging designated areas (Highway Department)
    • Closing streets and bridges (police department)
    • Shutting off power to threatened areas (public service)
    • Releasing children from school (school district)
    • Ordering an evacuation (Board of Selectmen/emergency director)
    • Opening evacuation shelters (churches, schools, Red Cross, municipal facilities)

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

3. **Critical Facilities Protection -** Protecting critical facilities is vital, since expending efforts on these facilities can draw workers and resources away from protecting other parts of town. Critical facilities fall into two categories:

    Buildings or locations vital to the flood response effort:
    • Emergency operations centers
    • Police and fire stations
    • Highway garages
    • Selected roads and bridges
    • Evacuation routes

    Buildings or locations that, if flooded, would create disasters:
    • Hazardous materials facilities
    • Schools

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

4. **Health and Safety Maintenance -** The flood response plan should identify appropriate measures to prevent danger to health and safety. Such measures include:

    • Patrolling evacuated areas to prevent looting
    • Vaccinating residents for tetanus
    • Clearing streets
    • Cleaning up debris

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

E. Structural Projects

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

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

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

F. Public Information

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

1. **Map Information -** Flood maps developed by FEMA outline the boundaries of the flood hazard areas. These maps can be used by anyone interested in a particular property to determine if it is flood-prone. These maps are available from FEMA, the NH Homeland Security and Emergency Management (HSEM), the NH Office of Energy and Planning (OEP), or your regional planning commission.

2. **Outreach Projects -** Outreach projects are proactive; they give the public information even if they have not asked for it. Outreach projects are designed to encourage people to seek out more information and take steps to protect themselves and their properties. Examples of outreach activities include:

   • Presentations at meetings of neighborhood groups
   • Mass mailings or newsletters to all residents
   • Notices directed to floodplain residents
   • Displays in public buildings, malls, etc.
   • Newspaper articles and special sections
   • Radio and TV news releases and interview shows
   • A local flood proofing video for cable TV programs and to loan to organizations
   • A detailed property owner handbook tailored for local conditions. Research has shown that outreach programs work, although awareness is not enough. People need to know what they can do about the hazards, so projects should include information on protection measures. Research also shows that locally designed and run programs are much more effective than national advertising.

3. **Real Estate Disclosure -** Disclosure of information regarding flood-prone properties is important if potential buyers are to be in a position to mitigate damage. Federally regulated lending institutions are required to advise applicants that a property is in the floodplain. However, this requirement needs to be met only five days prior to closing, and by that time, the applicant is typically committed to the purchase. State laws and local real estate practice can help by making this information available to prospective buyers early in the process.

4. **Library -** Your local library can serve as a repository for pertinent information on flooding and flood protection. Some libraries also maintain their own public information campaigns, augmenting the activities of the various governmental agencies involved in flood mitigation.

5. **Technical Assistance -** Certain types of technical assistance are available from the NFIP Coordinator, FEMA, and the Natural Resources Conservation District. Community officials can also set up a service delivery program to provide one-on-one sessions with property owners.

An example of technical assistance is the *flood audit*, in which a specialist visits a property. Following the visit, the owner is provided with a written report detailing the past and potential flood depths and recommending alternative protection measures.

6. **Environmental Education -** Education can be a great mitigating tool if people can learn what not to do before damage occurs. The sooner the education begins the better. Environmental education programs for children can be taught in the schools, park and recreation departments, conservation associations, or youth organizations. An activity can be as involved as course curriculum development or as simple as an explanatory sign near a river.

Education programs do not have to be limited to children. Adults can benefit from knowledge of flooding and mitigation measures; decision makers, armed with this knowledge, can make a difference in their communities.

II. EARTHQUAKES

A. Preventive

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

B. Property Protection

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

C. Emergency Services

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

D. Structural Projects

1. Slope stabilization

III. DAM FAILURE

A. Preventive

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

B. Property Protection

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

C. Emergency Services

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

D. Structural Projects

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

IV. WILDFIRES

A. Preventive

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

B. Property Protection

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

C. Natural Resource Protection

1. Prohibit development in high-risk areas

D. Emergency Services

1. Fire Fighting

V. WINTER STORMS

A. Prevention

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

B. Property Protection

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

C. Natural Resource Protection

1. Maintenance program for trimming trees and shrubs

D. Emergency Services

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

Appendix C: List of Contacts

NH Homeland Security & Emergency Management

Hazard Mitigation Section 271-2231

Federal Emergency Management Agency (Boston)..... 877-336-2734

NH Regional Planning Commissions:

Central NH Regional Planning Commission 226-6020
Lakes Region Planning Commission..... 279-8171
Nashua Regional Planning Commission..... 424-2240
North Country Council RPC..... 444-6303
Rockingham Planning Commission..... 778-0885
Southern New Hampshire Planning Commission..... 669-4664
Southwest Region Planning Commission..... 357-0557
Strafford Regional Planning Commission 742-2523
Upper Valley Lake Sunapee RPC 448-1680

NH Executive Department:
New Hampshire Office Energy & 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..... 271-3434
Rivers Management and Protection Program..... 271-8801
Bureau of Dams..... 271-3503

NH Fish and Game Department 271-3421

NH DRED..... 271-2411
Natural Heritage Inventory 271-3623
Division of Forests and Lands 271-2214
Division of Parks and Recreation 271-3556

NH Department of Transportation 271-3734

US Department of Commerce:

National Oceanic and Atmospheric Administration:
National Weather Service; Gray, Maine..... 207-688-3216

US Department of Interior:
US Fish and Wildlife Service..... 223-2541
.
US Geological Survey..... 225-4681

US Department of Agriculture:
Natural Resource Conservation Service..... 868-7581

New Hampshire State Police 846-3333

Additional Websites of Interest

Natural Hazards
Research Center, U. of Colorado
http://www.colorado.edu/hazards/

National Emergency Management Association
http://nemaweb.org

NASA-Earth Observatory
http://earthobservatory.nasa.gov/NaturalHazards/category.php?cat_id=12

NASA Natural Disaster Reference
Reference of worldwide natural disasters
http://gcmd.nasa.gov/records/NASA-NDRD.html

National Weather Service
Weather Warnings, 60 Second Updates
http://nws.noaa.gov

FEMA, National Flood Insurance Program, Community Status Books
http://fema.gov/business/nfip/

Florida State & NWS University Atlantic
Hurricane Site
http://www.met.fsu.edu/orgs/explores/

National Lightning Safety Institute
List of Lightning Safety Publications
http://lightningsafety.com

NASA Optical Transient Detector
Space-based sensor of lightning strikes
http://www.gr.ssr.upm.es/~jambrina/rayos/thunder.msfc.nasa.gov/otd.html

LLNL Geologic & Atmospheric Hazards
General Hazard Information
https://www.llnl.gov/

The Tornado Project Online
Recent tornado information & details
http://www.tornadoproject.com/

National Severe Storms Laboratory
Information & tracking of severe storms
Http://www.nssl.noaa.gov/
USDA Forest Service

Forest Fire & Land Management Information
http://www.fs.fed.us/fire

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

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs[5]:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

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

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

A. Hazard Mitigation Grant Program (HMGP)

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

What is the Hazard Mitigation Grant Program?

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

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

Who is eligible to apply?

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

- State and local governments
- Indian tribes or other tribal organizations
- Certain non-profit organizations

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

How are potential projects selected and identified?

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

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

For more information on the **Hazard Mitigation Grant Program (HMGP),** go to:
http://www.fema.gov/government/grant/hmgp/index.shtm

B. Pre-Disaster Mitigation (PDM)

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

Program Overview

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

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

C. Flood Mitigation Assistance (FMA)

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

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

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

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

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

D. Repetitive Flood Claims (RFC)

RFC provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100% federal funding for projects in communities that meet the reduced capacity requirements.

Program Overview
The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al).

Up to $10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

Federal / Non-Federal Cost Share
FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the Applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.

E. Severe Repetitive Loss (SRL)

SRL provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that are qualified as severe repetitive loss structures. SRL provides up to 90% federal funding for eligible projects.

Program Overview
The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

Definition
The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

> (a) That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
> (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

Purpose:
To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).

Federal / Non-Federal cost share:

75 / 25 %; up to 90 % Federal cost-share funding for projects approved in States, Territories, and Federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.

Appendix E: Seacoast NH Emergency Water System Interconnection Study – Executive Summary (January 2006)

Ten water utilities have joined together to investigate the potential for providing water transfers to each other during periods of emergency. The ten systems are:

- Aquarion Water Company of NH
- City of Dover
- Newmarket Water District
- City of Portsmouth Water Works
- City of Rochester Water Department
- Rollinsford Water & Sewer District
- Rye Water District
- Seabrook Water Department
- City of Somersworth Water Department
- UNH/Durham Water Works

The transfers would be on a temporary/emergency basis only and would not involve transfers of water on a permanent, non-emergency basis.

Between the ten systems, there are fifty-five (55) distinct sources of supply, including five surface water supplies and 50 groundwater supplies.

The mutual aid evaluation looks at a number of existing and potential interconnecting points between various systems and assesses the potential for successful transferring water between utilities for various durations of under six months. The evaluation considers the potential for hydraulic and capacity problems to interfere with water transfers through a particular interconnection, as well as water quality and public health concerns that could result from an interconnection.

Among the fifteen potential interconnections that were evaluated, some were determined to present little or no quantity issues. Adjacent water systems which have similar water quality may be able to blend waters from both systems with minimal impact. Other interconnections may pose a greater risk to the receiving system in terms of water quality upsets such as a loss of disinfectant residual, the creation of discolored water, and/or the generation of taste and odor complaints.

Particular care must be exercised when transferring a surface water supply to a groundwater system, or conversely a groundwater supply to a surface water system. Zones of mixing should be minimized, with the goal of completely displacing the native water with imported water as quickly as possible to reduce the risk of blending incompatibilities. These may include mixing chlorine to ammonia ratio and create the potential for taste and odor problems, mixing high pH water with low pH water, and mixing non-fluoridated water with fluoridated water.

Each utility operates their system at a different hydraulic grade (HG) than neighboring utilities. At each interconnection, water will flow unassisted from systems with a higher HG to systems with a lower HG. In the difference in hydraulic grades is large enough, a pressure-reducing valve will be needed at the interconnection to lower the hydraulic grade of the water passing though to that of the receiving system. Conversely, it will be

necessary to add energy to convey water from a lower HG system to a high HG system. This is accomplished with the installation of booster pump at the interconnection.

In arriving at the recommended pipe size for each interconnection, we took into consideration the service life of the pope (100 year for planning purposes), future functionality, e.g., the need to convey larger amounts of water as the seacoast region of New Hampshire continues to develop, and the thought that these interconnections will likely form the trunk line or backbone of any future regional water system. Transfer of fire flows between communities is possible under some conditions; however, the main goal is to transfer sufficient flows to replace existing supplies that have been temporarily compromised.

With the exception of Interconnections #1 and #5, which are strictly one way, each interconnection has been modeled for flow in both directions. The volume of water that can be conveyed in either direction is dependent on the excess capacity of each utility. Although bi-directional flow requires the installation of booster pumps and/or pressure reducing valves, it provides the most functional value and future flexibility for the utilities.

Each option or combination of options is presented in detail within the report along with results from a numerical model of the interconnected systems.

Benefits achieved by the study included

1. Documenting the current level of mutual aid possible through existing interconnections
2. Prioritizing where to best allocate resources to create new interconnections
3. Identifying needed infrastructure to implement new emergency interconnections
4. Establishing estimated costs for each of the proposed interconnections
5. Establishing operational recommendations to minimize water quality impacts
6. Providing a road map for enhanced reliability of service by giving each utility water supply options

Exclusions

Our emergency interconnection study did not focus on the following items:

- Emergency Communication Protocol
- Public Notification Issues
- Formal Mutual Aid Agreements

To work on these issues the ten utilities have formed a working group, which meets periodically.

A complete copy of this study will be included on a CD and attached to the final document.