TOWN OF NORTH SMITHFIELD
2013 Hazard Mitigation Plan

North Smithfield....A Green Community

Strategy for Reducing Risks from Natural Hazards in North Smithfield, Rhode Island

Created by the North Smithfield Natural Hazard Mitigation Committee

Adopted by the North Smithfield Town Council on July 18, 2011

ACKNOWLEDGMENTS

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Section 1.0 Introduction

Natural Hazard Mitigation is any sustained action taken to reduce or eliminate long-term risks to people and their property from the effects of natural hazards (e.g. wind, fire, flood, nor'easters, hurricanes, earthquakes, etc.).

Section 1.1 What Mitigation Can Do for North Smithfield

A primary benefit of hazard mitigation is that preventative measures can significantly reduce the cost of post-disaster cleanup. In addition, mitigation actions conducted before hazards occur greatly reduces the impact and costs associated with the aftermath of a hazard event. By planning ahead, North Smithfield will minimize the economic and social disruption that can result from floods, snowstorms, hurricanes and other natural disasters (destruction of property, loss or interruption of jobs and the loss of businesses).

The adoption and implementation of this hazard mitigation plan will assist North Smithfield in receiving assistance from the Federal Emergency Management Agency in pre- and post-disaster assistance such as: FEMA's Community Rating System (CRS), FEMA's Pre-Disaster Flood Mitigation Assistance (FMA) Program, and FEMA's Post-Disaster Hazard Mitigation Grant Program (HMGP).

The Town of North Smithfield currently does not participate in FEMA's Community Rating System (CRS) Program. FEMA's Community Rating System (CRS) Program would allow residents of the Town to gain credit points that would result in discounts on National Flood Insurance (NFIP) premiums. FEMA's Pre-Disaster Flood Mitigation Assistance Program makes grants available for communities to implement flood mitigation planning and activities such as acquisition, relocation, and retrofitting of structures. This program is made available only to communities having a pre-existing approved hazard mitigation plan. FEMA's Post-Disaster Hazard Mitigation Grant Program is made available only for communities after a federally declared disaster. Having an approved mitigation plan expedites the application process for pre- and post-federal mitigation funding, and ensures a funded project is eligible and feasible.

North Smithfield is actively involved in Letters of Map Amendment and we notify all who might be impacted and explain how to file for map amendment. We analyze areas using LIDAR to see why there are errors in the maps and we updated Zoning in 2009 to address the new NFIP zoning compliance.

Section 1.2 Mission Statement

Prevent loss of life and minimize property damage caused by natural hazards by identifying areas at risk from natural hazards and implementing priority hazard mitigation actions.

Section 1.3 Planning Process

The Town of North Smithfield established a Hazard Mitigation Planning Committee in September 2003 to oversee the preparation of the Hazard Mitigation Plan. Committee members

were appointed by the Town Administrator and include individuals from the community, businesses and town employees as listed in the front of this Plan.

Hazard Mitigation Planning Grant funds were used to hire a recent Wheaton College graduate in environmental science to assist in preparation of the plan. Much of the background work, such as preparation of the hazard map, risk assessment and priority identification had been started in 2010.

The committee reviewed the draft Hazard Analysis in a public meeting held July 11, 2011 (a copy of the notice and meeting minutes is in Appendix C). Once the Hazard Analysis was reviewed, a Mitigation Plan was prepared during several meetings throughout the fall. Once the final draft was prepared by the consultant, the Committee reviewed it and approved it; the public was again invited to comment on the plan prior to Council approval. Upon final approval from FEMA, the Council adopted the Plan via resolution on July 18, 2011.

Section 2.0 Historical Review of Hazardous Events for North Smithfield

To profile the history of these events, the National Climatic Data Center's on-line database was utilized since this is the most comprehensive source for past weather events. History has shown that due to the size of North Smithfield, any event affecting the community would affect the entire community in the same manner.

Even with today's complex and ever-improving technology, some weather systems can be unpredictable with dynamic conditions. However, North Smithfield is committed to prompt and thorough weather/natural hazard preparedness and response no matter how unpredictable the event. Severe weather/natural hazards in North Smithfield include Nor'easters, Winter Storms/blizzards, Severe Thunderstorms, Tornados, Hurricanes and Earthquakes. The Town has identified the overall risk from experiencing the direct effects of each event, susceptible facilities, services and infrastructure and the preparedness and response actions to be taken for each.

Section 2.1 Hurricanes

A hurricane, or tropical cyclone, is a low pressure system that forms in the tropics. They are often accompanied by thunderstorms, torrential rainfall and winds that can exceed 155 mph. As a result, hurricanes can damage coastlines and infrastructure. Flooding can occur as well. Hurricanes, which pose a moderate risk to North Smithfield, are most dangerous because of their high-sustained winds, floods from storm surge or heavy rains and shoreline erosion. The strain that the winds pose on structures can propel loose objects at high velocities. Felled trees and branches can result in extensive property damage and downed power lines. Also common during hurricanes is water supply contamination and the sewage treatment plant flooding. Loss of infrastructure is also a great concern. The National Grid Switch Station, Sewer Department, Water Department and the 146A overpass bridge are susceptible to the effects of the event.

Although Rhode Island has not been hit by extremely intense hurricanes (Category 4 or 5) as seen in other parts of the East Coast, we have had our share of major hurricanes that have caused extensive damage to our State. In the sixteen year period from 1938 to 1954, Rhode Island

experienced three major hurricanes that caused a tremendous amount of damage and resulted in almost 300 deaths across the State. The great un-named hurricane of 1938 devastated Rhode Island and caused $100 million dollars in property damage and took 262 lives. Hurricane Carol in August of 1954 caused similar damage dollar-wise, but thankfully only resulted in the loss of 19 lives. Even though Rhode Island has not had hurricanes as severe as this in the last 50 years, we have had several that have resulted in millions and millions of dollars in property damage, mostly due to the fact that people like to live near the water and are naïve to the fact that even a small hurricane can wreak havoc on lives and property. The wind and rain that precede a hurricane can cause severe damage even to those communities that are further inland, such as North Smithfield. Therefore, the threat of a hurricane to this community and the resulting wind and rain damage need to be considered.

Hurricane Sandy, a late-season post-tropical cyclone, hit the United States East Coast at the end of October, 2012, resulting in mass destruction, displacement of thousands and dozens of fatalities. The storm, which devoured much of southern Rhode Island's coastline, left North Smithfield with approximately 3,500 homes without power, several downed trees, and a blown transformer. The threat of long-term power outages and broad impacts of the storm were concerns of the Town. Therefore, in anticipation of possible flooding and power outages, the Town provided citizens access to 1,000 sand bags and Scouter's Hall was designated a "comfort area", providing charging stations for cell phones and other electronic devices. Residents received power again in a day and a half. During the storm, the Main Regional Shelter in Cumberland High School was ready to receive any North Smithfield residents in need of aid. The Town was well prepared for the storm and there were no lasting significant impacts.

On Sunday August 28th, Tropical Storm Irene hit North Smithfield, Rhode Island with heavy rain and wind gusts of up to 80 mph, resulting in falling tree limbs, downed power lines, uprooted trees, failed transformers and property damage. Overall, the Town of North Smithfield did an excellent job of alerting residents ahead of time about the potential destruction the storm could cause. Workers were ready to go, and cleanup response was immediate. The Town was prepared well ahead of time. However, the Town still seeks improvement in anticipation of future hurricanes, and will be making great efforts to do so.

Table 1 – Significant Hurricanes in Rhode Island

Date	Name	Category[1]	Winds (mph)	Property Damage ($million)	Deaths
September 21, 1938	N/A	3	95	100	262
September 14, 1944	N/A	3	82	2	0
August 31, 1954	Carol	3	110	90	19
September 11, 1954	Edna	3	40	0.1	0
September 12, 1960	Donna	2	58	2.4	0
September 27, 1985	Gloria	2	81	19.8	1
August 19, 1991	Bob	2	63	115	0

Source: National Climate Data Center

Section 2.2 Heavy Rains and Floods

Heavy rain is classified by a precipitation rate of 0.3 inches per hour. Floods, a common hazard in the United States, can develop in several ways. Some develop slowly over a period of days and some, called flash floods, can develop rapidly. Flooding usually occurs around a river or stream. Flooding in North Smithfield can occur from flash floods and breached dams, with flood elevation relative to topography and structures. Depending on the velocity of the moving water, the amount of debris carried by the water and the duration of the flood conditions will determine the extent of the damage. The Town is at high flood risk from river, stream and drainage system flooding, high flood risk from dam failure and low flood risk from steep topography. The Route 146/146A bridges have been historically flood prone. In addition to this, Slatersville's lower, middle and upper reservoirs could be affected by dam breaches associated with hurricanes, as well as Forestdale Pond, Todd's Pond and the Woonsocket Reservoir #3. Although North Smithfield is not considered a flood-prone community, the areas that are prone place cultural, historical and economic resources at risk as well as the entire community.

Flooding: During October 13-15, 2005 rainfall was heaviest in central and eastern Massachusetts and Rhode Island. The National Weather Service reported rainfall amounts of four to seven inches in central and eastern Massachusetts and seven to nine inches in Rhode Island. With the ground already saturated and stream flows elevated from earlier rains, the additional rains generally resulted in minor flooding throughout this region. Stream flow at most gauging stations peaked at levels that are expect once about every 2 to 25 years, but localized heavy rains produced peak flows that are expect once about every 50 years at stations on the Quinsigamond River at North Grafton, MA (in operation since 1939) and at the Woonasquatucket River at Centerdale, RI (in operation since 1941). The Blackstone River peaked at stations at Northbridge, MA and Woonsocket, RI at levels that are expected once about every 25 years.

March 2010 flooding: The storm of March 30-31, 2010 caused serious flooding in North Smithfield. At 4 PM on March 30, 7.9 inches of rain had fallen at T.F. Green Airport over a 24-hour period. That exceeded the engineering design value for a 100-year storm, although meteorological science and historical data support an actual value of 8.9 inches that became the RI Department of Environmental Management (RIDEM) standard in 2011.

A 100-year storm does not in itself create a 100-year flood. A 100-year storm is by definition a 24-hour event. During Hurricane Diane in August 1955, the Blackstone River crested in Woonsocket at a record 21.8 feet after 84 hours of rain totaling 13-18 inches, with the highest rainfall in the Massachusetts part of the watershed. In that storm, no rolling 24-hour rainfall value approached a 100-year storm.

In 2010, the rainfall totals decreased steadily moving north of Warwick. Although the Pawtuxet River crested at a record 21 feet, the Blackstone crested below 15 feet. However, the storm reminded everyone of the Town's vulnerability had the heaviest rain fallen to the west in the upper Branch River watershed.

[1] Category 1 74-95 mph winds, 4'-5' storm surge; Category 2 96-110 mph winds, 6'-8' storm surge; Category 3 111-130 mph winds, 9'-12' storm surge; Category 4 131-155 mph winds, 13'-18' storm surge; Category 5 winds greater than 155 mph, with a storm surge of greater than 18' source: Saffir-Simpson Hurricane Scale.

In North Smithfield, residents of Lapre Rd and Meadowbrook Dr. near Cherry Brook sustained the most damage. Sections of town roads were undermined at various places throughout the town. These two properties are regarded as repetitive losses and have received FEMA funding for damages twice. The bridge on Crookfall Brook on the Lincoln town line collapsed, but it was repaired "as was" within four days, thanks to the cooperation of DPW Director Ray Pendergast and Lincoln Town Engineer Jim Bernardino, PE.

FEMA paid $260,612 for 90% of eligible disaster management and public repair costs. The Town and its consultant provided extensive documentation of work hours and material costs in order to qualify for reimbursement.

FEMA paid $109, 694 to private property owners for eligible uninsured losses.

Long-term flood mitigation: The March 2010 flooding re-emphasized the long-term vulnerability of properties in the Branch River Redevelopment Area bounded by the Branch River and Cherry Brook. North Smithfield's CDBG-DR application focuses on cost-effective ways of addressing the continuing threats.

A 1968 engineering study documented how the funnel shape of a railroad culvert northeast of Meadowbrook Dr. throttles down the Cherry Brook flow, causing flooding behind it. Worse yet, the inflow side of the culvert allows entry of debris that cannot pass through the outflow side. Increasing the flow capacity of the culvert would be very costly now, because RIDEM would require compensatory storage for any increased flow to Woonsocket.

The Town used LIDAR contours available with the 2008 Electronic Field Study aerial orthophotos to find a natural basin and potential detention area in the Cherry Brook watershed. Coincidentally, the Town recently acquired 69 acres of Silva Estate land just north of the Greenville Rd/Route 146 interchange. A natural basin entirely within that acquisition can store 60-80 acre feet of water. An oversized culvert under Route 146 controls almost all of the southwest area of the Cherry Brook watershed. That area accounts for about 40% of the flow at the next downstream culvert on Woonsocket Hill Rd culvert near Wright's farm. Placing temporary flashboards at the culvert opening would minimize flooding downstream.

The engineering design report would provide a TR-20 hydrological model for the watershed, an engineering design for the flashboard system, and expected flow results for various levels of rainfall and times of flashboard installation.

The ATP site: Flooding on the Branch River seriously affected the viability of a 90,000 square-foot manufacturing facility near the point where the Branch River flows under Route 146A. The site was abandoned when ATP, a plastic orthotics manufacturer, accepted an incentive package from Arkansas and relocated.

The site is currently underused and in major violation of zoning regulations. In December 2010, RIDEM denied extension of a permit for operation of the site's wastewater treatment facility at or in the 100-year flood zone. No other form of wastewater treatment is available. The larger site has ledge and slopes that limit development options.

Long-term reuse of the site will require removal of a small building and impervious cover in the flood plain. Redevelopment of a sustainable sewered site as an incubator for new light manufacturing could provide up to 80 LMI jobs.

Table 2 – Significant Heavy Rain/Flooding for Providence County

Date	Rainfall (inches)	Comments
January 28, 1996	1-2”	Minor river flooding along the Blackstone River
November 1, 1997	2-3”	No damage reported
February 18, 1998	2-3.5”	Flooding in poor drainage areas
February 23, 1998	2”	Flooding in poor drainage areas
March 8, 1998	2-4”	Scattered power outages, Flood-prone properties flooded, Flooding in poor drainage areas, Blackstone River reached 10.3’ at Woonsocket.
June 13, 1998	7-8”	Minor flooding along Blackstone River reaching 9.17’, numerous small streams flooded their banks
October 8, 1998	3-4”	No reports of flooding
January 3, 1999	2-3”	No reports of flooding
September 10, 1999	3-5”	Flooding in poor drainage areas, no property damage reported
September 16, 1999	2-5”	Trees downed, Scattered power outages, flooding in low-lying areas
May 26, 2003	2.15”	Flooding in poor drainage areas
April 14, 2004	2-4”	Minor flooding along the Blackstone River, roads in low lying areas were closed to flooding, no significant damage reported.
March 30-31, 2010	7”-8”	Significant flooding along Cherry Brook and the Branch River with more than $360,00 in damage claims paid by FEMA

Source: National Climate Data Center

Section 2.3 Nor’easters/Snowstorms

Nor’easters are areas of low pressure that form off the Gulf of Mexico or the East Coast that travel up to New England and result in an intense storm. These storms are known for their heavy snow and huge waves they produce on the coastline. The winds produced by these storms can be stronger than hurricane winds. Regarding Nor’easters, the North Smithfield Emergency Operations Plan has identified the overall risk of experiencing direct events as “high”. The National Grid Switch Station, Sewer Department, Water Department and the 146A overpass bridge are considered susceptible to the effects of a Nor’easter. Winter Storms/Blizzards are categorized as having a high risk of experiencing direct events. The National Grid Switch Station, Sewer Department, Water Department and the 146A overpass bridge are susceptible to the effects of such an event.

Historically, Nor’easters/Snowstorms have resulted in hazardous road conditions, power outages, the closing of schools/businesses, minor accidents and highway travel disruptions. One of the more recent severe snowstorms recorded for North Smithfield occurred on April 1, 1997. The community experienced approximately 24’’ in accumulation of heavy, wet snow that made removal difficult and highway travel virtually impossible during the height of the storm. Tree limbs fell, power outages occurred, transportation systems were disrupted, and schools closed for two days.

Another storm that produced snowfall totals of 20+ inches in North Smithfield, but had less of an effect, occurred on February 17, 2003. Since this storm fell on Presidents Day, most schools were already closed which also resulted in less traffic on the roadways. However, there were still numerous minor accidents reports. This storm was also a light fluffy snow which resulted in less damage to trees and power lines.

Table 3 – Significant Nor'easters/Snowstorms for Providence County

Date	Snowfall (inches)	Comments
March 13, 1993	12"	Blizzard conditions for several hours, roads nearly impassable, most businesses closed early
March 3, 1994	4.8"	Blowing/drifting snow, schools closed, businesses affected and highway travel disrupted
December 14, 1995	4"-6"	Schools and businesses closed early, evening commute adversely affected
December 19, 1995	6"-10"	Most schools and some businesses closed the day after the storm
January 2, 1996	10"-12"	Snowfall at the rate of .5" to 2" per hr., most schools closed the next day
January 7, 1996	12"-24"	Heavy snow disrupted transportation systems, closed schools, stores and businesses. Most significant winter storm to hit southern NE in past 20 years.
February 2, 1996	6"-8"	Travel conditions were difficult, no damage reported
February 16, 1996	5"-7"	Highway travel seriously disrupted for the afternoon rush hour, no damage reported
March 7, 1996	7.5"	Numerous minor skidding accidents
April 7, 1996	6"-8"	Heavy, wet snow, no significant travel problems
April 9, 1996	12"-20"	Heavy, wet snow stuck to trees and power lines causing scattered power outages, less snow accumulated on pavements
December 6, 1996	6"	Scattered power outages and poor road conditions
December 7, 1996	4"	No reports of significant damage
January 11, 1997	6"	Rates up to two inches per hr., minimal effects on travel
April 1, 1997	24"	Heavy snow and strong winds caused blizzard conditions, travel just about impossible at height of storm, tree limbs and wires downed, schools closed for 2 days, power outages
December 23, 1997	6"-8"	Slick driving conditions, schools closed early, minor accidents
February 25, 1999	8"-12"	Schools closed early, hazardous road conditions
March 15, 1999	7"-12"	Poor traveling conditions, schools and businesses closed
January 25, 2000	4"-8"	Minor accidents reported
February 18, 2000	6"-8"	Snarled traffic on major highways and created treacherous driving conditions
December 30, 2000	6"-8"	Storm fell on a Saturday, so no major traffic problems
January 20, 2001	6"-8"	Storm fell on a weekend so no major traffic problems
February 5, 2001	7"-15"	Traffic snarled as commuters tried to leave work early, 1,300 customers were left without power
February 7, 2003	6"-12"	No significant storm damage, main impact was to travel
February 17, 2003	12"-24"	Storm fell on Presidents Day so travel impact was minimal, some minor accidents due to slippery roads
March 6, 2003	6"-10"	Dozens of minor accidents due to poor visibility and slippery roads
December 5, 2003	12"-24"	Major disruption to transportation systems, dozens of minor accidents
March 16, 2004	4"-8"	No major damage reported
March 16, 2007	7"	Heavy snow and sleet. No major damage reported
January 12, 2011	6"-10"	Heavy snowfall and strong wind gusts resulted in several roof collapses and transportation disruption

Source: National Climate Data Center

Section 2.4 Significant Hailstorms

A hailstorm is precipitation that is made out of balls of ice or snow that can vary in diameter. When hail falls, it can cause considerable damage to property and vehicles. Hailstorms are associated with severe thunderstorms accompanied by high winds. The National Climate Data Center reported several hailstorms that affected North Smithfield in the past with hail ranging in size from 1.00" to 1.75".

Table 4 – Significant Hailstorms for Providence County

Date	Magnitude (size in inches)	Comments
May 25, 1994	1”	Marble-sized hail fell during a thunderstorm
August 6, 1997	1.5”	Dime-size to ping-pong size hail fell
May 31, 1998	0.75”	Hail from thunderstorm in northern RI with 60 mph winds.
August 10, 2000	1.75”	Golf ball sized hail fell
May 21, 2006	0.88”	Nickel-sized hail fell

Source: National Climate Data Center

Section 2.5 Significant Wind Events

A wind event is characterized as wind of 39 to 54 mph, whereby the National Weather Service will issue a Gale Watch. National climatic events such as high gale winds, tropical storms, thunderstorms, nor’easters, hurricanes, and low-pressure systems produce wind events in Rhode Island. Damages from winds events range from power outages, property damage to vehicles and buildings to fallen trees/limbs. Wind events in North Smithfield have resulted primarily in power outages and downed tree limbs with minimal property damage.

Table 5 – Significant Wind Events for Providence County

Date	Magnitude (kts or mph)	Comments
January 7, 1995	Gusts + 50 mph	No reports of wind damage
July 13, 1996	Gusts to 60 mph	Tropical Storm Bertha brought high winds to the area with no damage reported
March 6, 1997	50-62 mph	Property damamged by falling trees and limbs, scattered power outages
March 31, 1997	30-40 mph gusts	Widespread power outages
August 21, 1997	40 mph gusts	Tree limbs downed, isolated power outages
December 2, 1997	40-50 mph gusts	No damage reported
February 4, 1998	40 mph gusts	No damage reported
February 24, 1998	40-56 mph gusts	Strong winds associated with a nor’easter, no damage reported
March 9, 1998	40-55 mph gusts	Scattered power outages reported
March 31, 1998	50 mph gusts	Winds associated with a severe thunderstorm downed large tree limbs and wires reported downed
July 19, 1999	50 mph gusts	Thunderstorm winds downed power lines
September 16, 1999	50 mph gusts	Tropical Storm Floyd brought high winds that downed branches, trees and wires
February 14, 2000	50 mph gusts	No wind damage was reported
April 9, 2000	Gusts to 60 mph	High winds associated with a severe thunderstorm downed branches
December 12, 2000	60 mph gusts	Downed trees, limbs and wires, scattered power outages
December 17, 2000	60 mph gusts	Downed trees, limbs and power lines, scattered power outages
February 17, 2001	45-55 mph gusts	No reports of wind damage
October 15, 2003	45-55 mph gusts	Downed trees and large limbs resulted in scattered power outages
November 13, 2003	50-60 mph gusts	Brought down trees and power lines
February 10, 2008	65-70 mph gusts	Tree limbs and wires downed across Rhode Island
April 29, 2010	40-50 mph gusts	Downed wires and property damage

Source: National Climate Data Center

Section 2.6 Significant Lightning Storms

Of all weather events, lightning storms are one of the most deadly. Lightning, a large discharge of electricity, is able to reach over five miles in length and can contain over a hundred million electrical volts. A lightning strike can cause damage to homes, property, start forest fires and even hurt or kill people. The National Climate Data Center does not list any significant lightning storms for North Smithfield. However, this does not mean that the community is not at risk from the effects of lightning. Thunderstorms are a common occurrence in this community and the results of lightning strikes can include scattered power outages, house fires, forest fires and damage from trees being struck by lightning.

North Smithfield is moderately at risk from experiencing the overall effects of a severe lightning storm. The National Grid Switch Station, Sewer Department, Water Department and the 146A overpass bridge are susceptible to the effects of the event. Lightning strikes associated with thunderstorms can lead to further property damage because of the risk of fire; hailstorms can also cause extensive property damage.

Table 6 – Significant Lightning Storms for Providence County

Date	Magnitude	Comments
August 28, 1993	n/a	Two homes struck on Durgee Hill Rd in Glocester, one was severely damages. Numerous lightning strikes reported in Foster with associated power outages
September 15, 2000	n/a	Lightning struck a house in Central Falls which ignited a gas line causing extensive damage to part of the house
July 19, 2005	n/a	Lightning strike set a transformer on fire, and caused an attic fire and structural damage to a house.

Source: National Climate Data Center

Section 2.7 Earthquakes and Forest Fires

An earthquake is caused by rock movement in the Earth's crust, resulting in ground shaking. They can last mere seconds or up to a few minutes, at any time of day, any time of year. Earthquakes can result in landslides, tsunamis and flash floods. The Town of North Smithfield is at low risk for seismic activity from earthquakes, despite shocks felt in 2003. However, a powerful earthquake could subject the Town to multiple emergency situations that would require the activation of the Emergency Operations Plan.

Although Rhode Island is not prone to major earthquakes, we do have our share of them. Thankfully most quakes in and around RI are usually only felt as a slight rumble lasting several seconds or less. The most recent earthquake centered in RI was on October 6, 2003 in West Warwick. This quake had a magnitude of 1.8 on the Richter Scale of 1 to 10 (10 being most severe). Most quakes that are felt in Rhode Island are not centered in the State, but in surrounding states (see Table 7). Therefore, earthquakes do need to be considered as a hazard to our community but with low priority. Buildings most at risk from earthquakes are old masonry buildings and high-rise structures such as extended care facilities.

Table 7 – History of Earthquakes in Rhode Island

Date	Point of Origin	Impact on RI
February 28, 1925	St. Lawrence River region	Intensity V effects felt on Block Island and in Providence. Intensity IV effects felt in Charlestown
November 19, 1929	Grand Banks of Newfoundland	Moderate vibrations felt on Block Island and in Chepachet, Newport, Providence and Westerly
November 1, 1935	Quebec, Canada	A magnitude of 6.25 with intensity IV felt on Block Island and in Providence and Woonsocket
December 20 & 24, 1940	Lake Ossipee, NH	Intensity V effects knocked pictures off walls in Newport. Intensity IV effects were felt at Central Falls, Pascoag, Providence and Woonsocket. Intensity I-III effects were felt at Kingston, New Shoreham and Wakefield.
September 4, 1944	Massena, NY	Intensity I-III was reported in Kingston, Lonsdale, Providence, Wakefield and Woonsocket
October 16, 1963	Coast of Massachusetts	A magnitude 4.5 quake caused intensity V to be felt in Chepachet with reports of some cracked plaster. There were also reports of rattling windows and dishes and rumbling earth sounds. Other Northern RI locations felt the tremor, but with less intensity.
December 7, 1965	Unknown	Windows and doors shook in Warwick and furniture and small objects moved in Bristol.
February 2, 1967	Unknown	A magnitude 2.4 created intensity V effects in Middletown, Newport, North Kingstown and Jamestown. No damage reported
February 3, 1973	Unknown	Explosion like or sonic boom noises were heard throughout RI and houses and windows shook, but nothing was reported by seismographs.
June 14, 1973	Western Maine	Intensity IV effects felt at Charlestown and Intensity I-III felt at Bristol, E. Providence, Harmony and Prov.
October 6, 2003	West Warwick	A magnitude of 1,8 caused minor shaking in the community, no damage reported

Source: US Geological Survey; Earthquake History of Rhode Island

Wildfires are any unwanted, unplanned fires burning in the woods, shrubs or grass. With climate change causing hot dry weather and more people living near forested areas, forest fires are on the rise. Nine out of ten wildfires are anthropogenic in cause, and the effects can be devastating. Periodic brush fires occur in the following location: Booth Pond area along Eddie Dowling Highway, along power lines between Greenville Road, Providence Pike, Old Oxford Road, Iron Mine Hill Road and Rocky Hill Road and power line areas between Mountain Road and East Harkness Road, areas along Route 146 between Branch River Industrial Park and Premisy Hill and the area south of Central Street in the Tifft Road area. Other fire prone areas include the Harkness Road/Gorge area along the Blackstone/Millville border.

The Audubon preserve along Providence Pike has substantial stands of white pine trees that have the potential for a brush fire to turn into a crown fire. Heavy use of power line easements by ATV's are the likely cause of fires in these areas. Power lines do provide a means of access to fire apparatus to fight fire in these remote forested areas. Where possible the Planning Board provides access strips to large forested areas when considering new subdivision proposals. The remote locations of many of the fire prone areas dictate that brush fires are fought by the Department utilizing a brush truck and hand tanks. Most fire prone areas in town, with a few exceptions, are sparsely settled and the potential for damage to homes is low. There have been no

reported instances of brush fires, permitted or accidental, causing damage to structures. The Town is investigating an ordinance that would regulate open burning. Access to remote areas and lack of water are the two greatest concerns.

Section 2.8 Hazard Profile Summary

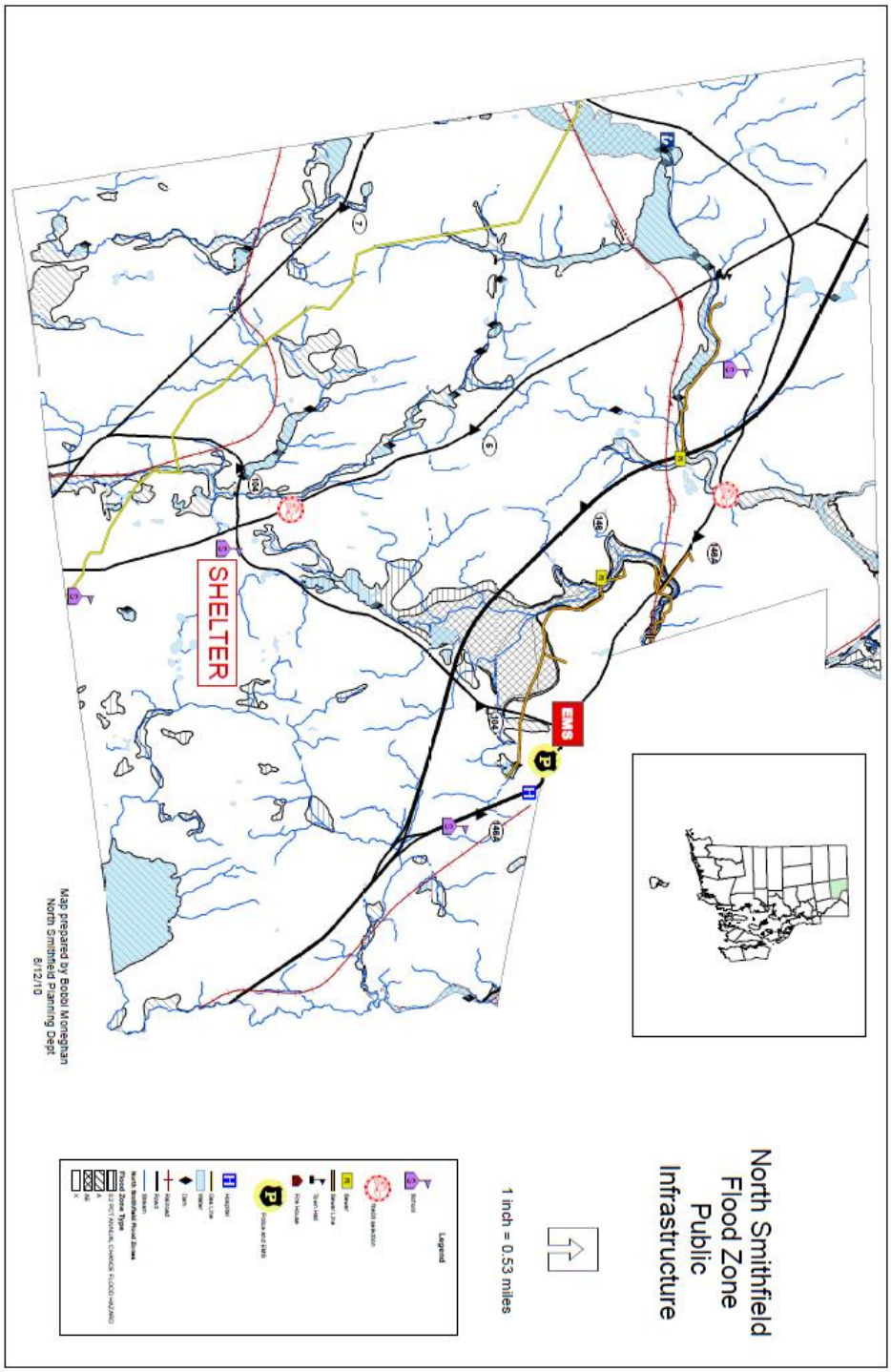
This Hazard Profile Summary lists the specific hazards that have and can affect North Smithfield along with specifics regarding frequency of occurrence, magnitude (% of community affected), speed of onset (warning time available), seasonal pattern, possible effects to the community and risk priority. This Hazard Profile Summary was used to prioritize actions in the Risk Assessment Matrix.

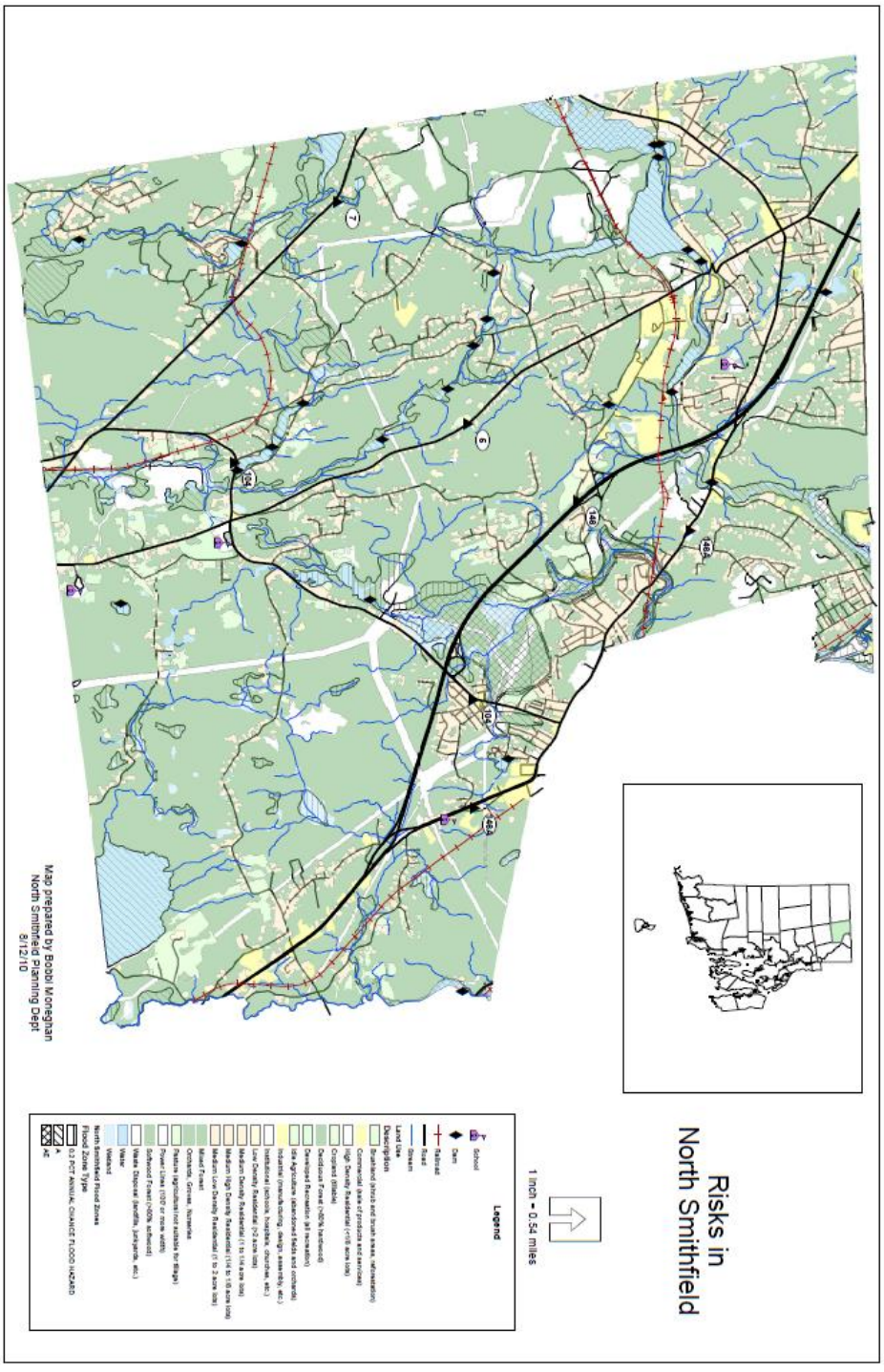
Table 8 – Hazard Profile Summary

Hazard	Frequency[2]	Magnitude[3]	Speed of Onset	Seasonal Pattern	Possible Affects	Risk Priority
Hurricane	Likely	Limited	24+ hrs.	June-Nov with Aug & Sept. most likely	Flooding, downed trees, power outages, property damage, loss of life	Medium
Heavy Rains Flooding	Highly likely	Limited	12-24 hrs.	Spring and Summer	Flooding, property damage, roads closed, dams breached	High
Nor'easter Snowstorm	Highly likely	Critical	12-24 hrs.	Winter	Power outages, poor travel conditions, schools/business closed	High
Hail	Possible	Negligible	Minimal	Summer	Property damage	Low
Wind Event	Highly likely	Critical	12-24 hrs.	Any Season	Property damage, power outages, downed trees and limbs	High
Lightning	Highly likely	Negligible	6-12 hrs.	Spring, Summer, Fall	Property damage, fire	Low
Earthquake	Possible	Critical	Minimal	Any Season	Loss of life, property damage, power outages	Low
Wildfire	Possible	Limited to Negligible	Minimal	Any Season	Property damage, environmental damage	Medium

2 Highly likely=near 100% probability within the next year; Likely=between 10% and 100% probability within the next year or at least one chance in next 10 years; Possible=between 1% and 10% probability within the next year or at least one chance in next 100 years; Unlikely=less than 1% probability in next 100 years

3 Catastrophic=more than 50% of community affected; Critical=25% to 50% affected; Limited= 10% to 25% affected; Negligible=Less than 10% affected.


North Smithfield
Flood Zone
Public
Infrastructure
1 inch = 0.53 miles
Legend
SHELTER
EMS
Map prepared by Bobbi Monaghan
North Smithfield Planning Dept
8/12/10


Risks in
North Smithfield
1 inch = 0.54 miles
Legend
School
Dam
Railroad
Road
Stream
Land Use
Deforestation
Map prepared by Bobbi Monaghan
North Smithfield Planning Dept
8/12/10

Section 3.0 Vulnerability/ Risk Assessment

This section focuses on assessing the community's risk and vulnerability. It will identify what areas are at risk, how vulnerable those areas (e.g., structures, population or natural resources) are and what the impacts (loss of life, environmental damage or inconvenience to residents) will be if those areas are affected by a natural disaster. The risk matrix (Table 10) summarizes the major risks to North Smithfield.

With the help of the University of Rhode Island (URI) Environmental Data Center, North Smithfield mapped high-risk areas in the Town. Map 1: Risks in North Smithfield, indicates public infrastructure (dams, bridges, major roads), social/economic risks, land use/land cover, flood zones, repetitive loss areas and areas of historic flooding (not marked on the FEMA Flood Insurance Rate Map). Map 2: Critical Facilities in North Smithfield, indicates public infrastructure (Town Hall, Fire Stations, Police Station and schools), utilities, critical facilities, evacuation routes and American Red-Cross approved shelters.

Section 3.1 Population at Risk

The use of mass care facilities during an emergency is dependent on a variety of variables. These variables include warning time, public awareness of the hazard, levels of encouragement from public officials, and the availability of shelters. There is an approved mass care facility located within the Town, which is the Junior/Senior High School located at 412 Greenville Road. This is an approved shelter by the American Red Cross that can operate as a mass care facility and it is not located in a flood zone. In addition to this, another mass care facility is located at Cumberland High School. If required for a large scale disaster, additional shelter at the North Smithfield Municipal Annex has been identified and could be established in other local facilities if needed.

Section 3.2 Property at Risk

The 100-year flood (base flood) is an event that has a one-percent probability of happening in any given year and is the storm event used to identify flood zones, which impact zoning and building requirements throughout the Town. Flood ordinances have regulated development in flood plains and mandated structures lowest floor elevation to be above the 100-year base flood elevation. Some portions of the Town experience frequent street and basement flooding during heavy rain. In addition, there are several dams in town that have been classified as being a significant to high hazard which could also pose a potential threat to properties in the vicinity as well as downstream from these dams if they were to fail.

FEMA lists that 19 properties in North Smithfield are insured by the NFIP with a total value of over $3 million as of December 31, 2003. From 1978 through 2003, there were 3 losses in North Smithfield through the NFIP with over $188 thousand in total payments to policyholders. The majority of flooding problems within the Town of North Smithfield stems from street flooding in poor drainage areas and flooded property in low-lying areas.

In addition to flood hazards, property in North Smithfield is also at risk from wind. Wind events are generally normal for Rhode Island and regularly occur each year. Winter storms and

Nor'easters cause high winds in the winter months and severe thunderstorms are prevalent in the spring and summer seasons. Tropical events or hurricanes provide high winds in late summer and fall. Most damage that occurs to property from this hazard is due mainly to fallen trees and limbs.

Section 3.3 The Economy at Risk

Although many of the residents of North Smithfield commute to jobs outside the community, there are several areas of manufacturing and industry within this community as well as numerous smaller businesses that would be severely affected if a natural disaster were to occur. Most of these businesses are not located in a floodplain; however, if a severe winter storm or hurricane were to happen, where businesses needed to be closed for extended periods of time, some of them may not be able to recover. Steps need to be taken to address this issue with the business community and help them to take the proper mitigation actions to help them recover quicker after a disaster happens. The most recent Comprehensive Plan states that steps need to be taken to attract new businesses as well as maintain current ones. Taking proactive steps to help the business community be prepared should be one of the ways the Town can accomplish this.

Section 3.4 Identifying the Issues

The Town of North Smithfield has several types of natural hazards that will be addressed through a variety of actions, including education, regulatory, enhancement of communication capabilities, improvements and repair of infrastructure and other capital acquisitions. The hazard ranked as "high priority" will be addressed in the Mitigation Action section of this plan.

Section 3.5 Capability Assessment

This capability assessment refers to the existing plans, programs and policies that have incorporated hazard mitigation or other proactive tools.

In 1969 the Town developed its first Comprehensive Plan, which was most recently updated in 1992. North Smithfield's Comprehensive Plan identifies actions that can be taken to address increased development pressures, economic stability, open space and recreation issues, and public infrastructure and facilities. It outlines goals, policies, issues, and actions to provide a framework for everyday operations within the Town. North Smithfield has recognized the importance of incorporating mitigation initiatives (both Pre- and Post-Disaster) into the Comprehensive Plan.

The Town implements and enforces the State Building Code. However, it does not currently participate in FEMA's Community Rating System (CRS) Program. Participation in FEMA's Community Rating System Program would allow flood insurance policy holders a 10% discount on their premiums, and is suggested in the mitigation actions section of this plan. The Town works regularly with other communities along the Blackstone River Valley to protect valuable natural resources and preserve open space along the river which has helped to reduce flooding and pollution risks.

The Town has an updated Emergency Operations Plan (EOP). This plan addresses the response to extraordinary emergency situations associated with natural, man-made, and technological disasters. The Town's Emergency Operations Plan further addresses pre- and post-disaster strategies to affectively deal with the hazards addressed in this plan such as hurricane and flooding evacuation, public warning and sheltering during natural disasters.

Section 3.6 Future Development Trends

As with all the other communities in Rhode Island, North Smithfield continues to grow in terms of new residential development. In the period from 1990 to 2000, there was an increase of 490 housing units in the community. This type of growth not only consumes more land, it also lends itself to more school age children being brought into the Town. This can cause strain on the already crowded schools. Commercial/Industrial development is also on the rise in North Smithfield which brings with it more employment opportunities, but also increases the daytime population. These areas, along with residential neighborhoods, may need to be evacuated and sheltered during a natural disaster.

Table 9 Summary of Land Use

Land Use	Acres	Percent
Residential	3,287	21.5
Commercial	273	1.3
Industrial	217	1.4
Public Lands, Roads	672	4.2
Gravel, Junkyards & Landfills	391	2.4
Recreation, Open Space, Conservation	1,494	9.3
Agricultural	670	4.2
Undeveloped Lands	8,467	53.2
Water	552	3.4
Total Land	16,021	100.0%

Preliminary population projections from the Statewide Planning Program show continued slow growth rate for North Smithfield. Since the 2005, only 60 acres of land have commercialized.

However, the build-out of 441 approved market rate condominiums, age restricted units and elderly units are expected by 2014. Additional units in three other market rate projects are in the planning stages and will tend to shift the slow growth rate to a moderate trend.

Preservation of Wetlands

The environmental and economic values of wetlands are endless and are finally gaining more recognition over time. Wetlands play an important role in flood control. Wetlands collect and detain flood waters, reducing flow force and destructiveness, which is readily apparent in southern states where over fifty percent of wetlands have been eliminated. Wetlands also provide a valuable, natural service regarding water quality. Wetlands absorb and filter out pollutants that could otherwise degrade the quality of water in rivers, lakes, and ponds. Wetlands provide necessary spawning/rearing habitat and food supply for freshwater fish. They also provide the critical habitat for most waterfowl and support a wide diversity of plants and animals. Additional

benefits of wetlands include: groundwater recharge, erosion control, land formation, and recreation.

Section 3.7 Risk Assessment Matrix

The Town of North Smithfield Natural Hazard Mitigation Committee in reviewing the natural hazards that can impact the Town, completed the following Risk Assessment Matrix (Table 10). In completing this matrix, the committee identified areas in town that are at risk and are vulnerable to costly damage and loss of life. The vulnerable areas have been ranked by which mitigation strategy would produce the greatest benefit for the Town and its residents.

Table 10.0 Risk Assessment Matrix

Rank	What is vulnerable	Risk Area	Location	Ownership	Natural Hazard	Primary Problem of Effect	Mitigation Benefits	Risk Historic=H Potention=P
1	Cherry Brook south of Great Rd	1	Lapre Rd and Meadowbrook Drive	Private and public	*Flooding *Hurricane *Heavy Rains	* Homes flooded * Roads impassable	*Reduce risk of downstream flooding, property damage, *Public safety	P
2	Roads subject to flooding	1	Greenville Road North Main Street	Public Public	*Flooding *Hurricane *Heavy Rain	*Disruption of arterial traffic flow *Disruption of evacuation routes *Damage to private property *Cost of cleanup	*Public safety *Maintain evacuation routes *Reduce liability for damage to private property *Decrease costs of cleanup	H
3	Emergency Shelter	2	NS Jr./Sr. High School	Public	*Hurricane *Wind Events *Nor-easters	*Loss/damage of lives and property *Loss of communication with Public Safety Personnel	*Public safety *Maintain shelters *Protect economic and social well-being	P
4	Residential Home	1,2 3,4	Town-wide	Private	*Hurricane *Wind Event *Ice Storm *Nor'easters *Fire *Heavy Rain *Flood *Earthquake	*Economic and social hardship	*public safety *Prevent/minimize economic and social damage	H & P
5	Public Infrastructure	2,4	Town Hall NS Fire Station #1 NS Fire Station #2 NS Municipal Annex NS Police Department	Public Public Public Public Public	*Hurricane *Wind Event *Nor-easters	*Damage to communications *Disruption of emergency services *Loss/damage of lives and property	*Minimize disruption to emergency services *Public safety *Protection of essential services	H & P
6	Tree Damage	2	Town-wide	Public and Private	*Hurricane *Windstorm *Ice Storm *Nor-easters	*Loss of drinking water, heat, communication *Power outages	*Maintain communication systems *Protection of essential services	H & P
7	Local Dams subject to flooding or posing a risk for failure	1	Forestdale Pond Slatersville Res. Middle Slatersville Res. Upper Woonsocket Res. #1 Woonsocket Res. #2	Private Private Private Public Public	*Flood *Wind Event *Earthquake *Heavy Rain	*Loss of life and infrastructure *Damage to property downstream	*Decrease potential for dam failure *Reduce liability for damage to private property *public safety	P
8	Industries in the Floodplain	1	Town-wide	Private	*Heavy Rain *Flood *Nor-easters	*Hazardous waste contamination *Public safety *Loss/damage of lives and property	*Minimize contamination to residential areas *Decrease costs of cleanup *Public safety	H & P
	Forested areas		Town-wide	Public and	*Fire	*Loss of lives and	*Public safety	

9		3		Private		property *Public safety *Lack of ingress and egress	*Better access to fire source *Decrease risk to lives and property	H & P

Section 4.0 Mitigation Actions

With today's modern technology, forecasting and weather tracking systems are able to provide several days' warning prior to a major event. The mass media is also able to provide updates about storm strength and location to the general public. On a regional scale, the local National Weather Service office in Taunton, MA, provides regulation regional weather forecasts, complete with watches and warnings if necessary. For example, a Blizzard Warning is issued if strong winds, heavy wind-driven snow and dangerous wind chill is expected. However, some weather events cannot be predicted; this is the case with earthquakes. NOAA reports the existence of a serious fault in the middle of the Narragansett Bay (which has not been active recently).

Despite unpredictable and varying conditions, some preparatory actions can be taken before a major winter event, hurricane or Nor'easter occurs. With others, like severe thunderstorms or tornadoes, conditions can worsen very quickly and little advance notice will be available. An earthquake can occur without any warning. Even with extensive media coverage, there will still be those who are informed of a forecasted event.

An Emergency Evacuation Route Map has been developed for public use. It includes key locations such as the main routes to use in the event of an evacuation, shelter locations, critical facilities, fire and police stations, tow truck/fuel locations and schools. This map will keep public traffic flowing smoothly.

Depending on the type of event, Town Administrator, Paulette Hamilton, will decide when, or if there is a need to open the Emergency Operations Center (EOC). If it is opened early, minimal staff will increase based on weather intelligence. The EOC members are briefed from calls placed to the EOC Emergency Response Team (ERT). The ERT decides the following:

- Closing of schools and Town buildings
- Restricting access to identified risk areas (roadways, highways and evacuation zones)
- Opening of mass care facilities
- Timing and ordering evacuations
- Communicating and coordinating with other jurisdictions
- Suspending normal local government operations (i.e. closing Town Hall, etc.)
- Early release for non-essential workers (may be recalled for emergency duty)
- Receiving preparation and staffing status from local emergency response organizations
- Reporting to the State about local EOC readiness, commencement of Situation Reports

North Smithfield will ensure that multiple means of connectivity are available to receive NWS Watches and Warnings. When a NWS watch or warning is issued, emergency communication is essential. North Smithfield will ensure effective communication during a serious weather event by:

- Testing emergency communications and back-ups

- Distributing hand-held radios to key personnel who normally rely on cell and landline phones
- Placing amateur radio operators on stand-by
- Fueling and testing emergency generators that power communications equipment

Emergency Public Information is utilized during a severe weather/natural hazard event. The following considerations are also carried out:

- Preparing press releases that clearly instruct residents and businesses about event timing, what to do, where to go
- Identifying which mass care locations have opened
- Remind evacuees to bring any necessary medicine and other special items to mass care locations
- Issue notices when mass care facilities are at capacity to prevent unnecessary loading issues
- Advising media of any press conferences
- Preparation of fact sheets for the Town Manager

In the case of mass care facilities, North Smithfield will ensure the following criteria are followed:

- Accessibility and safe locations of mass care facilities
- Structural safety (ensure that facilities selected for mass care have not been damaged by the event)
- Provisions for back-up power and communications
- Provisions for food and water

Before any major weather/natural hazard event, North Smithfield will:

- Verify necessary food and supplies are on hand
- Review department equipment to ensure it is functional for the storm
- Verify fueling arrangements for all vehicles
- Test all emergency equipment and verify communications to/from the EOC.
- Review and verify the locations of staging areas for materials and equipment
- Confirm mutual aid agreement/contract statuses with private firms regarding emergency services
- Verify with electric utilities that key facilities are part of the priority restoration list
- Prepare and inspect all facilities for storm preparedness
- Monitor weather reports

North Smithfield can also request support from the State Emergency Management Agency (RIEMA). RIEMA can act as a medium for State and Federal resources and equipment. Other state agencies, such as the State Police, State Fire Marshall, State Environmental Management and the State Health Department may also be requested to support emergency operations.

The purpose is to develop a consequence management plan for preparing, responding to, and recovering from the effects of a severe weather/natural hazard event striking the Town of North Smithfield or the nearby region. The plan, in conjunction with other related emergency plans and

procedures, serves as a guide for Town officials to ensure effective severe weather/natural hazard preparedness, response, and recovery.

In completing the risk and vulnerability analysis, the North Smithfield Natural Hazard Mitigation Committee considered projects and actions that would reduce the Town's vulnerability to the identified hazards. The Risk Assessment Matrix presented in Table 10 is the basis for the mitigation actions presented in Section 4.1. The Committee considered the following actions to be the objectives of this plan and prioritized each action using criteria based on historical damage, safety of the population, property protection and consistency with Town-wide goals and objectives. Issues and objectives were aligned to public health risks, evacuation and mass care considerations, disruption of essential services and potential economic losses to the Town. Because there are no records on file for previous damage, the Committee utilized the Hazard Profile Summary to determine what natural event poses the greatest danger to the community and what areas would be affected. From here, the Committee devised the Risk Assessment Matrix and assigned priority to each risk area and associated actions using a "round-table" discussion format of general consensus as to prioritize the order of each action and its associated benefit. The actions were prioritized by those which are most likely to occur in the community (i.e. flooding vs. forest fire) and which would benefit the community the greatest with the limited funding that is presently available.

The North Smithfield Hazard Mitigation Committee determined that the identified objectives could be met by considering actions aligned to the following:

- Planning and Regulations
- Property Protection, Structural Projects and Maintenance (acquisition, elevation, flood gates, sewers, repairs)
- Public Information and Outreach, Incentive Programs
- Emergency Services (Protection of Critical facilities)
- Post Disaster Opportunities

This Committee has worked to set goals and objectives that are bounded by a time frame and are compatible and consistent with State Hazard Mitigation Goals. Upon submittal of this plan to RIEMA, the State Hazard Mitigation Committee (SHMC) is expected to review and approve these goals and objectives to ensure consistency with the statewide goals and objectives. The time frame used for this strategy is as follows:

- Short Term = 0 to 6 Months
- Medium Term = 6 to 18 Months
- Long Term = 18 Months to 5 Years

Section 4.1 Action Plan

The following actions are derived from the Risk Assessment Matrix (Table 10.0) to identify areas at risk, offer mitigation strategies and consider benefits. Each action reflects the existing conditions, discusses the project, assigns responsible parties and if known, lists an estimated cost. Multiple actions associated with a vulnerable area reflect Town priorities as to those that will benefit the community the most and are simply prioritized high, medium, or low. Other

relevant departments/ agencies that can offer support to the project are also identified, as well as funding options.

Risk Area # 1 – Goal: Protect the citizens and property that are vulnerable to flooding.

Existing conditions – There are two streets within Town that continually flood during periods of heavy rains. Also, many of the dams that are in Town are privately owned which causes maintenance enforcement to be an issue.

Action 1 – Cherry Brook Watershed Management

a) The Town will commission a hydrological study of the Cherry Brook watershed with the intent to design an emergency detention system in a natural depression on the SW side of Route 146. The Town acquired 69 acres of land in 2010. This land can store 40-60 acre feet of stormwater behind flashboards in an oversized culvert that runs under Route 146.
High Priority.
Responsible Party: Director of Public Works
In Coordination With: Planning Department, Rhode Island Department of Transportation, RI Department of Environmental Management
When: Short term
Resources available: Community Development Block Grant – Disaster Relief
Benefit: Minimize downstream flooding, continued public safety
Estimated Cost: $58,000

Beyond repairs, CDBG-DR will pay for hazard mitigation engineering directly related to the disaster. In 2008, the Town declined to award an engineering contract for a report that would identify ways to minimize the impacts of Cherry Brook flooding.

A 1968 engineering study documented how the railroad culvert northeast of Meadowbrook Dr. throttles down the Cherry Brook flow, causing flooding behind it. Increasing the flow capacity of the culvert would be very costly now, because DEM would require compensatory storage for any increased flow to Woonsocket.

LIDAR contours available on the 2008 Electronic Field Study aerials were used to find a natural basin and potential detention area in the Cherry Brook watershed. An oversized culvert under Route 146 controls almost all of the southwest area of the Cherry Brook watershed. That area accounts for about 40% of the flow at the Woonsocket Hill Rd culvert near Wright's farm. Placing temporary flashboards at the culvert opening would minimize flooding downstream.

The engineering design report would provide a TR-20 hydrological model for the watershed, an engineering design for the flashboard system, and expected flow results for various levels of rainfall and times of flashboard installation. Using LIDAR instead of field surveys, the project would cost about $25,000 (less than 70% of the 2008 cost). After federal and state reimbursement, the cost to the Town would be less than $4,000.

This project depends on acquisition of 69 acres of land just north of the Greenville Rd/Route 146 interchange. The Town Solicitor has obtained all the necessary deeds from the appointed administrator of the Silva estate.

Action 2 – Infrastructure Improvements to Flood-Prone Roads.

a) The Town will work with RIDOT to evaluate how to improve drainage improvements on town roads which are prone to flood during heavy rain events.
High Priority.
Responsible Party: Director of Public Works
In Coordination With: North Smithfield Dept. of Public Works, Rhode Island Department of Transportation
When: Short term
Resources available: Rhode Island Department of Transportation, Town funding
Benefit: Maintain evacuation routes, continued public safety
Estimated Cost: Unknown

During the summer of 2011, the Town evaluated the current condition of catch basin and outfalls on town roads, especially in flood-prone areas. Although the work is still underway, findings such as significant catch basin blockage resulted in a joint meeting of Town departments to take remedial action. There has been significant ongoing progress cleaning and improving catch basin and outfall conditions in the Town. These efforts have already begun to remediate similar situations with RIDOT. For example, a catch basin at the intersection of Main St. and North Main St. has been repaired after the Town discovered it was obstructed with dry asphalt. The Town has also obtained use of a catch basin cleaning truck from Smithfield and repaired its own bucket truck in order to expedite the catch basin cleaning process.

Action 3 – Public Education and Outreach

a) The Town will contact the owners of private dams and inform them that periodic inspection, maintenance and repair are essential to minimize risk of failure during heavy rain/flood events. Medium Priority
Responsible Party: Director of Public Works
In Coordination With: Department of Public Works
When: Short term
Benefit: Minimize risk of failure and protection of life and property
Estimated Cost: Minimal to no additional costs

b) Brochures will be produced and made available to citizens regarding the value of preserving wetlands for their storm water storage capacity.
Medium Priority.
Responsible Party: Town Planner
In Coordination With: Department of Planning, Department of Public Works
When: Medium term
Resources available: FEMA
Benefit: Maintain wetlands to reduce flooding

Estimated Cost: Unknown

Risk Area # 2 – Goal: Protect citizens and property from the effects of wind events.

Existing conditions – Wind events are frequent within the Town and cause power outages as well as create communication problems for public safety personnel.

Action 3 – Tree Cutting Within the Town Right-of-Way.

a) Limbs and trees within the Town right-of-way may pose a hazard to property and cause power failure during wind events, therefore, the Town will purchase a bucket truck that will allow the Town crews to clear trees and limbs that may create a problem within the Town's right-of-way.
Medium Priority.
Responsible Party: Director of Public Works
In Coordination With: Department of Public Works
When: Long-term
Resources available: Capital budget
Benefit: Protection of critical infrastructure/essential services during an event
Estimated Cost: $2,000 for repairs to 1988 bucket truck

Action 4 – Communication Capability

a) If phone service is interrupted during a wind event, radio communication will be essential and radio communication at the emergency shelter needs to be improved, therefore, evaluate the capability of existing public safety communication equipment, determine areas where communication is difficult and upgrade equipment as necessary to ensure continued communication during wind events.
High Priority.
Responsible Party: Emergency Management Director
In Coordination With: All public safety agencies
When: Long term
Resources available: Capital budget
Benefit: Continuation of essential communications during an event; public safety
Estimated costs: $18,000 budgeted for FY2012

Risk Area # 3 – Goal: Protect present and future citizens and property from the risks posed by a forest fire.

Existing conditions – There are large forested areas within the community, some of which are privately owned, that have limited ingress and egress and are adjacent to residential developments.

Action 5 – Public Education and Outreach

a) Educate owners of large tracts of land about the importance of keeping fire roads clear and preventing the buildup of fuel on the forest floor.

Medium Priority.
Responsible Party: Fire Chief
In Coordination With: Hazard Mitigation Committee, Fire Department
When: Short term
Resources available: Town funding, NFPA
Benefit: Reduced risk of fire; protection of life and property; public safety
Estimated costs: $3,000

Action 6 - GIS Overlay for Fire Hazard

a) Develop a GIS map overlay identifying areas of high fire potential and define access routes to remote areas.
Medium Priority.
Responsible Party: Town Planner
In Coordination With: Planning Department, Dept. of Public Works, Fire Department
When: Medium term and on-going
Resources available: Town funding
Benefit: Reduced response time; designation of high risk areas for further mitigation measures to be taken
Estimated costs: Unknown

Risk Area # 4 – Goal: E**nsure emergency access is possible to all residents during heavy snowstorms.**

Existing conditions – During a recent heavy snowstorm, EMT's were forced to borrow a snowmobile to respond to an emergency medical call.

Action 7 – Purchase two snowmobiles for use by emergency personnel.

a) Purchase two snowmobiles for use by emergency personnel
Medium priority.
Responsible Party: Fire Chief
In Coordination With: Fire Department
When: Long-term
Resources available: Capital budget
Benefit: Continued public safety access to residents during winter storms
Estimated Cost: $12,000

Other Mitigation Actions
Although weather events are inevitable, North Smithfield has developed precautionary methods of mitigating the effects of these events. Town Administrator, Paulette Hamilton is also the Lead of Public Safety and she recognized the importance of preemptive notification in the case of Hurricane Irene. We plan to notify the public via the Town's webpage, radio, and television well before the hazard occurs. With hurricanes and lightning storms, active tree trimming around power lines and coordination with National Grid will serve to reduce the number of downed power lines and power outages. We plan to make our new Emergency Evacuation Route map

available to the public in case of a tornado or earthquake event. In case of wildfires or fires from lightning strikes, our cisterns and pumping trucks will be maintained and ready to act.

Section 4.2 – Strategy Adoption

The North Smithfield Natural Hazard Mitigation Committee unanimously adopted this plan and recommended it be forwarded to the Town Council for their review and approval. The Town Council approved the Plan on July 18, 2011 (a copy of the resolution is attached in Appendix C). The Plan will next be forwarded to the RIEMA for approval by the State Hazard Mitigation Committee, the executive director of the RIEMA and then FEMA Region I.

Section 4.3 – Implementation, Evaluation and Revision of Strategy

Implementation

Once the Plan is approved by FEMA, the responsible parties will begin the actions that have been assigned to them. Implementation will be based on what actions will benefit the community the most to mitigate the risk as previously determined by the Committee using the benefits listed under each action. Each department/agency will be responsible for reporting progress to the Emergency Management Director who will track action progress on the Mitigation Action Progress Form (Appendix D).

The Committee has also suggested that this Plan be incorporated into the present (as well as future) Comprehensive Plan to ensure that all of the Town's plans are working towards the same goal of protecting the community. This will also allow for continued public involvement by engaging the community in updates of all Town Plans.

Evaluation

The Committee will meet quarterly to review the progress of each action and make any revisions that are necessary to ensure the objective is met. The main tool used for the review of actions will be the Mitigation Action Progress Form that will be maintained by the Emergency Management Director. An annual review will take place to remove those actions that have been completed and include new actions that arise based on the changing needs of the community. New actions will be prioritized using a formal prioritization method (e.g. STAPLEE) to help the Committee ensure that actions are receiving the proper priority.

Revision

A formal revision of the Plan will take place every five (5) years and all review and revision meetings will be open to the public and advertised as such to encourage further community involvement. In the event of a natural disaster, the plan will be reviewed after the event to see if further revision is needed at that time. After the five year update, a copy will be forwarded to the RIEMA to incorporate the changes into the State Plan.

REFERENCES

Earthquake: Needs Assessment. Rhode Island Emergency Management Agency. October 1994.

Flood Hazard Mitigation Planning: A Community Guide. Massachusetts Department of Environmental Management Flood Hazard Management Program. June 1997.

Flood Insurance Study for the Town of North Smithfield, Rhode Island, Providence County. Federal Emergency Management Agency. 1993.

National Climatic Data Center. National Oceanic and Atmospheric Administration. National Climatic Data Website – www.ncdc.noaa.gov .

State and Local Mitigation Planning How-To Guides. FEMA. FEMA 386-2, August 2001. FEMA 386-3, April 2003. FEMA 386-4, April 2003.

Town of North Smithfield Comprehensive Plan, 1992.

Town of North Smithfield Emergency Operations Plan, 2004.

APPENDIX A – Technical and Financial Assistance for Mitigation

State Resources

Coastal Resources Center
University of Rhode Island
Narragansett Bay Campus
Narragansett, RI 02882
(401) 874-6224

Coastal Resources Management Council
Steadman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
(401) 222-2476

Department of Administration
Division Of Planning
One Capitol Hill
Providence, RI 02908
(401) 222-6478

Department of Environmental Management
Division of Parks and Recreation
2321 Hartford Avenue
Johnston, RI 02919
(401) 222-2635

Department of Transportation-Design Section/Bridges
2 Capitol Hill, Room 231D
Providence, RI 02903
(401) 222-2053

Rhode Island Banking Commission/ Associate Director
233 Richmond Street
Providence, RI 02903
(401) 222-2405

Rhode Island Builders Association
The Terry Lane Corporation
Terry Lane
Glocester, RI 02814
(401) 568-8006

Rhode Island Department of Business Regulations
233 Richmond Street
Providence, RI 02903
(401) 222-2246

Rhode Island Emergency Management Agency
645 New London Avenue
Cranston, RI 02920
(401) 946-9996

Public Utilities Commission
100 Orange Street
Providence, RI 02903
(401) 222-3500 ext. 153

State Fire Marshal's Office
272 West Exchange Street
Providence, RI 02903
(401) 222-2335

State of Rhode Island Building Committee Office
Building Commissioner's Office
One Capitol Hill
Providence, RI 02903
(401) 222-3529

Federal Resources

Economic Development Administration
143 North Main Street, Suite 209
Concord, NH 03301
(603) 225-1624

Federal Emergency Management Agency
Taunton, MA 02780

U.S. Department of Commerce National Weather Service
Forecast Office
445 Myles Standish Boulevard

(508) 823-2262

Mitigation Division
Region I Office
J.W. McCormack POCH, Room 462
Boston, MA 02109
(617) 223-9561
10 Causeway Street

Small Business Administration
360 Rainbow Blvd., South, 3rd Floor
Niagara Falls, NY 14303
(716) 282-4612 or (800) 659-2955

National Park Service

U.S. Army Corps of Engineers
New England District
424 Trapelo Road
Waltham, MA 02254
(617) 647-8505

U.S. Department of Agriculture
Natural Resources Conservation Service
(formerly Soil Conservation Service)
451 West Street
Amherst, MA 01002
(413) 253-4362

U.S. Fish and Wildlife Service
New England Field Office
22 Bridge Street, Unit #1
Concord, NH 03301-4986

U.S. Department of Housing and Urban Development
Comm. Development Block Grants
Region I-O'Neill Federal Building

Boston, MA 02222
(617) 656-5354

U.S. Department of the Interior

River & Trail Conservation Program
Regional Office
15 State Street
Boston, MA 02109
(617) 223-5203

U.S. Environmental Protection Agency – Region I
JFK Federal Building
Government Center
Boston, MA 02203
(617) 565-3400

U.S. Geological Society
12201 Sunrise Valley Drive
Reston, VA

Other Resources

The Association of State Floodplain Managers (ASFPM)
Professional association with a membership of almost 1,000 state employees that assists communities with the NFIP. ASFPM has developed a series of technical and topical research papers and a series of proceedings from their annual conferences. Many mitigation "success stories" have been documented through these resources and provide a good starting point for planning.

Floodplain Management Resources Center
Free library and referral service of the ASFPM for floodplain management publication. Co-located with the Natural Hazards Center at the University of Colorado in Boulder, staff can use keywords to identify useful publications from the more than 900 flood-related documents in the library.

Institute for Business and Home Safety (IBHS) (formerly Insurance Institute for Property Loss Reduction)
An insurance industry sponsored, nonprofit organization dedicated to reducing losses – deaths, injuries and property damage – resulting from natural hazards. IBHS efforts are directed at five specific hazards: flood, windstorm, hail, earthquake and wildfire. Through its public education efforts and information center, IBHS communicates the results of its research and statistical gathering, as well as mitigation information, to a broad audience.

Volunteer Organizations
Organization, such as the American Red Cross, the Salvation Army, Habitat for Humanity, Interfaith and the Mennonite Disaster Service are often available to help after disasters. Service organization, such as the Lions, Elks and VFW are also available. These organizations have helped others with food, shelter, clothing, money, etc. Habitat for Humanity and the Mennonite Disaster Service provide skilled labor to help rebuild damaged buildings incorporating mitigation or flood proofing concepts. The offices of individual organizations can be contacted directly or the FEMA Regional office may be able to assist.

Flood Relief Funds
After a disaster, local businesses, residents and out-of-town groups often donate money to local relief funds. They may be managed by the local government, one or more local churches or an ad hoc committee. No government disaster declaration is needed. Local officials should recommend that the funds be held until an applicant exhausts all sources of public disaster assistance. Doing so allows the funds to be used for mitigation and other projects that cannot be funded elsewhere.

New England States Emergency Consortium (NESEC) – Lakeside Office Park
NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Brochures and videotapes are available on such topics as earthquake preparedness, mitigation and hurricane safety tips. NESEC maintains a world wide web home page that is accessible at http://www.serve.com/NESEC.

The New England Floodplain and Stormwater Managers Association (NEFSMA)
Professional organization for New England floodplain and stormwater managers. Provides workshops, conferences and a newsletter to membership and interested individuals and companies. NEFSMA home page is accessible at http://www.seacoast.com/~nefsma.

APPENDIX B – Existing Protection Systems – State and Federal

State of Rhode Island

Earthquakes and Hurricanes:
A certain amount of funding is allotted to each state per year based on a risk formula for earthquakes. Coastal states are allocated funds based on a risk formula for hurricanes. Each state receiving such funds has the ability to grant project funds to a community. There is not a match requirement on the part of the community, but the funds are limited and are generally only available once a year. The projects or products proposed for such funding must demonstrate that earthquake or hurricane risk will be reduced or eliminated and that the proposed projects or product is a cost-effective measure (a stringent cost/benefit analysis need not be performed). Information about the amount of funding available per year and the state requirements for eligibility and performance may be obtained from the RIEMA at (401) 946-9996.

Economic/Community Development
There may be programs existing to help flood proof homes using Community Development Block Grant funds. There may be housing assistance programs in the community that can be used following a major flood, achieving both the objectives of reducing flood damage and improving the community's housing stock (see Appendix A, "Federal Resources", for more information).

Evacuation Plans and Systems
The community's emergency operations center should have evacuation plans in place. For communities near a nuclear power plant, evacuation plans are required and may also be used for flood evacuation. The RIEMA may have additional evacuation plan information.

Land Use Restrictions
There are several federal and state regulations that serve to restrict land use in certain areas that may help reduce flood hazard vulnerability. If the community has open land owned by the state or federal government, examine what restrictions are placed on its development. In addition, the state Wetlands Protection Act regulates the development of all lands identified as significant to the protection of resources identified in the act.

Septic Systems
If there are areas in the community not served by a public sewer system, state septic system regulation influence development and may be a consideration for mitigation alternatives that include rebuilding and elevation of structures. Specific design requirements must be met for any construction in coastal velocity zones or river floodways. Generally, an inspection of a septic system is required if there is a change in use of the structure, an increase in flow or failed system. Limited inspections are required if the footprint of the structure is being changed. Upgrades are required by the state if an inspection reveals a failed system. However, local regulations may be more restrictive than state requirements, requiring inspections or upgrades in other cases.

Warning Systems and Emergency Operations Plans:
The community may have a flood warning system in place and should have a plan for response to flooding.

Federal Government

Community Rating System (CRS)

A voluntary initiative of the NFIP, the CRS was developed to encourage communities to perform activities that exceed the minimum NFIP floodplain management standards. If a community participating in the CRS performs activities that include maintaining records for floodplain development, publicizing the flood hazard, improving flood data and conducting floodplain management planning, then the flood insurance premiums paid by policy holders in the community will be reduced by 5 to 45 percent. Developing a flood mitigation plan will help communities gain additional credit under the CRS.

Hazard Mitigation Grant Program

Also known as the 404 Program or HMGP, this program is available only after a federally declared disaster occurs. It represents an additional 15 percent of all infrastructure and individual assistance funds that are provided to states to repair damages and recover from losses and is administered by the state in partnership with FEMA. Having a plan or completed mitigation action matrix prior to a disaster event is required by FEMA and is extremely helpful in meeting the states' deadlines for applications and ensuring the project is eligible and technically feasible. It provides 75/25 matching grants on a competitive basis to state, local and tribal governments, as well as to certain nonprofit organization that can be matched by either cash or in-kind services. The grants are specifically directed toward reducing future hazard losses and can be used for projects protecting property and resources against the damaging effects of floods, earthquakes, wind and other hazards. Specific activities encouraged under the HMGP include acquiring damaged structures to turn the land over to the community for open space or recreations use, relocating damaged or damage-prone structures out of the hazard area and retrofitting properties to resist the damaging effects of disasters. Retrofitting can include wet- or dry-flood proofing, elevation of the structure above flood level, elevation of utilities or proper anchoring of the structure.

Two programs that have been authorized under the National Flood Insurance Reform Act of 1994 include the Flood Mitigation Assistance (FMA) program and a provision for increased cost of compliance (ICC) coverage. FMA makes grants available on a pre- disaster basis for flood mitigation planning and activities, including acquisition, relocation and retrofitting of structures. FMA grants for mitigation projects will be available only to those communities with approved hazard mitigation plans. ICC coverage has recently been implemented for all new NFIP policies and renewals and is intended to be "mitigation insurance" to allow homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of $15,000. A certain amount of funding is allotted to each state per year based on a risk formula for floods. Each state has the discretion to award funds to communities or to state government agencies. States may use whatever criteria or method they choose to award the funds as long as the applicant and the proposal are eligible. The program may fund up to 75 percent of the total cost of the proposed project, with a minimum of 25 percent of the cost coming from the community. A minimum of half the community share must be cash or "hard match". Funds can also be granted to communities to help them prepare local flood mitigation plans. The same match requirements apply. Once a community receives a planning grant, however, it is not eligible to

receive additional planning grants for another five years. For further information on the FMA program or ICC coverage, contact the RIEMA at (401) 946-9996.

National Flood Insurance Program (NFIP)
All of Rhode Island's 39 municipalities participate in the NFIP. This program is a direct agreement between the federal government and the local community that flood insurance will be made available to residents in exchange for community compliance with minimum floodplain management regulations. Communities participating in the NFIP must:

- Adopt the flood insurance rate maps as an overlay regulatory district
- Require that all new construction or substantial improvement to existing structures in the flood hazard area be elevated or (if nonresidential) flood proofed to the identified flood level on the maps
- Require design techniques to minimize flood damage for structures being built in high hazard areas, such as floodways or velocity zones

In return for community adoption of these standards, any structure in that community is eligible for protection by flood insurance, which covers property owners from losses due to inundation from surface water of any source. Coverage for land subsidence, sewer backup and water seepage is also available subject to the conditions outlined in the NFIP standard policy (see Appendix A, "Federal Resources", for contacts regarding insurance coverage and purchase). Since homeowners insurance does not cover flooding, a community's participation in the NFIP is vital to protecting property in the floodplain as well as being essential to ensure that federally backed mortgages and loans can be used to finance flood prone property.

Town of North Smithfield

Hazard Mitigation
Planning Committee

Kendall Dean School
83 Green Street

Thursday, September 22, 2011
5:00 PM

AGENDA

Roll call

Public review of draft Hazard Mitigation Plan

Discussion and recommendations for revisions

Adjournment

Meeting Minutes
Hazard Mitigation Planning Committee
September 22, 2011

Present: Robert Ericson, Town Planner; Raymond Pendergast, Public Works Director; Chief Jeff Jillson, North Smithfield Fire and Rescue Services; Robert Nault, Business Representative; Peter Branconnier, EMA Director.

Call to Order: the meeting was called to order at 5:00 PM in the Town Council Chambers at Kendal Dean School Administration Building, 83 Green Street.

The members discussed the final draft plan. There were no changes recommended, but Mr. Ericson planned to review one more time for any typographical errors and notify the Commission members of any corrections.

Mr. Pendergast moved "to approve the 2011 plan and forward it to the Town Council for approval."

Meeting adjourned at 5:17 PM