

City of Somersworth, New Hampshire

Multi-Hazard Mitigation Plan

prepared by

**City of Somersworth
Multi-Hazard Mitigation Planning Committee**

in cooperation with

Strafford Regional Planning Commission

Adopted by the Somersworth City Council

July 12, 2010

City of Somersworth, New Hampshire

MULTI-HAZARD MITIGATION PLAN

Adopted July 12, 2010



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ADOPTION

The Somersworth City Council by majority vote does hereby adopt the *2009 Update of the Somersworth Multi-Hazard Mitigation Plan* as a statement of policy.

Actions for implementation under this statement of policy are set forth in priority order in the chart *Implementation Strategy for Priority Mitigation Actions* in Section VI and in the *Monitoring & Updates* sub-section contained in this section.

All other sections of this *Plan* are supporting documentation for information purposes only and are not included as the statement of policy.

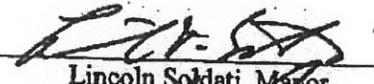
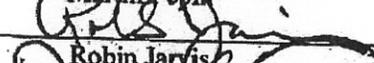
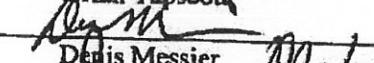
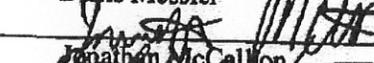
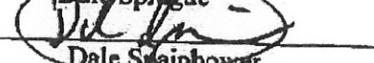
	July 12, 2010
Lincoln Soldati, Mayor	Date
	July 12, 2010
Martin Pepin	Date
	July 12, 2010
Robin Jarvis	Date
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David Witham	Date
	July 12, 2010
Brian Tapscoff	Date
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ACKNOWLEDGEMENTS

The Somersworth City Council extends special thanks to the Somersworth Multi-Hazard Mitigation Planning Committee members.

- | | |
|-------------------|---|
| Don Messier | Fire Chief, Emergency Management Director and Local Multi-Hazard Mitigation Planning, Committee Chair |
| Robert M. Belmore | City Manager |
| Robert Crichton | Somersworth Housing Authority |
| Dean Crombie | Chief of Police |
| John Jackman | Public Works Director |
| Chris Jacobs | City Engineer |
| Andy Lucier | Somersworth Schools |
| Tim McLin | Lieutenant, Police Department |
| Dave Sharples | City Planner |
| Craig Wheeler | Director of Development Services |

Special thanks are also extended to the staff of the Strafford Region Planning Commission for professional services, process facilitation and preparation of this document.

INTRODUCTION

City Overview

The City of Somersworth is located in the southeast portion of Strafford County in southern New Hampshire. Somersworth is bounded on the north by Rochester, on the east by Berwick, Maine, on the south by Rollinsford and on the west by Dover.

According to the 2007 population estimates, the City has a population of 11,989¹ with a population increase of 4.2% from 2000-2008.² The median age in 2000 was 34.9, with 26.2% of the population under the age of 18, and 12% age 65 and older³. The total number of households in 2000 was 4,687 with an average household size of 2.44 persons⁴. Of these households 60.9% were either one or two person households. Family households were 65.6% and non-family households were 34.3% in 2000. Household 60+ years were 27.1% of Somersworth.⁵

The City of Somersworth contains 9.8 square miles of land area and 0.2 square miles of inland water area. It lies along the Salmon Falls River, which forms the border between New Hampshire and Maine.

Somersworth operates under the City Council and Manager form of government. It has a full complement of services for residents and businesses, including Development Services (Planning, Code Enforcement, Assessing), Police Department, Public Works (Highway, Cemeteries, Engineering, Water/Wastewater Utilities). The Somersworth Fire Department has 17 career and 10 call personnel. Off-duty career and call staff report to the Central fire station during a *Zone Out*. A *Zone Out* is used when additional staffing is needed, due to structure fires, mutual aid, or specialized rescue efforts. Personnel are alerted when department pagers are activated.

The nearest hospital is Wentworth-Douglass in Dover, approximately 6 miles away. Wentworth-Douglass is licensed for 178 beds, making it the largest acute care hospital in the Seacoast.

Disaster Risk

Somersworth is prone to a variety of man-made and natural hazards. These include: dam failures, riverine and ice jam flooding, severe wind events, wildfire, drought, ice storms and severe winter storms.

Flooding, whether from heavy rains or ice jams, carries the greatest risk for Somersworth. The Salmon Falls River floods occasionally. However, in 2006, 2007 and 2010 the entire coastal region was subjected to severe spring flooding events. The 2006 Mother's Day flood resulted from record breaking amounts of rainfall in a very short duration. The 2007 Patriot's Day flood was a combination of heavy rainfall and rapid snowmelt as up to seven inches of rain fell April 16 -18 from a storm that stalled off the coast of New England. The peak discharges during this flood event were the highest recorded at five longterm stream gage sites - the New Hampshire Salmon Falls River at Milton (north of Somersworth), Cocheco River near Rochester, Oyster River near Durham, Contoocook River at Peterborough, and South Branch Piscataguog River near Goffstown. In addition, peak discharges equaled or exceeded a 100 year recurrence interval at ten stream gages and a 50 year recurrence interval at 16 stream gages. The most severe flooding occurred in Strafford, Rockingham, Merrimack and Hillsborough Counties.⁶ The latest flooding event occurred in March 2010 when two separate storm events occurred in mid and late March.

¹ Office of Energy and Planning Population Estimate 2008, June 2009.

² Census 2000 population was 11,477, General Profile

³ Census 2000 General Profile

⁴ Census 2000 Household Characteristics

⁵ Census 2000 Household Characteristics

⁶ USGS Scientific Investigations Report 2008-5120

Severe wind events, hurricane residuals, and downbursts have caused damage to Somersworth. The City is fairly wooded and forested in many areas, which carries the potential for major tree damage from high-wind events. In February 2010 there was severe windstorm that affected trees and power lines. In 2008 there was a tornado that passed through the region to the west and north causing severe damage along its path. In December 2008 there was a record breaking ice storm in New Hampshire that disrupted power and communication services for weeks in some locations as well as extensive damage to infrastructure, trees and property. Somersworth received damage but not to the extent that other locations received.

Background

In 2000 the Disaster Mitigation Act (DMA) was enacted requiring states and municipalities to have local hazard mitigation plans in place in order to be eligible for disaster funding. The disaster funding comes from a number of sources including: Pre-Disaster Mitigation Program (PDM), Community Development Block Grant (CDBG), Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Program (FMAP), and Mitigation Assistance Program (MAP). New Hampshire is awarded funds based upon the completeness of its State Plan and upon the number of local plans in place.

The Federal Emergency Management Agency (FEMA) has created state, municipal and tribal guidelines for plan creation. FEMA regulations were created under Code of Federal Regulations (CFR), Title 44, Part 201. Somersworth used the document, *Local Multi-Hazard Mitigation Planning Guidance* to prepare the 2003 Plan. The purpose of this particular document is to provide guidance to local governments to meet the requirements of 44 CFR Part 201.6; Local Mitigation Plans.

On October 31, 2007 FEMA published amendments to the Title 44 CFR Part 201 at 72 Fed. 1 Reg. 61720 incorporating mitigation planning requirements. The amendments impacted 44 CFR §201.6, Local Mitigation Plans, as follows:

- Combined the Local Mitigation Plan requirement for all hazard mitigation assistance
- Programs under 44 CFR §201.6 include the Flood Mitigation Assistance Program, Hazard Mitigation Grant Program Pre-Disaster Mitigation, and Severe Repetitive Loss programs, thus eliminating duplicative mitigation plan regulations
- Incorporated the requirement for communities with National Flood Insurance Program (NFIP) insured properties that have been repetitively damaged from floods to address such properties in their risk assessment and mitigation strategy.
- Incorporated the requirement for communities that participate in the NFIP to include a strategy for continued compliance with the NFIP.

As a result of the 2000 Disaster Mitigation Act, funding is provided to state offices of emergency management to produce local hazard mitigation plans. The NH Division of Homeland Security and Emergency Management has provided funding to the nine regional planning commissions in New Hampshire to work with municipalities in their respective regions to produce hazard mitigation plans. The Strafford Regional Planning Commission approached the City of Somersworth, and both parties agreed jointly to complete an All Hazard Mitigation Plan in 2003 and in 2009 to update the All Hazard Mitigation Plan to meet federal requirements for a Multi-Hazard Plan. Fully federally funded, there is no cost to the City other than in-kind match to produce the Plan and any updates.

Purpose

The Federal Emergency Management Agency has defined hazard mitigation as: *any sustained action taken to reduce or eliminate longterm risk to people and property from natural and man-made hazards and their effects*. The Somersworth Multi-Hazard Mitigation Plan is intended to be a strategic planning tool to provide information in the event of a natural disaster; to raise awareness of the vulnerability of facilities and structures in Somersworth to such disasters; and, most importantly, to implement actions to mitigate potential damages from future disasters. It is designed for use by the City, as well as by other municipalities, state and federal agencies in their cooperative and continuous efforts to reduce the effects from natural and man-made hazards.

Scope of the Plan

The scope of this plan includes identification of man-made and natural hazards potentially affecting the City of Somersworth as identified by the Multi-Hazard Mitigation Planning Committee; the analysis of risk with respect to those hazards; identification of goals for multi-hazard mitigation; and establishment of constructive mitigation actions to achieve the desired goals. The man-made and natural hazards considered in the planning process are those identified in the State of New Hampshire's Hazard Mitigation Plan (NH HS&EM 2007). http://www.nh.gov/safety/divisions/hsem/HazardMitigation/haz_mit_plan.html

Authority

This Multi-Hazard Mitigation Plan was prepared in accordance with the City of Somersworth's Emergency Management Plan, effective 2005, and under the authority of the Planning Mandate of Section 409 of Public law 93-288 as amended by Public Law 100-707, the Robert T. Stafford Act of 1988, hereinafter referred to as the *Stafford Act*. Accordingly, this Multi-Hazard Mitigation Plan will be referred to as the *Plan*.

Adoption

The Somersworth Multi-Hazard Mitigation Planning Committee members reviewed and edited the plan during its revision. After acceptance by the Committee members, the plan was submitted to the New Hampshire Office of Emergency Management and to the Federal Emergency Management Agency Region 1 for formal approval. At a public meeting, after a publicly noticed hearing, the City Council formally approved the plan on _____, 2010.

CHAPTER 1. PLANNING PROCESS

1. Documentation of the Planning Process

The Somersworth Multi-Hazard Mitigation Planning Committee decided, after a thorough review of the 2003 Plan, that many of the 2003 Plan chapters could remain as originally written with minor updates to the data contained within those chapters. Most importantly though, the Planning Committee used the recent Multi-Hazard Mitigation Plan template designed by the Federal Emergency Management Agency. This template served as a guide throughout the update process.

The Somersworth Multi-Hazard Mitigation Plan was updated in 2009 and 2010 according to the six sections laid out in FEMA's *Local Multi-Hazard Mitigation Planning Guidance*. The *Guidance* is divided into six sections and subsections as follows:

- Introduction
 - Adoption by the Local Governing Body
- Chapter 1: Planning Process
 - 1. Documentation of the Planning Process
- Chapter 2: Risk Assessment
 - 1. Identifying Multi-Hazards
 - 2. Profiling Multi-Hazards
 - 3. Assessing Vulnerability
 - A. Critical Facilities Overview Summary
 - B. Updated Inventory of Structures Affected
 - C. Addressing Repetitive Loss Properties
 - D. Identifying Structures
 - E. Estimating Potential Losses
 - F. Analyzing Development Trends
- Chapter 3: Mitigation Strategy
 - 1. Local Multi-Hazard Mitigation Goals
 - A. 2003 All Hazard Mitigation Goals
 - 2. Identification of Existing Hazard Mitigation Program
 - 3. Identification and Analysis of Mitigation Actions
 - 4. Status of 2003 Mitigation Actions
 - 5. Identification and Analysis of 2010 Mitigation Actions
 - 6. Implementation of National Flood Insurance Program (NFIP)
 - 7. Implementation of Mitigation Actions
- Chapter 4: Plan Maintenance Process
 - 1. Monitoring, Evaluating, and Updating the Plan
 - 2. Implementation Strategy for Priority Mitigation Actions
 - 3. Incorporating into Existing Planning Mechanisms and Projects
 - 4. Continued Public Involvement
 - 5. Ongoing Plan Maintenance Process
- Resources Used in Preparation of Plan
- Maps of Hazards and Critical Facilities
- Local Mitigation Plan Review and Crosswalk

The Committee was formed of local officials in early 2009 to follow these guidelines and update the 2003 plan according to events and changes over the past six years. The Committee determined that updating the key components of the plan would best use their time.

On January 21st 2009 the initial meeting was held at the City Manager's office consisting of City Manager Robert Belmore, Fire Chief and Emergency Management Director Don Messier, as well as representatives

City of Somersworth, New Hampshire
 from the Strafford Regional Planning Commission. Committee members were selected reflecting aspects of City responsibilities for hazard mitigation actions. It was decided that the meetings would be held in the first half of 2009. These meetings took place on:

- January 28th, 2009 at 10:30am at Somersworth City Council Chambers was cancelled due to snow storm
- February 3rd, 2009 at 9:00am at the Somersworth City Council Chambers
- February 18th, 2009 at 10:30am at the Somersworth City Council Chambers
- March 19th, 2009 at 10:30am at the Somersworth City Council Chambers
- April 8th, 2009 at 10:30 am at the Somersworth City Council Chambers
- April 29th, 2009 at 10:30 am at the Somersworth City Council Chambers

The six sections laid out in FEMA’s *Local Multi-Hazard Mitigation Planning Guidance* were organized within this planning process and each section or task was placed within the meeting timeline.

The **first meeting** began with a review of the update process, followed by a review of changes in critical facilities as well as updating maps and documenting hazard events that may have occurred since the last plan was adopted.

The **second meeting** focused on updating the goals of the previous plan, and creating a new action and implementation plan. This process consisted of editing actions from the 2003 plan, deleting those actions that had been completed or were no longer relevant, and finally adding new actions based on changes within the community.

Between the second and third meeting, a draft of the plan was sent to the Committee for review.

The **third meeting** was used to review the draft and note any edits and changes necessary.

The **fourth and fifth meetings** were used for discussion of mitigation measures, priorities, and further edits and reviews of the draft document

Committee Members

Table 1 lists Committee members involved in the multi-hazard mitigation plan update process.

Table 1. Somersworth Multi-Hazard Mitigation Planning Committee

Name	Title	Contact Information
Don Messier	Committee Chairman Emergency Management Director Fire Chief	sfdchief@comcast.net
Robert M. Belmore	City Manager	bbelmore@somersworth.com
Robert Crichton	Somersworth Housing Authority	
Dean Crombie	Chief of Police	
John Jackman	Public Works Director	jjackman@somersworth.org
Chris Jacobs	City Engineer	

City of Somersworth, New Hampshire

Name	Title	Contact Information
Andy Lucier	Somersworth Schools	bberry@sau56.k12.nh.us
Tim McLin	Lieutenant, Police Department	
Dave Sharples	City Planner	dsharples@somersworth.org
Craig Wheeler	Director of Development Services	cwheeler@somersworth.org

Public Involvement

All meetings held throughout the update process were open to the public. A legal notice was published on January 25, 2009 in Fosters Daily Democrat, a regional paper, to notify all area residents and businesses of the meetings with the goal of encouraging and soliciting valuable input from the community (See Appendix). The public notice not only invited local citizens, businesses and interested parties to the meetings, but also invited comments via phone calls and email to the Committee Chair, Fire Chief Dan Messier, and a representative from SRPC.

The key components of the *Plan* and any significant changes within Somersworth's infrastructure, event history and action plan were updated.

The Committee's priorities were placed on:

- Updating Critical Facilities
- Updating Recent Hazard Events and their Impact
- Updating the Mitigation Actions and Implementation Timeline

CHAPTER 2. RISK ASSESSMENT

1. Identifying Multi-Hazards

Within the last six years, no new types of hazards have emerged that would threaten the City of Somersworth. What has emerged is a greater threat from certain hazards that may not have been considered as quite as large an issue in the past. Damaging floods and ice storms that crippled the entire city were certainly not hazards that took a key focus in the 2003 Plan. How to prepare for such incidents has taken the forefront of this update.

The following section contains a list of natural and manmade disasters, and the areas that have been affected or could affect the City of Somersworth. These hazards were identified in a session with the Multi-Hazard Mitigation Planning Committee meeting on March 12, 2003. The *Past and Potential Hazards Map* reflects the contents of this list.

A. FLOODING

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

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however floods can occur at any time of year. A sudden thaw in the winter or a major downpour can cause flooding because there is suddenly a lot of water in one place with nowhere to go.

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

B. RIVERINE FLOODING 100-YEAR FLOODPLAIN EVENTS

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100-year flood does not mean that a flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase *1% annual chance flood*. What it means is there is a 1% chance that a flood of that size would occur in any given year.

C. ICE JAM FLOODING

Rising waters in early spring often break ice into chunks, which float downstream and often pile up, causing flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents significant flooding threats to bridges, roads, and the surrounding lands. Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

D. DAM BREACH

Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property. There are three dams within Somersworth as well as upstream dams. Knowing the contact information and plans for upstream dams is critical. Dam inundation studies are critical.

E. DROUGHT

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of droughts is indicated through measurements of soil moisture, groundwater levels, and stream flow. However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising

groundwater levels or increasing stream flow. Low stream flow also correlates with low ground-water levels because ground water discharge to streams and rivers maintains stream flow during extended dry periods. Low stream flow and low ground-water levels commonly cause diminished water supply.

F. EXTREME HEAT

Extreme heat events can be described as periods with high temperatures of 90°F or above. Elderly and very young populations are particularly susceptible to these events, even those of only single-day duration. Also, roads, railroads and other infrastructure can suffer significant damage during extended events.

Normally, the state enjoys variably moderate temperatures throughout the summer months with occasional peaks of high temperature and humidity. Extreme heat may come from a lasting heat wave in the summer.

The major threat from extreme heat to humans is heat stroke, exhaustion and poor air quality. Roads, bridges and railroads can be damaged in very high temperature. Utilities may need more energy for artificial cooling to be functional, as well as other structures used by humans.

G. WILDFIRE

Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassland areas.

The cause of fire may include arson, lightning, and burning of debris. The damage may include burned trees, a destroyed ecosystem, property damage, and loss of life. Fire could break out anywhere in the city. If the fire is detected and put under control immediately after breakout, the damage may be minimized.

H. EARTHQUAKE

Geologic events are often associated with California, but New England is considered a moderate risk earthquake zone. An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale.

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, avalanches, and tsunamis. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. There is no season for earthquakes. They can occur at any time without warning.

I. LANDSLIDE

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity including: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides, and earth flows. Landslides have damaged or destroyed roads, railroads, pipelines, electrical and telephone lines, mines, oil wells buildings, canals, sewers, bridges, dams, seaports, airports, forests, parks, and farms.

Erosion and mudslides become significant threats to development during floods. Floods speed up the process of erosion and increase the risk of mudslides. Erosion is the process of wind and water wearing away soil. Typically in New Hampshire, the land along rivers is relatively heavily developed. Mudslides may be formed when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock.

J. SUBSIDENCE

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 (hydro compaction), natural compaction, liquefaction, crystal deformation, subterranean mining, and withdrawal of fluids (ground water, petroleum, geothermal).

Subsidence poses a greater risk to property than to life. Damage consists of direct structural damage, property loss and depreciation of land values.

K. GEOMAGNETISM

It can be of significance for electric power utilities, pipeline operations, and radio communications. Nothing can be done to shield earth from these events. Effects could include brownouts throughout the city; disruptions of radio and television service; disruptions of digital communication, the effects on which are not fully understood; and disruptions of telephone service. The latter would happen primarily to wireless service.

L. RADON AIR/WATER

A naturally occurring radioactive gas with carcinogenic properties, radon is a common problem in many states. New Hampshire is one of them. Radon is particularly prevalent in areas with shallow depth to granite bedrock. Data collected by the NH Office of Community and Public Health, Bureau of Radiological Health indicated 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 the southeastern 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.

M. TORNADO

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud with winds in excess of 200 mph, often accompanied by violent lightning, peripheral high winds, severe hail, and severe rain. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Tornadoes develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Violent winds and debris slamming into buildings cause the most structural damage. The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

Tornados are not common in New Hampshire, however there was a tornado in southeastern New Hampshire in the summer of 2008 that had extensive damage along its pathway. 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. Dollar estimates from this type of hazard can range widely from thousands to millions depending on the nature and severity of the hazard.

N. HURRICANE

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually 20-30 miles wide and may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage. Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which accompany the storm. These floods can result in loss of lives and property.

O. DOWNBURST

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

Downbursts are strong, columnar, downwardly moving gusts of wind generated most often by powerful thunderstorms. Somersworth has not experienced downbursts in recent memory.

P. LIGHTNING STRIKES

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, a shock wave that can damage building walls and break glass. Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Lightning strikes can cause death, injury, and property damage.

Hailstones are balls of ice that grow as they are held up by winds, known as updrafts, which blow upward in thunderstorms. The updrafts carry droplets of supercooled water - water at a below freezing temperature - but not yet ice. The supercooled water droplets hit the balls of ice and freeze instantly, making the hailstones grow. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. Details of how hailstones grow are complicated, but the results are irregular balls of ice that can be as large as baseballs, sometimes even bigger. While crops are the major victims, hail is also a hazard to vehicles, roofs and windows. There was a large hailstorm in Exeter the summer of 2007 that had extensive damage.

Q. EXTREME WINTER WEATHER

In the New England region, the winter season may extend from September to May. Severe winter weather includes snow, sleet, ice storms, freezing rain, high winds and hail. Possible damage may include: felled trees, downed power lines with loss of electrical power, structure collapse under the weight of snow, blocked or narrowed right-of-ways, frozen or restricted water/sewer lines, flooding caused by ice-jammed rivers or storm drains, train derailments, and traffic accidents.

Ice and snow events typically occur during the winter months and can cause loss of life, property damage, and tree damage. A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding, wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

An ice storm involves rain, which freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects. Ice storms also often produce widespread power outages. There was an extensive ice storm that covered the state of New Hampshire in December 2008 that caused extensive damage to homes and the utility infrastructure.

A Nor'easter is defined as a large weather system traveling from south to north, passing along or near the seacoast. As the storm approaches New England, and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a northeasterly direction.

The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours (even days) in terms of duration. In the winter months, oftentimes blizzard conditions accompany these events. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods.

R. MAN-MADE HAZARDS

Transportation of chemicals and bio-hazardous materials to and from Canada or Maine by railroad or truck is a concern. The seasonal influx of vacationers in our area is of concern to the firefighters and emergency care providers as far as preparing for protection of these visitors in the case of an accidental release.

2. Profiling Multi-Hazards

In order to determine estimated losses due to natural and man made hazards in Somersworth, each hazard area was analyzed with results shown below. Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of the analyses exclude both the land value and contents of the structure. The value of all structures in the City, including exempt structures such as schools and churches, is \$597,428,980.⁷ The data below was calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses*, August 2001. In addition, the 2003 Committee completed the Vulnerability Assessment Worksheets, which provided more data to estimate the potential losses. The 2009 Committee reviewed the work from 2003 and made minor changes.

A. FLOODING RIVERINE/100-YEAR FLOODPLAIN EVENTS - HIGH RISK

Specific Location: Salmon Falls River

Extent: High Risk

Recurrence Potential: High - Flood conditions will continue to affect the City of Somersworth. Both seasonal flooding and flooding due to extreme weather events have the potential to occur during all seasons.

B. ICE JAM FLOODING

Specific Location: Instances of ice jam flooding on the Salmon Falls River have been rare to non-existent. The US Army Corps of Engineers Ice Jams Database contains no records of ice jams in Somersworth. Although some anecdotal information indicates that ice formation and ice flows do occur on the Salmon Falls River, the Multi-Hazard Mitigation Plan Committee could find no evidence, even at the two dams on the river.

Extent: Low Risk

Recurrence Potential: Low - Instances of ice jam flooding on the Salmon Falls River have been rare to non-existent.

C. DAM BREACH

Specific Location: The dams are the Stonewall, GE Baxter LRSW Detention Pond Dam and the Lower Great Falls Dam. If these dams were breached, the residential parcels along the Salmon Falls River would be in jeopardy.

Extent: Low Risk

Recurrence Potential: - No dam breaches have occurred in Somersworth, and the dams are designed to withstand likely storms; therefore, the hazard potential is considered low.

D. DROUGHT

Specific Location: Droughts are rare in New Hampshire. Somersworth has experienced severe drought conditions most recently in the summers of 1999 through 2002. Sustained, severe drought conditions also existed in New Hampshire from 1960 to 1969.

Extent: Medium Risk

Recurrence Potential: High - Drought and other extremes of environmental variation are increasing in frequency in the region, so drought can be expected increasingly to recur in Somersworth.

⁷ City of Somersworth Assessor, 2009 data

E. EXTREME HEAT

Specific Location: Normally, the state enjoys variably moderate temperatures throughout the summer months with occasional peaks of high temperature and humidity. Extreme heat may come from a lasting heat wave in the summer.

Extent: Medium Risk

Recurrence Potential: *Medium* - Heat wave conditions will continue to affect the Somersworth area. The City should anticipate periodic recurrence of such conditions. An Internet search of temperature and climate data showed a moderately high and increasing frequency of heat wave conditions, characterized by three consecutive days of temperatures exceeding 90 degrees F.

F. WILDFIRE

Specific Location: Somersworth has some forested areas, especially in the north and southwest parts along the Dover and Rochester borders. Mobile home parks, such as Crystal Springs and Colonial Pines, are particularly vulnerable. Other potential wildfire areas are in the north central section of the City surrounding Bates Brook and in the southeast of the City in the area around Twombly Brook. The latter area, though not large, is of particular note, because it is contiguous with the large, undeveloped woodland in Rollinsford known as the Scoutlands.

Extent: Medium Risk

Recurrence Potential: *Low* - As timber harvesting is reduced, wood roads close, debris builds up on the ground, and the potential for wildfire increases. Wildfire has been an insignificant occurrence in Somersworth. Though wildfire may technically increase in frequency for the above reasons, it is not likely to be a significant increase.

G. EARTHQUAKE

Specific Location: New England experiences an average of 30-40 earthquakes per year although most are not felt. Due to the solid bedrock geology of New England, an earthquake will affect a much larger area than an earthquake of similar magnitude in California. The State of New Hampshire lies in an area of the Northeastern United States that has a "Moderate" risk from seismic activity. On April 19, 2002, a 5.1 earthquake centered near Plattsburgh, N.Y. hit New Hampshire. The tremor was felt in Somersworth, but did not cause any damage.

Extent: Moderate

Recurrence Potential: *Medium* - Significant seismic activity in southeast New Hampshire is rare. Given the proximity to past significant events, the likelihood of a significant seismic event occurring in the future is moderate. The most significant earthquake in the Somersworth area was the Cape Ann quake that occurred November 18, 1875.

H. LANDSLIDE

Specific Location: Areas of steep slopes with unstable soils that could lead to landslides are not found in Somersworth. The city is mostly a low-lying area, with elevations about 200 feet above sea level. There are two hilly areas including one off High Street near the downtown center, and another along the Salmon Falls River near the Rochester border, where elevations rise to about 300 feet.

Extent: Low Risk

Recurrence Potential: *Low* - Somersworth is a low-risk area for landslides. The State of New Hampshire Hazard Mitigation Plan classifies the Somersworth area as being at no risk for landslide.

I. SUBSIDENCE

Specific Location: Land subsidence, the loss of surface elevation due to removal of subsurface support, occurs in nearly every state in the United States. Unpredictable areas in Somersworth could be along old river channels or old land fills.

Extent: Low Risk

Recurrence Potential: *Low* - No evidence exists of subsidence in Somersworth, and the soils, the bedrock structure, and the prevailing water extraction and development practices in the city would not tend to promote subsidence.

J. GEOMAGNETISM

Specific Location: Geomagnetic disturbances are a potential risk to Somersworth. It can be of significance for electric power utilities, pipeline operations, and radio communications.

Extent: Low Risk

Recurrence Potential: *Low* – Serious geomagnetic disturbances are generally rare. Because they are naturally occurring, human activities are unlikely to have any effect on the frequency of these events.

K. RADON AIR/WATER

Specific Location: Radon is a common problem in many states, including New Hampshire. Geologic conditions that produce radon will continue to affect the Somersworth area.

Extent: Medium Risk

Recurrence Potential: *High* - New development provides opportunity to test and install mitigation systems to limit exposure to building occupants.

L. TORNADO

Specific Location: Tornadoes are not common in New Hampshire. Somersworth has a number of masonry structures and mobile homes that could be susceptible to tornadoes and high winds. There are approximately 105 mobile homes and 15 masonry structures, including Hilltop Elementary, the GE Building, and the Great Falls Mill that could be particularly vulnerable.

Extent: Low Risk

Recurrence Potential: *Low* - Historically, tornado occurrence in the Somersworth area is rare. The National Climatic Data Center website documents only six tornadoes that have affected Strafford County since 1950.

M. HURRICANE

Specific Location: Somersworth's location in southeast New Hampshire makes it somewhat more susceptible to extremely high winds and flooding that are associated with hurricanes. There have been relatively recent instances where hurricanes uprooted trees onto structures, specifically Hurricane Gloria in 1985 and Hurricane Bob in 1991. The great hurricane of 1938 devastated much of south coastal New England and caused significant damage in Somersworth. There are approximately 105 mobile homes and 15 masonry structures, including Hilltop Elementary, the GE Building, and the Great Falls Mill that could be particularly vulnerable.

Extent: Medium Risk

Recurrence Potential: *Medium* – Significant hurricanes could be expected to affect Somersworth approximately every 15-20 years. Although this frequency is relatively low, the damage from a hurricane that makes landfall in Coastal New Hampshire could be large.

N. DOWNBURST

Specific Location: Somersworth has approximately 105 mobile homes and 15 masonry structures that would be particularly vulnerable.

Extent: Medium Risk

Recurrence Potential: *Low* – Although thunderstorms are common in the Somersworth area, downbursts are relatively rare, and the spatial concentration of a downburst further reduces the likelihood of occurrence. Somersworth has not experienced downbursts in recent memory.

O. LIGHTNING STRIKES

Specific Location: Lightning strikes are common with thunderstorms in the Somersworth area. Damage is most likely to be done through secondary effects like wildfire or tree felling. Direct strikes of people and buildings, however, remain a distinct possibility. Loss of life is generally not likely, but the opening of a new golf course in Somersworth might significantly increase the likelihood of direct strikes on people, as do outdoor events, such as the Somersworth International Children's Festival.

Extent: *Low Risk*

Recurrence Potential: *Low* – The probability of damaging lightning strikes is low, despite the high frequency of lightning generating storms.

P. EXTREME WINTER WEATHER

Specific Location: Masses of snow and/or ice often affects infrastructure, transportation and the delivery of goods and services for extended periods. All homes and structures are vulnerable to property damage and loss.

Extent: *Medium Risk*

Recurrence Potential: *High* - winter storms will continue to affect the City of Somersworth regularly. According to the National Climatic Data Center website at least 67 significant winter storms have affected Strafford County. Records from the early 1900's and from the 1950's through 1980's indicate multiple occurrences of extremely heavy snowfalls. More recently, in March 1993, February 1996, and three times in Winter 2002, heavy snow events occurred. Perhaps most significantly in recent history, January 1998 brought a devastating ice storm, after which President Clinton issued a Disaster Declaration for the State of New Hampshire (with the exception of Rockingham County). And again in December 2008, there was an even more devastating ice storm for which President Bush issues a Disaster Declaration for the State of New Hampshire. While the likelihood of winter storms affecting Somersworth is very high, the risk is reduced due to the low occurrence of truly severe storms.

Q. MAN-MADE HAZARDS

Specific Location: The NH North Coast rail line runs through Somersworth in the densely developed and populated downtown area, mostly carrying freight and Liquid Propane Gas "LPG" to Eastern Propane & Oil terminal in North Rochester. Transportation of chemicals and bio-hazardous materials to and from Canada or Maine by railroad or truck is a concern. The potential for derailments and accidents at rail crossings always exists. Three major roads also pose significant hazards for the City. The Spaulding Turnpike (Route 16) is a main highway from southern New Hampshire to the Lakes Region and the White Mountains. Traffic accidents occur on this highway regularly, and hazardous materials are routinely carried on this road. State Route 9 (High Street) connects the Spaulding Turnpike with the Berwicks in Maine, passing directly through downtown Somersworth, crossing both the Salmon Falls River and the New Hampshire North Coast railroad line, and continuing eastward into Berwick, Maine. Though probably not as frequently, hazardous materials are carried on this roadway. Traffic congestion is a common problem on this route. Finally, state Route 108 is a major alternative road to the Spaulding Turnpike in western Somersworth, connecting Dover and Rochester, New Hampshire. It is a major commercial corridor.

Extent: *Medium Risk*

Recurrence Potential: *Low* – No disastrous accidents on either the highway or rail system in Somersworth have been recorded. Safety regulations and enforcement are fairly strict, so the likelihood of an accidental and seriously damaging release of harmful chemicals in Somersworth is small. If an accident does occur, though, especially close to downtown, the percentage of the population exposed to the hazard could be large.

The 2003 Committee identified five general areas wherein structures may be at risk from damage from an event:

- Wind hazard
- Floodplains
- Dam failure inundation
- Buildings of masonry construction
- Wildfire hazard

The 2009 Committee confirmed that these are the five general areas where structures are at risk.

3. Assessing Vulnerability

A. CRITICAL FACILITIES OVERVIEW SUMMARY

Specific buildings or infrastructure within a community that must receive immediate attention during a disaster are referred to as a critical facility. A critical facility is defined as a building, structure, or location which:

- is vital to the hazard response effort

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- maintains an existing level of protection from hazards for the community
- would create a secondary disaster if a hazard were to impact it

The 2009 Multi-Hazard Committee reviewed a list of the 2003 Plan’s critical facilities. Those facilities were also displayed graphically on a map of Somersworth. The Committee used the 2003 resources to update the list and location of critical facilities. This update included new facilities, relocated facilities, defunct facilities and any other changes that may have occurred.

B. UPDATED INVENTORY OF STRUCTURES AFFECTED

The critical facilities list for the City of Somersworth has been organized according to a list provided by the State Hazard Mitigation Officer. Somersworth's Multi-Hazard Mitigation Planning Committee has divided this list of facilities into four categories:

- The *first category* contains facilities needed for emergency response in the event of a disaster.
- The *second category* contains non-emergency response facilities that have been identified by the Committee. These are not required in an emergency response event, but are considered essential for the everyday operation of Somersworth.
- The *third category* contains facilities and populations that the committee wishes to protect in the event of a disaster.
- The *fourth category* contains potential resources, which could provide services or supplies in the event of a disaster.

The *Critical Facilities Map and Evacuation Plan* at the end of the Plan identifies the facilities and the evacuation routes.

Table 2. Critical Facilities

Category 1: Emergency Response Services		
Facility Name	Building Type	Address
Central Fire Station	Fire Station	195 Maple Street
Police Station	Police Station	12 Lilac Lane
Getty Oil	Fuel Station	463 High Street
Irving Oil Corp	Fuel Station	425 High Street
Optima Gas	Fuel Station	463 High Street
Citgo Gas	Fuel Station	196 Tri City Plaza
Texaco-Mr Mike's	Fuel Station	202 Route 108
Mobil Car Wash	Fuel Station	55 Route 108
State Barn	Gas and Propane	Dover
Webber Energy	Gas and Propane	420 Route 108
Electric Transformer	Power Substation	352 Main Street
Electric Transformer	Power Substation	Tates Brook
Electric Transformer	Power Substation	High Street/Walmart
High Street	Evacuation Route	
West High Street	Evacuation Route	
Green Street	Evacuation Route	
Main Street	Evacuation Route	
Fairpoint Switch	Telephone Switch Station	High Street
Fairpoint Main Building	Telephone Station	100 Tri City Road
Somersworth City Hall	Municipal Building	One Government Way

Category 2: Non-Emergency Response Facilities		
Facility Name	Building Type	Address
Public Works Facility	Public Works Garage	18 Lilac Lane
Wastewater Plant	Sewage Treatment Plant	99 Buffumsville Road
City Wells	Water Supply	Rocky Hill Road
Water Treatment Plant	Water Treatment Plant	9 Wells Street
Cell Towers	Communications	Various

Category 3: Facilities and Populations to Protect		
Facility Name	Building Type	Address
Albert Nadeau Homes	Multi-Family Housing	Bartlett Ave
Smokey Hollow Commons	Multi-Family Housing	225 Main Street
Robert Filion Terrace	Apartments	70-84 Washington Street
Queensbury Mill	Apartments	1 Market Street
Preservation Park	Apartments	163,185,195 Main Street
Edward Charpentier Apartments	Apartments	28 Franklin Street
Sunnyhurst Apartments	Apartments	731 Tri City Rd
Indigo Hill Road Apartments	Apartments	151 Indigo Hill Road
Crockett's Crossing	Apartments	Wildflower Circle
Cherryfield Village	Apartments	395 Main Street
US Army Reserve Center	Armory	Route 108
National Guard Armory	NH National Guard Armory	15 Blackwater Road
American Legion	American Legion Hall	9 Constitutional
VFW	VFW	43 High Street
Holy Trinity Church	Church	404 High Street
St. Martins Church	Church	120 Maple Street
First Parish Congressional Church	Church	176 West High Street
Somersworth Pentecostal Center	Church	59 Market Street
Tri City Covenant Church	Church	150 W High Street
Tri City Covenant School	School	150 W High Street
Tri City Covenant School Christian Day School	School	12 Rocky Hill
Church of Latter Day Saints	Church	35 Tate's Brook Road
First Baptist Church	Church	25 Cemetery Road
Greek Orthodox Church	Church	45 Tate's Brook Road
SAU #56 Building	School	51 W High Street
Hilltop Elementary School	School	17 Grant Street
Maplewood Elementary School	School	184 Maple St
High School	School	11 Memorial Drive
Vocational Technical	School	11 Memorial Drive

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Center		
Middle School	School	7 Memorial Drive
Somersworth Child Care Center	School	15 Bartlett Avenue
Public Library	Library	9 Main Street
US Post Office	Post Office	2 Government Way

Category 4: Potential Resources		
Facility Name	Building Type	Address
Martin Flanagan Center	Services	9 Bartlett Avenue
General Electric	Industrial	130 Main Street
Trelleborg	Industrial	366 Route 108
Velcro USA Inc	Industrial	330 Route 108
WalMart	Retail	59 Walton's
Redi-Care	Medical Office	396 High Street
Somersworth Health Center	Medical Office	85 Main Street
Marsh Brook	Medical Office	237 Route 108
Martin Flanagan Center	Community Center	9 Bartlett Avenue
Construction Company – Turgeon's Inc		37 Indigo Hill Road
Mutual Aid – Police, Fire, Highway		
Favorite Foods	Wholesale Distribution Center	Interstate Drive
Somersworth School District	Transportation - buses	SAU 56 51 West High Street
Fortier & Son Inc	Propane fuel distribution	216 Green Street
Borderline Fuels	Propane fuel distribution	35 Center Road
First Student	Transportation - buses	Whitehouse Road
Construction Company – MacKennon & Sons		23 Linden Street
Tri City Bingo	Recreation Hall	451 High Street

C. ADDRESSING REPETITIVE LOSS PROPERTIES

Repetitive loss properties are those for which two or more losses of at least \$1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978 (FEMA, 2008). An assessment of Repetitive Loss Structures was not conducted within the 2003 Plan. The total value of all structures in the City within the 1% special flood hazard areas is \$4,608,900⁸.

Table 3. Repetitive Loss Property

Community	Property	Occupancy	Insured	Losses	Total Building Payment	Total Contents Payment	Total Paid	As of Date
Somersworth	Residential	Single Family	Yes	2	\$182,585.98	\$47,564.87	\$230,150.85	7/31/2008

⁸ 2009 Assessors Data

There is only one repetitive loss structure that currently exists in the City of Somersworth. This residence is located on a floodplain.

D. IDENTIFYING STRUCTURES

Besides the residence list reported as a repetitive loss structure in the previous section, the 2003 plan also identified the following structures as being located within hazard areas:

- The location of the Water Treatment Plant in the 100-yr. floodplain is a fairly typical condition in the region. It places the plant in close proximity to the water intake. Unless a new plant is built, this location is unlikely to change.
- With regard to wildfire hazard, the two industrial facilities are located along the edge of an identified wildfire hazard area. The hazard area is largely owned by those industrial companies and maintained by them.
- Perhaps more significantly, the Cherryfield Village housing development is within a wildfire hazard area in the southeast portion of the city adjacent to the Town of Rollinsford boundary. Furthermore, that hazard area is nearly contiguous with the large, undeveloped forest area in Rollinsford known as the Scoutlands and, therefore, may have an elevated probability of experiencing wildfire compared with other wildfire hazard areas in Somersworth. The Scoutlands has just had a conservation easement placed on the property by the Town of Rollinsford.

Table 4. Critical Facilities in Hazard Areas

Flooding:		
Water Treatment Plant	Municipal Water Facility	9 Wells Street
Wildfire:		
Forsheda Palmer Chenard Trelleborg	Industrial	366 Route 108
Velcro USA, Inc.	Industrial	330 Route 108
Cherryfield Village	Housing	395 Main Street

E. ESTIMATING POTENTIAL LOSSES

The only loss this plan focused on was the repetitive loss property located on the floodplain.

If the flooding losses were estimated for this property annually according to a 100-year storm, the potential dollar loss would calculate as follows:

$$\$182,585.98 \text{ (Building)} + 47,564.87 \text{ (Contents)} = \$230,150.85 \text{ (Total Payments)} \Rightarrow 2, 201.51 \text{ Annualized.}$$

This number should be considered a rough estimate only, as it factors only one structure. The inventory could also be lacking other structures not taken into consideration, like seasonal campsites or seasonal mobile homes.

F. ANALYZING DEVELOPMENT TRENDS

Somersworth was incorporated as a city in 1893. With its location on the Salmon Falls River, Somersworth has been home to many gristmills, sawmills, and cotton and woolen-making establishments. Somersworth has seen steady growth over the last three decades.

Single-family housing stock constitutes a majority of the City’s residential base. According to the 2000 Census, there were 4,841 total housing units. Of those, 2,298 were single-family units, 2,046 were multi-family units and 497 were mobile homes. The median value of owner-occupied housing is \$105,500 and the median gross rent is \$621.

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Over the past 30 years, Somersworth has seen steady and significant growth, including residential, commercial, and industrial expansion. Growth has occurred largely around a few growth centers. Most residential development is occurring along the Dover border near the Spaulding Turnpike, although other areas of development include the area of Rocky Hill Road near the Rochester border. Commercial and industrial development has been centered downtown and along the Route 108 and Route 9 (High Street) corridors. Some of the largest current employers include Wal-Mart (Route 9) and General Electric (downtown). The pace of commercial development in the Route 9 corridor has increased markedly in the last decade, characterized by establishment of big-box superstores, shopping plazas with large chain retail, restaurants, fuel stations, and other automobile related businesses. Although not as quickly burgeoning, development in the Route 108 corridor has increased noticeably, a significant percentage related to commercial health care. Notably, Somersworth has also developed a new 18 -hole golf course within the last two years.

With the exception of flooding and wildfire, all identified hazards in this report are either regional or citywide hazards; therefore, new development will occur by definition within these distributed hazard areas.

In regard to flooding, the Multi-Hazard Mitigation Planning Committee reviewed overlays of the 100-yr. floodplains on structures in the city and found 23 structures in the floodplain with a total value of approximately \$4,608,900. Future development in the floodplain is likely to be sparse with the exception of that in already developed floodplain in the downtown area. Floodplain development is expensive due to the stringent flood-proofing requirements in place in the Somersworth zoning ordinances. Also, floodplains by definition surround significant streams and rivers that have state and locally defined protective buffers.

Wildfire hazard areas are more likely than floodplains to experience significant development in the future. The Tates Brook wildfire hazard area in northeast Somersworth seems the most likely to experience heavy development pressure. Tates Brook bisects the area, and the western half of the area is itself bisected by Otis Road, which provides existing access to the interior of the area. The hazard area is also located near the newly developed golf course, which might make the hazard area prime real estate. If most of the area would be developed fairly quickly into residential lots through standard subdivision, wildfire hazard might conceivably be minimized. If just a few, larger, and isolated lots are developed; those lots might be under significant wildfire risk.

The Twombly Brook wildfire hazard area in the southeast of the City is less likely to undergo development, at least in the near future. Existing road access to this area is not extensive and mostly from the southern end of Main Street. Some development does exist already, most notably the Cherryfield Village housing units with access from Main Street. Other sides of the hazard area are not closely approached by existing roads, and therefore extension of municipal services to new development would be expensive. Finally, the wildfire hazard area west of Route 108 that is owned largely by industrial entities is also less likely to be developed, because of the industrial ownership and the physical buffer it provides between the industrial plants and residential and commercial development in the surrounding area.

One factor that could have major influence on the future occurrence of development in the wildfire hazard areas is the establishment of permanent conservation land. Somersworth is already quite densely developed, and the wildfire hazard areas identified in this plan are some of the few lands left in the City that could have major conservation impact. Various city and state entities are vigorously pursuing conservation goals, so the wildfire hazard areas may not be developed.

Actions to Reduce Vulnerability

CHAPTER 3. MITIGATION STRATEGY

1. Local Multi-Hazard Mitigation Goals

A. 2003 ALL HAZARD MITIGATION GOALS

The Multi-Hazard Mitigation Planning Committee reviewed the goals and objectives of the 2003 Plan. It was decided that these goals and objectives reflected the same concepts that the City was working towards with the new update of the plan. Despite a new emphasis on *resiliency* and pre-hazard mitigation, the 2003 goals and objectives still represent a stepping-stone towards new and modified actions that the Committee hopes to achieve.

The following mitigation goals, established by the 2003 Hazard Mitigation Planning Committee were taken with minimal modification from the State of New Hampshire Hazard Mitigation Plan. The 2003 Hazard Mitigation Planning Committee had access to the State Plan and felt that the broad goals presented therein were adequate and would serve as a criterion against which mitigation actions could be judged. The 2003 Committee also found the goals to be helpful as a list of guiding principles throughout the process.

1. Improve upon the protection of the general population, the citizens of the City of Somersworth and guests, from all natural and man-made hazards.
2. Reduce the potential impact of natural and man-made disasters on the City of Somersworth's emergency response services.
3. Reduce the potential impact of natural and man-made disasters on the critical facilities in the City of Somersworth.
4. Reduce the potential impact of natural and man-made disasters on the City of Somersworth's infrastructure.
5. Improve the City of Somersworth's emergency preparedness and disaster response and recovery capability.
6. Reduce the potential impact of natural and man-made disasters on private property in the City of Somersworth.
7. Reduce the potential impact of natural and man-made disasters on the City of Somersworth's economy.
8. Reduce the potential impact of natural and man-made disasters on the City of Somersworth's natural environment.
9. Reduce the City of Somersworth's liability with respect to natural and man-made hazards through a community education program.
10. Reduce the potential impact of natural and man-made disasters on the City of Somersworth's specific historic treasures.
11. Identify, introduce and implement cost-effective multi-hazard mitigation measures so as to accomplish the City's goals and objectives and to raise the awareness of and acceptance of multi-hazard mitigation opportunities generally.
12. The City of Somersworth will work in conjunction and cooperation with the State of New Hampshire's multi-hazard mitigation goals.

2. Identification of Existing Hazard Mitigation Programs

Table 5: Existing Hazard Mitigation Programs in Somersworth

Existing Program or Activity	Description	Hazard	Area of City Covered	Status
Building Code / Permits	Requires builder to obtain all permits prior to action.	All	City wide IBC BOCA code	Ongoing
Life Safety Codes	NFPA 1 and 101 2003 Edition	All	State adopted standards	Ongoing
Fire Standards	NFPA 1 and 101 2003 Edition	All	State adopted standards	Ongoing
Elevation Certificates	Required for Individual applications on case by case basis	Severe Storms Ice Jams	Potential Flood Areas Part of flood insurance program.	Ongoing
Flood Hazard District	Requires compliance with zoning ordinance and land use regulations	Ice Jams Severe Storms	Potential Flood Areas per FIRM maps. Allows for elevated construction within the floodplain.	Ongoing
Groundwater Resource Protection District	Protect existing and potential groundwater supply and groundwater recharge areas.	Drought	Aquifer areas	Ongoing
Riparian Buffer Ordinance	Protection of vegetation and soil in vicinity of wetlands	Flooding Severe Storms	Wetlands	Ongoing
Comprehensive Shoreland Protection Act	State standards Referenced in ordinances	Flooding Severe Storms	Willand and Lily Ponds Salmon Falls River with urban exemption	Ongoing
Zoning Ordinance	Minimum lot area definition excludes constrained lands, such as steep slopes	All	City-wide	Ongoing
Best Management Practices	Required by State for stormwater management, sedimentation erosion control, site alteration, timber management, etc	All	City-wide	Ongoing
Road Design Standards	State minimum standards with additional subdivision and site plan regulations.	All	City-wide	Ongoing
Manufactured Homes and Parks	State standards	All	Manufactured Homes and Parks	Ongoing
Mutual Aid	Police mutual aid system	All	1. Dover-Rochester-Rollinsford 2. S Berwick –Berwick 3. Strafford County Dispatch Units 4. Strafford Co. Tactical Response 5. Strafford Co. Technical Accident	Ongoing

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Existing Program or Activity	Description	Hazard	Area of City Covered	Status
			Reconstruction Team 6. State Police Units	
Mutual Aid	Mutual aid system for highway	All	NH Public Works Association	Ongoing
Mutual Aid	Mutual aid system for fire	All	1. Community Mutual Aid Association 2. Seacoast Chief Fire Officers Association	Ongoing
Emergency Operations Plan	Describes actions and responsible parties, for various emergency events	All	City-wide	Updated in 2005. Currently under review for update.
Evacuation and Notification	Radio station, TV notification, email blast, website Government cable access; Fire apparatus, National Guard vehicles, Housing Authority vans, privately owned vehicles,	All	City-wide	Ongoing
Emergency Back-up Power	Have a generator at Police Station, Fire Department, Housing Authority, Public Works Department, Water and Wastewater facilities-need a generator at schools	All	City- wide	Need for generator at City Hall
Emergency Shelter	Share shelter with Rochester	All	City-wide	Ongoing
Tree maintenance in Right of Way	Public Service of New Hampshire, Public Works Dept to remove diseased, dead, and/or dangerous trees as needed.	Severe Storms Tornados Ice Storms Flooding	City-wide	Ongoing
Storm Drain Maintenance	Open & closed channels as needed.	Severe Storms Flooding	City-wide	. MS4 Permit due in mid 2009 will mandate new compliance activities
Flood gauge	Measures level of river	Severe Storms Flooding	At water facility on Salmon Falls River	Ongoing
Flood Warning System	Computer linked to flood gauge notifies operator of water levels; available by computer to EMD	Severe Storms Flooding	At water facility on Salmon Falls River	Ongoing
State Dam Program	Inspected by State	Severe Storms Flooding	At dams	State jurisdiction
Public Education	City newsletter, email blasts, website, government access channel 22	All	City-wide	Ongoing

3. Identification and Analysis of Mitigation actions

The 2003 Hazard Mitigation Planning Committee established a list of mitigation actions defined within seven categories of objectives, which constituted a usable framework for identifying and categorizing potential mitigation actions. The seven categories of objectives are as follows:

- preventative (programs & policies)
- engineering projects
- training
- equipment purchase
- property protection
- structural
- public education & information

The 2003 Committee eliminated options that would not be applicable to the City of Somersworth. The next step was to review the actions and to eliminate those that seemed infeasible due to cost/benefit or logistical difficulties. The Committee members used their experience and expertise to judge whether an action was *feasible* or *potentially do-able*.

Using the STAPLEE process, the 2003 Committee created an actions list after review of the mitigation goals and the man-made and natural hazards. The Committee created a list of projects from the types of hazards for which Somersworth is at risk. Accordingly, the Committee considered each action for its status using the following criteria:

- potential for filling a gap in existing mitigation measures
- relative cost
- feasibility given current resources and expertise
- timeliness of need considering the risk level.

By this evaluation, the number of mitigation actions was reduced to six, all within the objective category *preventative* (programs and policies). The resulting list of 2003 is shown in Table 6.

Moving the process up to 2009, the Multi-Hazard Committee, again used a STAPLEE process. The Committee kept the same goals and seven objectives from the 2003 plan. For the action plan, the Multi-Hazard Committee reviewed the 2003 actions sorting to see which actions had been completed, where actions were in the process, and if the actions had not been started, which actions were still relevant.

After this process was completed a brainstorm session was held to develop new actions. Many of the same hazard and resource issues came up, specifically funding. A discussion of FEMA grants and other funding sources clarified the point of the exercise from that of a wish list to that of filling City needs that are 1) achievable in the near future, 2) with available monies, specifically for pre-disaster projects. Working within this consensus-based decision process, the City will work to establish actions that have achievable and measurable events.

The Multi-Hazard Committee discussed these actions at two meetings. The gas line project was viewed as not feasible due to the inability of the City to receive data from gas line companies. Since the last three storm events, the City viewed the public utilities, as having an aggressive, ongoing tree-trimming program that is effective. The DES Dam Bureau is completing dam inundation studies as part of their functions.

In summary, the actions within the 2003 Plan and updated 2010 Plan are designed to reduce the City's vulnerability to hazard events. Several of the actions laid out in the 2003 plan have been completed as the City has taken steps to improve daily emergency management, as well as preparedness for unforeseen events.

4. Status of 2003 MITIGATION Actions

Table 6 displays the 2003 Plan's prioritized mitigation actions. Those in *bold italics* are successfully completed.

Table 6. 2003 Prioritized Mitigation Actions Update

MITIGATION ACTION	STATUS	RESULT
<i>Dam Study</i>	<i>In process through DES Dam Bureau</i>	<i>Better knowledge of dams and river</i>
<i>Central Dispatch Communications Station</i>	<i>Completed by City</i>	<i>Better communication amongst City departments, staff, business and residents. New equipment (repeater system) New police station incorporates City's new emergency operations center and dispatch</i>
<i>Hire a GIS Administrator</i>	<i>Completed by City with shared resources from staff and SRPC</i>	<i>Better use of data amongst City departments. Parcel data linked with assessor's data. 911 mapping has been completed in 2010.</i>
Automate Gas Lines (GIS)	Not feasible	Gas companies unwilling to share data with City.
Annual Tree Review	In process	HMGP grants
Create Digital Orthophotography	In process	NH DOT received an ARRA grant to create Spring 2010 orthophotography of entire state, which will be available in late 2010 or 2011.

The new Central Dispatch Station improves communications and response time to emergencies citywide, including responses to critical facilities. GIS mapping, through a cooperative effort, updates street maps, as well as identifies where structures throughout the city might fall within hazard areas, like floodplains and wildfire areas.

5. Identification and Analysis of 2010 Mitigation Actions

The new 2010 list of actions is shorter and incorporates several of the previous actions. It was decided by the Multi-Hazard Committee, after reviewing the 2003 plan and using the STAPLEE process, to focus on what could be accomplished realistically based on funding and resource availability. The new actions also reflect recent events that have affected the City since 2003, specifically the flooding events of 2006, 2007 and 2010 as well as the ice storm of December 2008 and windstorm of 2010.

City of Somersworth, New Hampshire
Table 7. 2010 Action and Implementation Plan

MITIGATION ACTION	WHO Responsible Party	WHEN Timeframe Deadline	HOW Funding Source Resources
<i>4 Laptops/Software/GPS Emergency Vehicles Command, Fire Department</i>	Emergency Management Director	1 Year	EMPG Grants
<i>Update Digital Orthophotography-integrate into City system</i>	City Planner City Engineer	1 Year	NHDOT ARRA grant being flown in April 2010 City resources
<i>Flood Prevention on Rocky Hill Road (3 culverts) and Blackwater Road (1 culvert) Raise road and replace four culverts to increase water flow and reduce flooding</i>	City Engineer	3 years	City resources FEMA hazard mitigation assistance grants
<i>Sump pumps needed for structures during severe storms</i>	Emergency Management Director	2 years	EMG City resources
<i>Server needed for City Hall</i>	Emergency Management Director	1 year	EMG City resources
<i>E911 Address Layer into GIS System</i>	City Planner Public Works Director	1 Year	GRANIT/E911 EMG City resources
<i>Fluvial Erosion Hazard Mapping, Ordinance Development and Outreach</i>	DES and NH Geologic Survey staff City Planner	3 Years	FEMA funds City resources

6. Implementation of National Flood Insurance Program (NFIP)

Somersworth has been participating in the National Flood Insurance Program since June 1979. Flood Insurance Rate Maps and the Flood Boundary and Floodway Map, all bearing the effective date of May 17, 2005 are used for flood insurance purposes and are on file with the Somersworth Planning Board. As of January 1997, there are approximately 23 structures located in the FEMA designated Special Flood Hazard Areas, with a population of 200, and three NFIP Policies.

The City participates in the National Flood Insurance Program and is in compliance with its regulations and practices. City staff are trained to assist members of the public with enquiries and requests. The City Planner and Building Inspector will work with the NFIP staff at the Office of Energy and Planning in responding to requests from the public, providing new sources of information on flooding and insurance of properties, responding to Community Assisted Visit checklists, and working with applicants for building permits, site plans and subdivisions to ensure that the applicants and public understand the flood hazard district regulations and zoning.

The NH Geologic Survey and Department of Environmental Services staff are receiving FEMA funds to inventory and map the fluvial erosion hazard using the Vermont protocols, modified to New Hampshire. In 2010 they will be inventorying the Cochecho River, and Strafford Regional Planning Commission staff will support the NHGS in public outreach and education for the public and planners. The Somersworth City Planner will be participating in this education process. Depending upon state priorities for mapping, the Salmon Falls River may also be inventoried and mapped in the next five year cycle. The City Planner will be able to provide information to City Planning Board, Conservation Commission, and public regarding fluvial erosion hazards in Somersworth and their value to mitigate future flooding within the flood hazard areas in Somersworth.

7. Implementation of Mitigation Actions

The City of Somersworth understands that the Multi-Hazard Plan also provides guidance in support of operational and maintenance activities in the City as well as implementation of mitigation actions listed in Table 7. The City, with the adoption of the Multi-Hazard Mitigation Plan Update for 2010, commits to ongoing integration of its hazard mitigation and emergency management functions within the daily tasks of operating a city government. The 2010 mitigation actions are derived by a consensus decision-making process that incorporates cost benefits. By selection to the priority listing, the City of Somersworth commits to implementing these actions to the best of their abilities given known circumstances.

8. CHAPTER 4. PLAN MAINTENANCE PROCESS

1. Monitoring, Evaluating and Updating the Plan

The completion of a planning document is merely the first step in its life as a municipal tool. The Multi-Hazard Mitigation Plan is a dynamic document that should be reviewed on an annual basis to evaluate its relevancy and usefulness and to add new tasks as old tasks are completed. This chapter discusses the methods by which the City of Somersworth will review, monitor, and update its Multi-Hazard Mitigation Plan.

The Hazard Mitigation Planning Committee will meet annually to evaluate goals and effectiveness of the mitigation strategies (see also Monitoring & Updates below). The Committee will review the events of the past year and analyze the effectiveness of the strategies defined in the plan. Any changes or recommendations will be incorporated into a new draft plan to be posted at the City Hall for public review. Availability of the draft will be announced through the usual communication channels used by the City for announcing public review materials. Next, the Committee will present the plan in an appropriately advertised public meeting or forum such as a City Council meeting for comment. The Committee will then address comments and issue an updated plan, available to the public at the City Hall and ready for reauthorization by the City Council.

The Hazard Mitigation Planning Committee may change in membership from one year to the next depending on the availability of its members. The Emergency Management Director and City Manager will be responsible for annual Committee review and recruitment of new or replacement members. As always, citizens are welcome and encouraged to serve on the Hazard Mitigation Planning Committee. Outreach to encourage citizen involvement and participation will be made.

2. Implementation Strategy for Priority Mitigation Actions

The regulations governing the mitigation planning requirements for local mitigation plans are published under 44 CFR §201.6. Under 44 CFR §201.6, local governments must have a FEMA-approved Local Multi-Mitigation Plan in order to apply for and/or receive project grants under the following hazard mitigation assistance programs:

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

The Somersworth Multi-Hazard Mitigation Planning Committee created the following prioritized schedule for implementation:

A. UPDATES ANNUALLY OR AFTER A DISASTER

The Somersworth Hazard Mitigation Planning Committee and the City Council should review the Multi-Hazard Mitigation Plan annually, or after a disaster, to track its progress.

B. EMERGENCY MANAGEMENT DIRECTOR INITIATES PLAN REVIEW

It will be the responsibility of the Emergency Management Director to ensure the review of the plan is initiated. Plan review will include both updates and monitoring. Updates to the Plan will follow from a review of each chapter of the Plan for any changes in mitigation goals, critical facility identification or status, vulnerability/risk analysis, existing mitigation policies or regulations, or demonstrated need for mitigation action. Monitoring of the current Plan will involve evaluation of the proposed mitigation actions to determine the progress of each action. The entity or entities responsible for the implementation of each action (as listed in the Mitigation Actions, Chapter 3) will be contacted by the reviewing team and asked to provide a summary of the status of the action(s).

C. ADOPTION BY CITY COUNCIL

The Somersworth City Council may adopt updates to the Plan subsequent to a public hearing.

3. Incorporating into Existing Planning Mechanisms and Projects

Throughout the 2009-2010 Somersworth Multi-Hazard Mitigation planning process, discussion included the integration of this plan with current and future planning tools, staffing, and City infrastructure projects. Culvert repair on Rocky Hill Road would require road and culvert work as well as the time of City officials, staff, consultants, businesses, citizens, and state agencies. The actions in this plan become part of City budgets and Capital Improvement Plan, grant applications, Master Plan, zoning ordinance, subdivision and site plan regulations, building codes and other City ordinances, and ongoing communications. These actions will assist City departments, citizens and businesses on a daily basis as well as unplanned for hazard events.

4. Continued Public Involvement

Just as each Committee meeting was open to the public during the 2003 and 2009-2010 planning processes, so will the annual review meeting. Local residents, businesses, officials and all interested parties will be encouraged to be involved in this continuing process.

Public support will be imperative for these mitigation actions to be successfully completed. Ideas and concerns can always be forwarded to the Emergency Management Director.

5. Ongoing Plan Five Year Maintenance Process

The Plan will undergo a formal review and update at least every five years. The City will receive approval from FEMA prior to adoption by the City.

The Emergency Management Director is the responsible party for initiating the five year formal review and will consult with members of the Multi-Hazard Committee identified in this plan.

The public will be encouraged to participate in the five year formal review through public notification in local newspapers, use of website, postings at City Hall and Library and other venues used to inform the public and businesses in the City. A formal public hearing will be held by the City Council prior to adoption of a revision to the plan or major updates.

Changes will be made to the Plan to accommodate projects that have been completed, failed, or are no longer feasible after a review for their consistency with factors such as, timing, financial resources, priorities, and consensus. Priorities that were not ranked high, but were identified as potential mitigation strategies will be reviewed as well during the monitoring and update of the Plan to determine feasibility of future implementation.

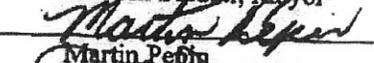
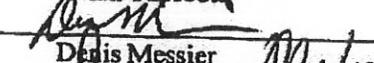
In keeping with the process of adopting the Multi-Hazard Mitigation Plan, a public hearing to receive public comment on plan maintenance and updating will be held before the final product is adopted by the City Council.

ADOPTION

The Somersworth City Council by majority vote does hereby adopt the *2009 Update of the Somersworth Multi-Hazard Mitigation Plan* as a statement of policy.

Actions for implementation under this statement of policy are set forth in priority order in the chart *Implementation Strategy for Priority Mitigation Actions* in Section VI and in the *Monitoring & Updates* sub-section contained in this section.

All other sections of this *Plan* are supporting documentation for information purposes only and are not included as the statement of policy.

	July 12, 2010
Lincoln Soldati, Mayor	Date
	July 12, 2010
Martin Pefin	Date
	July 12, 2010
Robin Jarvis	Date
	July 12, 2010
David Witham	Date
	July 12, 2010
Brian Tapscott	Date
	July 12, 2010
Denis Messier	Date
	July 12, 2010
Jonathan McCallion	Date
	July 12, 2010
Michael Watman	Date
	July 12, 2010
Dale Sprague	Date
	July 12, 2010
Dale Spainhower	Date

Resources Used In the Preparation Of This Plan

City of Somersworth: *Emergency Management Plan* (April 1992)

City of Somersworth, NH: *Master Plan* (February 2000)

City of Somersworth, NH Zoning Ordinance (August 30, 1989, amended February 17, 2009)

City of Somersworth, NH: *Master Plan: Toward the Year 2010, All Hazard Mitigation Plan* (December 2003)

Federal Emergency Management Agency: *Community Based Hazard Mitigation Planning: Lowering the Risks and Costs of Disasters* (August 1998)

Federal Emergency Management Agency: *Local Multi-Hazard Mitigation Planning Guidance* (July 2008)

NH Bureau of Emergency Management: *State of New Hampshire Natural Hazards Mitigation Plan* (October 2007)

NH Bureau of Emergency Management: *Hazard Mitigation Plan for New Hampshire Communities* (December 2002)

NH Flood Management Needs & Recommendation as Documented in NH House Bill 648 Chapter 179 Laws of 2007, *Comprehensive Flood Management Study Commission Final Report* (September 2008)

NH Office of Energy and Planning: *Flood Insurance Handbook* (November 2006)

Southwest Regional Planning Commission: *Hazard Mitigation Planning for New Hampshire Communities* (July 1999)

USACoE: *Flood Emergency Plan for Surry Mountain Lake* (1994)

USACoE: *Flood Emergency Plan for Otter Brook* (1994 update)

Maps of Hazards and Critical Facilities



FEMA

February 3, 2011

FEB 14 2011

The Honorable Lincoln T. Soldati, Mayor
City Of Somersworth
One Government Way
Somersworth NH 03878

Dear Mayor Soldati:

Thank you for the opportunity to review the City of Somersworth Multi-Hazard Mitigation Plan. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I has evaluated the plan for compliance with 44 CFR Part 201. The plan satisfactorily meets all of the mandatory requirements set forth by the regulations. Congratulations on this achievement!

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

The City's Multi-Hazard Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of February 3, 2011** in order to maintain eligibility as an applicant for mitigation grants. Over the next five years, we encourage Somersworth to continue updating the plan's assessment of vulnerability, adhere to its maintenance schedule, and begin implementing, when possible, the mitigation actions proposed in the plan.

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

Sincerely,

Don R. Boyce
Regional Administrator

Enclosure

cc: Michael Poirier, New Hampshire State Hazard Mitigation Officer
Lance Harbour, Hazard Mitigation Planner
Cynthia Copeland, Strafford Regional Planning Commission

Enclosure