Adopted by the Town of Westford Selectboard on March 10, 2011

TOWN OF WESTFORD, Vermont
All-Hazards Mitigation Plan

Annex 16 to the
Chittenden County Multi-Jurisdictional
All-Hazards Mitigation Plan

Prepared by:

The Chittenden County Regional Planning Commission

and the

Town of Westford, Vermont

March, 2011

Executive Summary

Hazard Mitigation is a sustained effort to permanently reduce or eliminate long-term risks to people and property from the effects of reasonably predictable hazards. The purposes of this updated Local All-Hazards Mitigation Plan are to:

- Identify specific natural, technological and societal hazards that impact the Town of Westford;
- Prioritize hazards for mitigation planning;
- Recommend town-level goals and strategies to reduce losses from those hazards; and
- Establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

This plan is a local annex to the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan*. **In order to become eligible to receive various forms of Federal hazard mitigation grants, a Chittenden County municipality must formally adopt its Local All-Hazards Mitigation Plan along with the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan*, or develop and adopt an independent, stand-along Local All-Hazards Mitigation Plan.**

Section 1: Introduction and Purpose explains the purpose, benefits, implications and goals of this plan. This section also describes municipal demographics and development characteristics, and describes the planning process used to develop this plan.

Section 2: Hazard Identification expands on the hazard identification in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan* with specific municipal-level details on selected hazards.

Section 3: Risk Assessment discusses identified hazard areas in the municipality and reviews previous federally-declared disasters as a means to identify what risks are likely in the future. This section presents a hazard risk assessment for the municipality, identifying the most significant and most likely hazards which merit mitigation activity. The most significant identified hazards for Westford are:

Severe winter storm	Power loss	Telecommunications failure
Epidemic	Economic recession	Flooding

Section 4: Vulnerability Assessment discusses buildings, critical facilities and infrastructure in designated hazard areas and the issue of estimating potential losses.

Section 5: Mitigation Strategies is the heart of this All Hazards Mitigation Plan. This section begins with an overview of goals and policies in the *2004 Westford Town Plan* that support hazard mitigation. This is followed by an analysis of existing municipal actions that support hazard mitigation, such as planning and zoning, emergency services and public works. This section presents the following all-hazards mitigation goals:

1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.

2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
3) Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan and as identified generally in the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan.
4) Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and stormwater management and the planning and development of various land uses.
5) Maintain existing municipal plans, programs, regulations, bylaws and ordinances that directly or indirectly support hazard mitigation.
6) Consider formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5), as well as incorporation of proposed new mitigation actions into the municipality's/town's bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.
7) Consider formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the municipal/town operating and capital plans and infrastructure, utilities, highways and emergency services.

This section also identifies and provides a detailed discussion of the following Mitigation Actions:

- Action #1: Continue and improve highway, culvert and bridge maintenance programs.
- Action #2: Evaluate capabilities of existing road and stormwater management infrastructure.
- Action #3: Complete fluvial geomorphology assessment and develop strategies in response to identified risk.
- Action #4: Conduct landslide hazard assessments and develop strategies in response to identified risk.
- Action #5: Evaluate capabilities of existing and potential public shelters.
- Action #6: Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident; ensure town and school emergency plans are fully coordinated.
- Action #7: Raise public awareness of hazards, hazard mitigation and disaster preparedness.

Finally, this section provides an Implementation Matrix to aid the municipality in implementing the Mitigation Actions and annual monitoring of this Plan.

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SECTION 1: INTRODUCTION AND PURPOSE

1.1 Purpose and Scope of this Plan

The purpose of this Local All-Hazards Mitigation Plan is to assist this municipality in identifying all hazards facing their community and in identifying strategies to reduce the impacts of those hazards. The plan also seeks to coordinate the mitigation efforts of this municipality with those outlined in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan* as well as efforts of quasi-governmental organizations such as Local Emergency Planning Committee, District #1 and the Chittenden County Regional Planning Commission.

This annex, when used with the appropriate sections of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan, constitutes an All-Hazards Mitigation Plan for the Town of Westford. Community planning can aid in significantly reducing the impact of expected, but unpredictable natural and human-caused events. The goal of this plan is provide hazard mitigation strategies to aid in creating disaster resistant communities throughout Chittenden County.

1.2 Hazard Mitigation

The *2007 Vermont State All-Hazards Mitigation Plan* defines hazard mitigation as

> any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. The Federal Emergency Management Agency (FEMA) and state agencies recognize that it is less expensive to prevent disaster or mitigate its effects than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management—Preparedness, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where they are, where they are most severe and to identify actions that can reduce the severity of the hazard.

Hazard mitigation strategies and measures can reduce or eliminate the frequency of a specific hazard, lessen the impact of a hazard, modify standards and structures to adapt to a hazard, or limit development in identified hazardous areas.

1.3 Hazard Mitigation Planning Required by the Disaster Mitigation Act of 2000

Hazard mitigation planning is the process that analyzes a community's risk from natural hazards, coordinates available resources, and implements actions to reduce risks. According to 44 CFR Part 201, Hazard Mitigation Planning, this planning process establishes criteria for State and local hazard mitigation planning authorized by Section 322 of the Stafford Act as amended by Section 104 of the *Disaster Mitigation Act of 2000*. Effective November 1, 2003, local governments now have to have an approved local mitigation plan prior to the approval of a local mitigation project funded through federal Pre-Disaster Mitigation funds. Furthermore, the State of Vermont is required to adopt a State Pre-Disaster Mitigation Plan in order for Pre-Disaster

Mitigation funds or grants to be released for either a state or local mitigation project after November 1, 2004.

There are several implications if the plan is not adopted.

- After November 1, 2004, Flood Mitigation Assistance Grant Program (FMAGP) funds will be available only to communities that have adopted a local Plan
- For disasters declared after November 1, 2004, a community without a plan is not eligible for HMGP project grants but may apply for planning grants under the 7% of HMGP available for planning.
- For the Pre-Disaster Mitigation (PDM) program, a community may apply for PDM funding but must have an approved plan in order to receive a PDM project grant.

1.4 Benefits

Adoption and maintenance of this Plan will:

- Make certain funding sources available to complete the identified mitigation initiatives that would not otherwise be available if the plan was not in place.
- Ease the receipt of post-disaster state and federal funding because the list of mitigation initiatives is already identified.
- Support effective pre- and post-disaster decision making efforts.
- Lessen each local government's vulnerability to disasters by focusing limited financial resources to specifically identified initiatives whose importance has been ranked.
- Connect hazard mitigation planning to community planning where possible.

1.5 All-Hazards Mitigation Plan Goals

The Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan establishes the following general goals for the county as a whole and its municipalities:

1) Recognize the mixed urban-suburban-rural nature of Chittenden County and its position as the state's most populous and most economically powerful county and incorporate these facts in hazard mitigation planning.
2) Promote awareness amongst municipalities, residents and business in the county of the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and stormwater management and the planning and development of various land uses.
3) Ensure that regionally-initiated mitigation measures are consistent with municipal plans and the capacity of municipalities to implement them.
4) Encourage municipalities to formally incorporate their individual Local All-Hazards Mitigation Plan into their municipal plan as described in 24 VSA, Section 4403(5), as well as incorporate their proposed mitigation actions into their various bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.

5) Encourage municipalities to formally incorporate elements of their Local All-Hazards Mitigation Plan, particularly their recommended mitigation strategies, into their municipal operating and capital plans and programs, especially, but not limited to, as they relate to public facilities and infrastructure, utilities, highways and emergency services.
6) Educate regional entities on the damage to public infrastructure resulting from all hazards and work to incorporate hazard mitigation planning into regional land use planning, such as the Chittenden County Regional Plan, and regional transportation planning conducted by the Chittenden County Metropolitan Planning Organization.
7) Maintain existing mechanisms or develop additional processes to foster regional cooperation in hazard mitigation, specifically and emergency planning, generally.

1.6 Town of Westford: Demographics and Development Characteristics

The Town of Westford is located on the northern edge of Chittenden County and is bounded on the west by Milton and Colchester, on the south by Essex and Jericho, on the east by Underhill and on the north by Fairfax (in Franklin County) and Cambridge (in Lamoille County). Westford encompasses 39.12 square miles.

Based on U.S. Census data, the University of Vermont's Center for Rural Studies reports a population of 2,086 people in 2000. Selected population characteristics are as follows:

Table 1-1 Town of Westford, selected population characteristics, 2000 Census

Category	Number	%
Total Population	2,086	--
Median Age	36.9 years	--
Population age 65 years and over	117	5.6
Population (and %) under 10 years old	350	16.3
Population (and %) in group quarters	0	0.0

The following shows the types of housing within Westford, also based on the 2000 U.S. Census data:

Table1-2 Town of Westford, selected housing unit data, 2000 Census

Category	Number	%
Total Housing Units	750	--
Occupied housing units	725	96.7
Vacant housing units	25	3.3
Vacant housing units used for seasonal, recreational or occasional use	6	0.8
Detached 1-unit housing units	605	80.7
Housing units with 5 or more units in structure	3	0.4
Mobile homes	96	12.8
Housing structures built in 1939 or earlier	156	20.8

Population concentrations occur in the village center, along VT 15 in the northeast corner of town, around Cambridge Rd. and Plains Rd. on the north border, and along Old Stage Rd. and

the Westford-Milton Rd west of the village. With the exception of limited commercial development and municipal buildings along VT 128 and VT 15, and in the small village area, the overwhelming use of the landscape in Westford is for large-lot residential and agricultural purposes.

1.7 Summary of Planning Process

1.7.1 Planning and Development of the 2005 All-Hazards Mitigation Plan Westford Annex

In mid-August 2003 the CCRPC sent a letter detailing the PDM planning process to Kenneth Tardie, Chair of the Westford Selectboard. In late August 2003 CCRPC staff met with Steve Zeppi, the Town's Emergency Management Coordinator to describe the data collection process and the associated Mitigation 20/20 forms. Mr. Zeppi provided a portion of the completed forms to the CCRPC in mid January of 2004. A first draft of the Local Hazard Mitigation Plan for Westford was provided to the Town of Westford in late September 2004 for their review and comment. Following a presentation by CCRPC staff to the Selectboard in December 2004 and subsequent consultations with the Town in March 2005, a second, more complete, draft along with a draft resolution of adoption was provided to the Town Selectboard in early April 2005. The Selectboard subsequently adopted the Westford Plan annex and the Multi-Jurisdictional Plan on June 23, 2005.

1.7.2 Development of the 2010 update to the Westford Annex

In November and December of 2008, CCRPC staff gathered updated data for the tables and in-text factual information. The availability of GIS data for updated maps was also assessed at this time. In January 2009, CCRPC staff convened a meeting of the Review/Update Committee for the Multi-Jurisdictional All-Hazards Mitigation Plan; all towns in the County were invited to appoint a representative to this committee. The Review/Update Committee focused on the County plan, but also served to introduce the Plan to the town representatives present.

In February 2009, CCRPC staff sent detailed and individualized questionnaires to the emergency management coordinator, town planner, and town highway foreman. These questionnaires sought updated information for Table 5-1, as well as information on the progress, logical next steps, and continued relevance of the mitigation strategies laid out in the 2005 plan. Additionally, the following municipal plans and reports were reviewed:

- *2004 Westford Town Plan*
- Fluvial erosion hazard studies

Based on information from the County plan, the updated tables, and input from town officials, CCRPC staff drafted an update to the text of the Westford annex in January 2010. All sections of the annex were revised and updated. CCRPC staff coordinated with Melissa Manka, Town Planner, to gather the remaining information needed to complete the draft. CCRPC staff revised the draft update based on input from municipal officials. The revised draft annex was presented to the Westford Selectboard on March 15, 2010 for comment and review. Comments from the Selectboard were incorporated into the final revised draft annex. The draft was also posted on the CCRPC website for public review.

The revised final draft annex was submitted to VEM and FEMA for formal review and approval pending municipal adoption. CCRPC staff made minor revisions to the multi-jurisdictional plan

and municipal annexes in response to June 2010 comments from Vermont Emergency Management. This version of the plan was resubmitted to the Federal Emergency Management Agency Region 1 for approval pending adoption. Upon approval pending adoption, CCRPC staff provided final drafts of the Multi-Jurisdictional Plan and the Westford Annex to the selectboard members and the town clerk. CCRPC also provided draft language for a resolution of adoption to be discussed at a regularly scheduled and properly warned selectboard meeting on March 10, 2011.

The revised annex was adopted by the Westford Selectboard on March 10, 2011.

SECTION 2: HAZARD IDENTIFICATION

Detailed descriptions of the natural, technological, and societal hazards affecting the municipalities of Chittenden County are contained in the *Multi-Jurisdictional All-Hazards Mitigation Plan*. Designated and non-designated hazard areas are described in Section 3 of this annex. Vulnerability of structures and infrastructure to hazards is also described in Section 4 and depicted on Map 3-1. A few of the hazards identified in the multi-jurisdictional AHMP are presented in more detail in the municipal annexes. However, as Westford contains no locations that store above 10,000 gallons of fuel or extremely hazardous substances, no further discussion of hazardous materials is warranted.

2.1 Transportation Incident

2.1.1 High Accident Locations

The following High Accident Locations have been identified by the Vermont Agency of Transportation in Westford.

Table 2-1 Town of Westford, high accident road sections, based on 2001-2005 data

Road	Road Type	Section (miles)
Westford-Milton Rd	Major Collector	0.800 - 1.100

Source: VTrans

2.1.2 Road Infrastructure Failure

Of the four bridges inventoried by VTrans for Westford, none are rated functionally or structurally deficient. None of the bridges in Westford are rated Scour Critical with regards to fluvial undermining of bridge structure. Details on the bridges in the town are found in Table 4-4.

SECTION 3: RISK ASSESSMENT

3.1 Designated Hazard Areas

3.1.1 Flood Hazard Areas

In 2004, Westford began participation in the NFIP, and has been issued official FEMA Floodplain maps. The town is participating in the regular NFIP as of 2010. Westford's Zoning Regulations designate a Water Resources Overlay District for the area 100 ft from top-of-bank along the Browns River and 50 ft or 100 ft from the center of all named and unnamed streams, ponds and lakes shown on the Town Plan Water Resources, Wetlands & Floodplains map. Only uses such as low impact recreation, agriculture, forestry, open land maintenance, maintenance of man-made ponds, invasive species control, and wastewater and potable water systems are permitted within the overlay district.

A simple GIS intersection analysis reveals that portions of town roads are also located within the 100-year floodplain as well as culverts and bridges and utility poles. Unfortunately, this level of analysis does not take into account the fluvial geomorphology (volume, velocity, direction, etc.) nor, most critically, does it factor in the elevation of the road relative to flood elevation. Analysis also reveals farmland located within the floodplain, however, without an accurate fluvial geomorphology assessment at each location it is not currently possible to predict how many cubic yards of productive soils would be a net loss during a flood event.

Map 3-1 shows the current extent of the FEMA-FIRM flood hazard area in Westford, as well as structures, infrastructure, and critical facilities located in the flood hazard area.

3.1.2 Fluvial Erosion Hazard Areas

Some level of geomorphic assessment has been completed for most of the streams that run through Westford. Fluvial Erosion Hazard areas have been identified for some of these waterways. Notably, sections along the banks of the Browns River have been identified as fluvial erosion hazard areas. *Map 3-2* shows the progress of geomorphic assessments and identified fluvial rrosion hazard areas in Westford. Critical facilities and infrastructure located in the fluvial erosion hazard area are not identified on this map because the fluvial erosion data has not been finalized.

3.1.3 Repetitive Loss Properties

Repetitive loss properties are public or private buildings insured under the National Flood Insurance Program that have made at least two insurance claims of more than $1,000 each during a ten year period.

According to the National Flood Insurance Program there are no such properties located in the Town of Westford.

3.2 Non-designated Hazard Areas

3.2.1 1998 Ice Storm Damage

Only a small area in the southwest portion of the town, near Rollin Irish Road, suffered downed trees and limbs.

3.2.2 High Winds and Lightning

Ridgeline and hilltop homes, utility lines, and homes located in the midst of mature forests are the most vulnerable to damage from falling trees and tree limbs. Two high wind events have been specifically identified as affecting Westford by the National Climatic Data Center. According to the National Climatic Data Center, lightning has struck and damaged structures twice in Westford since 1993, although local officials indicate that many more lightning incidents have occurred than are recorded in the database.

3.3 Previous FEMA-Declared Natural Disasters and Snow Emergencies

Since 1990, Westford has received public assistance funding from FEMA for the following natural disasters:

Table 3-1 Town of Westford, FEMA-declared disasters and snow emergencies, 1990-2009

Date (FEMA ID#)	Type of Event	Total repair estimates
June 1990 (DR 875)	flooding	$37,658
January 1996 (DR 1101)	flooding	$44,494
July 1998 (DR 1228)	flooding	$389,279
April 2001 (EM3167)	snow emergency	$11,050
August 2004 (DR 1559)	flooding	$70,321

Sources: Vermont Department of Housing & Community Affairs; Vermont Agency of Transportation.
Dollar value figures represent the total estimated repair costs for damages suffered to municipal resources. This table does not include damage claims submitted to FEMA by non-municipal organizations or by private individuals or businesses.

The Town of Westford was reimbursed at a rate of 75 percent by FEMA for the estimated repair costs. Funds provided in response to these natural disasters were used as follows:

- June 1990: Money was spent on gravel only, to fix washouts throughout the Town.
- January 1996: Gravel washouts were repaired, and snow blocked culverts.
- July 1998: Gravel plus culvert repairs, bigger culverts and more ditching; new culverts: 3ft, 4ft, 5ft. All culverts upgraded to at least 18. On Seymour Road: high bridge, 10 houses at dead end street, installed 3 new 6ft culvert. Most severely damaged roads were Osgood Hill Road, Machia Hill Road. Damage also occurred on Woods Hollow Road and Rollin Irish Road; new culverts were installed at Huntley Road; Old #11 Road.
- April 2001: Increased contractual costs for snow removal.
- August 2004: Gravel replacement. Extensive damage reported on Woods Hollow and Rollin Irish Road; less damage on Chapin Road, Old Stage Road, Westford-Milton Road. New culverts added at Pettingill Road (1) and Rollin Irish (3).

3.4 Future Events

Although estimating the risk of future events is far from an exact science, CCRPC staff used best available data and best professional judgment to conduct an updated Hazards Risk Estimate analysis, which was subsequently reviewed and revised by town officials in 2010. This analysis assigns numerical values to a hazard's affected area, expected consequences, and probability. This quantification allows direct comparison of very different kinds of hazards and their effect on the county, and serves as a rough method of identifying which hazards hold the greatest risk. CCRPC staff applied the following scoring system:

Area Impacted, scored from 0-4, rates how much of the municipality's developed area would be impacted.

Consequences consists of the sum of estimated damages or severity for four items, each of which are scored on a scale of 0-3:

- Health and Safety Consequences
- Property Damage
- Environmental Damage
- Economic Disruption

Probability of Occurrence (scored 1-5) estimates an anticipated frequency of occurrence.

To arrive at the overall risk value, the sum of the Area and Consequence ratings was multiplied by the Probability rating. The highest possible score is 80.

3.4.1 Natural Hazards

According to the updated Hazard and Risk Estimation analysis for Westford, the following natural hazards received the highest risk ratings out of a possible high score of 80:

- Severe Winter Storm (45)
- Flooding (20)

While flooding is likely to have a significant impact over a smaller area, severe winter storms tend to affect the entire town and are more common, hence the higher rating.

Table 3-2 Natural hazards risk estimation matrix, Westford

	Drought	Flooding	High Winds	Fluvial Erosion	Landslide	Lightning	Multi-Structure Urban Fire	Wildfire	Winter Storm	Radiological (Natural)
Area Impacted	1	1	1	1	1	1	1	0	4	0
Key: 0 = No developed area impacted										
1 = Less than 25% of developed area impacted										
2 = Less than 50% of developed area impacted										
3 = Less than 75% of developed area impacted										
4 = Over 75% of developed area impacted										
Consequences										
Health & Safety Consequences	1	1	1	0	0	0	1	0	1	1
Key: 0 = No health and safety impact										
1 = Few injuries or illnesses										
2 = Few fatalities or illnesses										
3 = Numerous Fatalities										
Property Damage	0	1	1	1	1	1	2	1	2	0
Key: 0 = No property damage										
1 = Few properties destroyed or damaged										
2 = Few destroyed but many damaged										
2 = Few damaged and many destroyed										
3 = Many properties destroyed and damaged										
Environmental Damage	0	1	0	1	1	0	0	1	1	0
Key: 0 = Little or no environmental damage										
1 = Resources damaged with short-term recovery										
2 = Resources damaged with long-term recovery										
3 = Resources destroyed beyond recovery										
Economic Disruption	1	1	1	1	2	1	2	1	1	1
Key: 0 = No economic impact										
1 = Low direct and/or indirect costs										
2 = High direct and low indirect costs										
2 = Low direct and high indirect costs										
3 = High direct and high indirect costs										
Sum of Area & Consequences Scores	*3*	*5*	*4*	*4*	*5*	*3*	*6*	*3*	*9*	*2*
Probability of Occurrence	4	4	4	4	2	4	2	3	5	2
Key: 1 = Unknown but rare occurrence										
2 = Unknown but anticipate an occurrence										
3 = 100 years or less occurrence										
4 = 25 years or less occurrence										
5 = Once a year or more occurrence										
TOTAL RISK RATING	12	20	16	16	10	12	12	9	45	4
Total Risk Rating =										
Sum of Area & Consequences Scores										
x Probability of Occurrence										

3.4.2 Technological Hazards

According to the updated Hazard Risk Estimation analysis for Westford, the following technological hazards received the highest risk ratings out of a possible high score of 80:

- Power Loss (35)
- Telecommunications Failure (30)

Westford is vulnerable to Power Loss and Telecommunications Failure because the population is dispersed and repairing utility infrastructure in rural areas can take more time. Westford does not have municipal water service, but town residents and businesses rely on well water, so it should be noted that a power loss also results in a water service loss.

Table 3-3 Technological hazards risk estimation matrix, Westford

	Gas Service Loss	Hazardous Materials Incident	Power Loss	Radiological Incident	Sewer Service Loss	Telecommunications Failure	Water Service Loss	Major Transportation Incident	Military Ordnance Incident
Area impacted Key: 0 = No developed area impacted 1 = Less than 25% of developed area impacted 2 = Less than 50% of developed area impacted 3 = Less than 75% of developed area impacted 4 = Over 75% of developed area impacted	0	1	4	1	0	4	2	1	0
Consequences									
Health & Safety Consequences Key: 0 = No health and safety impact 1 = Few injuries or illnesses 2 = Few fatalities or illnesses 3 = Numerous Fatalities	1	1	1	2	0	1	1	2	1
Property Damage Key: 0 = No property damage 1 = Few properties destroyed or damaged 2 = Few destroyed but many damaged 3 = Few damaged and many destroyed 4 = Many properties destroyed and damaged	0	1	1	1	1	0	0	1	1
Environmental Damage Key: 0 = Little or no environmental damage 1 = Resources damaged with short-term recovery 2 = Resources damaged with long-term recovery 3 = Resources destroyed beyond recovery	0	1	0	1	1	0	0	1	1
Economic Disruption Key: 0 = No economic impact 1 = Low direct and/or indirect costs 2 = High direct and low indirect costs 2 = Low direct and high indirect costs 3= High direct and high indirect costs	1	1	1	2	1	1	1	1	2
Sum of Area & Consequences Scores	2	5	7	7	3	6	4	6	5
Probability of Occurrence Key: 1 = Unknown but rare occurrence 2 = Unknown but anticipate an occurrence 3 = 100 years or less occurrence 4 = 25 years or less occurrence 5 = Once a year or more occurrence	1	3	5	1	1	5	4	2	1
TOTAL RISK RATING Total Risk Rating = Sum of Area & Consequences Scores x Probability of Occurrence	2	15	35	7	3	30	16	12	5

3.4.3 Societal Hazards

According to the updated Hazard Risk Estimation analysis for Westford, the following societal hazards received the highest risk ratings out of a possible high score of 80:

- Epidemic (21)
- Economic Recession (21)

Economic recession is highly ranked for both its direct impacts and its secondary effects on health, safety, and the environment. In a recession, property owners may not be able to maintain their properties, which are then more vulnerable to natural hazards. The likelihood of an epidemic is difficult to gauge, but its consequences could be severe.

Table 3-4 Societal hazards risk estimation matrix, Westford

	Crime	Civil Disturbance	Terrorism	Epidemic	Economic Recession	Key Employer Loss
Area Impacted	1	1	1	2	3	1
Key: 0 = No developed area impacted						
1 = Less than 25% of developed area impacted						
2 = Less than 50% of developed area impacted						
3 = Less than 75% of developed area impacted						
4 = Over 75% of developed area impacted						
Consequences						
Health & Safety Consequences	0	0	1	2	1	0
Key: 0 = No health and safety impact						
1 = Few injuries or illnesses						
2 = Few fatalities or illnesses						
3 = Numerous Fatalities						
Property Damage	1	1	1	0	0	0
Key: 0 = No property damage						
1 = Few properties destroyed or damaged						
2 = Few destroyed but many damaged						
3 = Few damaged and many destroyed						
4 = Many properties destroyed and damaged						
Environmental Damage	0	0	0	0	1	0
Key: 0 = Little or no environmental damage						
1 = Resources damaged with short-term recovery						
2 = Resources damaged with long-term recovery						
3 = Resources destroyed beyond recovery						
Economic Disruption	1	1	2	3	2	2
Key: 0 = No economic impact						
1 = Low direct and/or indirect costs						
2 = High direct and low indirect costs						
2 = Low direct and high indirect costs						
3 = High direct and high indirect costs						
Sum of Area & Consequences Scores	*3*	*3*	*5*	*7*	*7*	*3*
Probability of Occurrence	4	1	1	3	3	4
Key: 1 = Unknown but rare occurrence						
2 = Unknown but anticipate an occurrence						
3 = 100 years or less occurrence						
4 = 25 years or less occurrence						
5 = Once a year or more occurrence						
TOTAL RISK RATING	12	3	5	21	21	12
Total Risk Rating =						
Sum of Area & Consequences Scores						
x Probability of Occurrence						

3.4.4 Hazard Summary

According to the risk estimation analysis, the highest rated hazards for Westford are:

- Severe Winter Storm (45)
- Power Loss (35)
- Telecommunications Failure (30)
- Epidemic (21)
- Economic Recession (21)
- Flooding (20)

It should be noted that the two natural hazards on the list—flooding and severe winter storm—could be the cause of the highest-rated technological hazards, power loss and telecommunications failure. Winter storms are the highest rated hazard for Westford, due in large part to their widespread nature and frequent occurrence.

SECTION 4: VULNERABILITY ASSESSMENT

4.1 Critical Facilities

The Center for Disaster Management and Humanitarian Assistance defines critical facilities as: "Those structures critical to the operation of a community and the key installations of the economic sector." *Map 4-1* shows the geographic distribution of some critical facilities and utilities. Table 4-1 identifies critical facilities in Westford. This list includes all critical facilities, not only the facilities located in designated hazard areas.

Table 4-1 Critical facilities in the Town of Westford

Facility Type	Number of Facilities
Veterinary Hospital / Clinic	1
Education Facility	1
Fire Station	1
Emergency Shelters	1
Emergency Operations Center	1
Energy	1
Government and Military	2
Mail and Shipping	1
Water Supply and Treatment	1

Source: VCGI

4.2 Infrastructure

4.2.1 Town Highways

The following is a statistical overview of roads in the Town of Westford. These tables show the range of road types within the town, from state highway to unimproved unpaved roads. Different road types have different hazard vulnerabilities. Unpaved roads are more vulnerable to washing out in a flood or storm, while traffic incidents are more likely to occur on large, arterial roads.

Table 4-2 Town highway mileage by class, Town of Westford

Class 1	Class 2	Class 3	Class 4	State Hwy	Fed Hwy	Interstate	Total 1, 2, 3, State Hwy
	12.467	26.860	1.710	9.374			48.701

Source: derived from VTrans TransRDS GIS data – surface class and arc length

Table 4-3 Town highway mileage by surface type, Town of Westford

Paved	Gravel	Soil or Graded	Unimproved	Impassable	Unknown	Total
12.328	42.933	2.926	0.945	0.579	10.300	70.011

Total Known	Total Unpaved	% Paved	% Unpaved
59.711	47.383	20.6%	79.4%

Source: derived from VTrans TransRDS GIS data – surface class and arc length

4.2.2 Bridges, Culverts, and Dams

There are a variety of bridges, culverts and dams located in the municipality. The following bridges are contained in an inventory maintained by VCGI, VTrans and the CCRPC. A GIS intersection was performed to determine which bridges are located in the designated flood hazard area. This analysis does not take into account the fluvial geomorphology or the elevation of the bridge above the floodplain. Less data was available for the Town Short bridges.

Table 4-4 Inventoried bridges in the Town of Westford

Type	ID Label	Year Built	Bridge Type	Deficiency	Bridge Features	Scour Critical	Located in Floodplain
STATE LONG	B17	1931	T BM WIDEN W/ SLAB	NO DEFICIENCY	BEAVER BROOK	5 - NOT SCOUR CRITICAL	
TOWN LONG	B2	2005	CONCRETE SLAB	NO DEFICIENCY	ROGERS BROOK	8 - NOT SCOUR CRITICAL	
TOWN LONG	B22	1966	ROLLED BEAM	NO DEFICIENCY	BROWNS RIVER	8 - NOT SCOUR CRITICAL	YES
STATE LONG	B5	1930	ROLLED BEAM	NO DEFICIENCY	BROWNS RIVER	8 - NOT SCOUR CRITICAL	YES
TOWN SHORT	B2				WOODS HOLLOW RD		
TOWN SHORT	B3				OLD STAGE RD		
TOWN SHORT	B4				OLD STAGE RD		
TOWN SHORT	B5				CAMBRIDGE RD		
TOWN SHORT	B6				OLD NUMBER ELEVEN RD		
TOWN SHORT	B8				OSGOOD HILL RD		
TOWN SHORT	B11				BROOKSIDE RD		
TOWN SHORT	B12				CAMBRIDGE RD		
TOWN SHORT	B14				COVEY RD N		
TOWN SHORT	B15				OLD NUMBER ELEVEN RD		
TOWN SHORT	B16				OLD NUMBER ELEVEN RD		
TOWN SHORT	B17				OLD NUMBER ELEVEN RD		
TOWN SHORT	B18				SEYMOUR RD		
TOWN SHORT	B19				OSGOOD HILL RD		YES
TOWN SHORT	B20				OSGOOD HILL RD		YES
TOWN SHORT	B23				RUBAUD RD		
TOWN ULTRA-SHORT	B9				ROGERS RD		
TOWN SHORT	B27				ALLEN IRISH RD		
TOWN SHORT	B13				COVEY RD N		

Source: VTrans

Notes: ID Label used by municipality. Type: 1st character, T=Town, S=State: 2nd character, L=Long (20ft or greater, S=Short 6ft or greater, less than 20ft) Note: state inspection only conducted on "long" bridges. Scour Critical Code: N-Bridge not over waterway; U-Bridge with "unknown" foundation that has not been evaluated for scour. Since risk cannot be determined, flag for monitoring during flood events and, if appropriate, closure; 9-Bridge foundations (including piles) on dry land well above flood water elevations; 8-Bridge foundations determined to be stable for assessed or calculated scour conditions; calculated scour is above top of footing; 7-

Countermeasures have been installed to correct a previously existing problem with scour. Bridge is no longer scour critical; 6-Scour calculation/evaluation has not been made. (Use only to describe case where bridge has not yet been evaluated for scour potential; 5-Bridge foundations determined to be stable for calculated scour conditions; scour within limits of footing or piles; 4-Bridge foundations determined to be stable for calculated scour conditions; field review indicates action is required to protect exposed foundations from effects of additional erosion and corrosion; 3-Bridge is scour critical; bridge foundations determined to be unstable for calculated scour conditions; 2-Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations. Immediate action is required to provide scour countermeasures; 1-Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic; 0-Bridge is scour critical. Bridge has failed and is closed to traffic.

As noted in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan*, the CCRPC has conducted an inventory of culverts in many of the county's municipalities. The inventory collects data on the location, diameter, material, and length of each culvert as well makes subjective judgments on the condition of the culvert. Culverts located in the 100-year floodplain are listed below.

Table 4-5 Westford culverts located in 100-year floodplain

Type	Local Reference	Road Name	Condition
OTHER STRUCTURES	2570	OSGOOD HILL RD	GOOD
OTHER STRUCTURES	2560	OSGOOD HILL RD	GOOD
OTHER STRUCTURES	2540	OSGOOD HILL RD	POOR
OTHER STRUCTURES	4680	HUNTLEY RD	GOOD

Source: VTrans

The National Dam Inventory identifies one dam in the municipality, shown in Table 4-6.

Table 4-6 Dams located in the Town of Westford

Name	Owner	River	Description	Maximum Storage (acre/feet)	Hazard Potential
Westford	Clarke or Villaseca	Browns River	Dam noted as breached. No other data recorded. Approximately 8 to 10 ft. drop	0	Low-losses limited to owner's property.

Source: National Dam Inventory

4.2.3 Water, Wastewater and Natural Gas Service Areas

The town operates no wastewater or water delivery systems. All residents and businesses receive water from wells and dispose of wastewater through septic systems. There are no natural gas distribution facilities in the town.

4.2.4 Electric Power Transmission Lines and Telecommunications Land Lines

Two CVPS high-tension transmission lines run through Westford. One runs northeast from the Westford Substation to the Fairfax line east of VT Route 128. The other is in the northeast corner of town, paralleling VT Route 15.

4.3 Estimating Potential Losses in Designated Hazard Areas.

A simple GIS intersection of esite data with the 2009 draft FIRM floodplain data indicates that 5 residential structures and no commercial/industrial structures are located within the 100-year

floodplain. Assuming a 2007 median grand list value, the estimated potential losses due to a major flood event inundating the floodplain are $619,500. This estimate only takes structures into account, however. It does not account for personal property or business losses.

Repair and replacement cost data was not available for all infrastructure located within the floodplain. Available repair and replacement costs to bridges in the hazard area (from VTrans) are as follows:

Table 4-7 Repair and replacement costs for bridges in 100 year floodplain, Westford

Bridge ID	Repair Cost	Replacement Cost
B22	$899,000	$1,049,000
B5	$908,000	$1,058,000
Total:	**$1,807,000**	**$2,107,000**

Source: VTrans Transportation Structure data, 2008

At this time, a more detailed analysis of potential losses to structures, infrastructure, and agricultural lands cannot be made. Completing the fluvial geomorphology assessment, conducting a culvert capability/vulnerability analysis, and conducting a detailed assessment of roadway infrastructure (especially its elevation within the floodplain) would allow a more complete analysis of potential loss.

4.4 Land Use and Development Trends Related to Mitigation

As noted at the introduction, Westford's land use is primary residential and agricultural. An analysis of GIS data shows the following percentages for land use and the percentages of land allocated to each zoning district.

Table 4-7 Land use compared to zoning, Town of Westford

Westford Land Use, 2003	Percent	Westford Zoning, 2008	Percent
Residential	31.11%	Agricultural, Forestry, and Residential (AR1, AR2)	94.11%
Commercial	0.21%	Rural Residential (RR)	3.05%
Industrial	0.00%	Town Center (TC, VD, CEN)	2.84%
Institutional/Infrastructure	0.46%		
Travel	1.58%		
Mass Assembly	0.01%		
Leisure / Recreation	0.10%		
Natural Resources	29.58%		
Unclassifiable / No Human Use	36.91%		

Source: Land Based Classification System Activity Data and Town of Westford Zoning

4.4.1 Conserved or Undevelopable Parcels

There are a handful of conserved parcels in Westford. Most parcels have been conserved for their scenic, agricultural or natural resource values. According to CCRPC records, the Vermont Land Trust holds conservation easements on several parcels located in the northeast corner of the Town abutting Vermont Route 15. These include 3 parcels totaling approximately 115 acres near Seymour Drive, and 6 parcels totaling approximately 500 acres surrounding Cowie Road. It is likely that the number and extent of conserved parcels in Westford will increase in the future. In March 2004, the Town of Westford created a fund for use in land conservation or open space

purchases. At present the fund only receives donations, not municipal funds. The rising price of land in Westford may slow the rate of land conservation, however, there is a strong degree of public support for land conservation among the town's residents.

4.4.2 Future Development

At present and for the foreseeable future the current development pattern will continue: some residential and commercial growth in the Village District and continued, dispersed residential growth on 5 and 10 acre lots in the Agriculture/Forestry/Residential districts. At this time, the main way CCRPC has to predict future development is by analysis of municipal zoning bylaws. As the municipality participates in the NFIP, zoning bylaws heavily regulate development in designated flood hazard areas. As a result, little to no development is likely to take place in flood hazard areas. These zoning requirements mitigate flood hazards to future structures.

SECTION 5: MITIGATION STRATEGY

5.1 Existing *2010 Westford Town Plan* Goals and Objectives That Support Hazard Mitigation

5.1.1 General Goals

1. Preserve Westford's unique rural character and conserve valuable open spaces outside of the Town Center area, while respecting landowner rights and allowing low density development in appropriate areas that do not have critical value to the town in terms of natural resources, aesthetic value, cultural and economic importance.
3. Protect and encourage agricultural and forestry activities, and recognize the social and economic benefits they contribute to the community.
4. Plan for the development of the Town Center area in such a way that higher density, mixed use development is encouraged and appropriate infrastructure exists, or is planned for, to allow this area to serve as the Town's growth center.
7. Identify and address transportation related problems and increase alternatives to automobile based transportation and public transportation.
9. Provide for the development of small-scale commerce and industry to supply local employment.
11. Ensure that residents are provided with an adequate level of town services and infrastructure and that new growth does not outstrip the town's ability to continue to provide this level of service to existing and future residents.
13. Encourage the appropriate use and/or conservation of natural resources, natural areas, wildlife corridors, waterways, floodplains, scenic areas, open land, forest land, steep slopes and sensitive areas.

5.1.2 Population, Housing, and Existing Land Use Objectives and Implementation

Objective #1 (Growth & Services)

Ensure a pattern of residential growth compatible with Westford's rural character, and a rate of growth that does not outstrip the Town's ability to provide necessary services.

Implementation #1 – Without undue impact to the environment and when economically feasible, provide infrastructure in the Town Center area so that higher density development can occur.

Implementation #2 - Give due consideration to innovative water and sewer technology that could enhance development of the Town Center area.

Implementation #3 - Investigate strategies to allow/encourage property owners to develop shared systems to expand wastewater capacity

Implementation #4 – Continue working toward development of a community wastewater disposal system.

Implementation #5 - Consider offering incentives such as density bonuses for the provision of public infrastructure and services, including wastewater, in the Town Center.

Implementation #6 - Ensure Zoning and Subdivision Regulations allow residents of the Town Center area s to sufficiently use existing wastewater capacity such as by allowing mixed use development.

Objective #3 Growth & Natural Resource Protection

Facilitate the dual objectives of allowing residential development while conserving agricultural lands, open spaces, and critical natural resources.

Implementation #1 - In rural areas, develop Zoning and Subdivision Regulations that creates residential developments which are in keeping with Westford's rural character by clustering development on the least sensitive portions of a property and away from steep slopes, agricultural soils and critical habitat areas.

5.1.3 Economic Development Objectives and Implementation

Objective #1 (Support of Local Business)

Support existing and foster the development of local businesses that serve the community, provide employment to residents, and are in keeping with the Town's rural character.

Implementation #1 - Continue to provide for and enhance the Zoning Regulations to encourage economic development in Westford that allows residents to engage in home occupations and home businesses while protecting neighbors from any adverse effect caused by these businesses.

Implementation #4 – Investigate and develop Zoning Regulations unique to the Town Center area to better accommodate small scale commerce.

Implementation #7 - Facilitate high speed internet, improved telecommunications, and telecommuting by supporting aesthetically acceptable telecommunication infrastructure.

Implementation #9 – Give due consideration to innovative water and sewer technology that could enhance development in the Town Center area.

Implementation #10 – Continue working toward development of a community wastewater disposal system.

Implementation #11 - Investigate strategies to allow/encourage property owners to develop shared systems to expand wastewater capacity.

Objective #2 (Commercial Use of Natural Resources)

Preserve and enhance resident's ability to sustainably use Westford's natural resources for commercial purposes such as agriculture and silviculture.

Implementation #1 – Steer development from prime agricultural to marginal soils with Subdivision and Zoning Regulations that allow the DRB to guide developers to site residential development on the least productive portion of a productive agricultural parcel and to encourage smaller lots which meet overall density requirements while leaving the most productive soils available for agricultural use.

5.1.4 Natural Resources Objectives and Implementation

Objective #1 (Critical Natural Resources)

Conserve and provide stewardship of parcels which contain, or are part of, critical natural resources.

Implementation #5 – The Water Resource Overlay District will continue to protect water resources from development with an undisturbed buffer area of natural vegetation.

Implementation #6 – Gather data on significant and critical natural resources, prioritize/value the resources inventoried and create Zoning and Subdivision Regulations which sufficiently protect the resources.

Objective #2 (Natural Areas & Natural Features)

Conserve and provide stewardship for smaller natural areas and natural features.

Implementation #5 - The Zoning and Subdivision Regulations shall severely limit the development on and re-contouring of steep slopes.

Objective #3 ("Green" Development)

Incursion of development into natural resources and natural features should take place under environmentally responsible and sustainable design and methods. Green practices shall be encouraged throughout the development cycle.

Implementation #1 –Development should be clustered to minimize the impact to natural resources. This clustering should occur both on individual parcels when subdividing and across multiple parcels such that development is proximate to other development rather than interspersed throughout critical natural resources.

Objective #4 (Conservation Commission)

The Westford Conservation Commission should partner with citizens to create a vibrant, sustainable environment where land uses, including agriculture, silviculture, recreation and development, coexist in harmony with natural resources.

Implementation #1 – Provide an advisory environmental review for development within critical natural resources at the request of the Planning Coordinator. The Conservation Commission will designate a representative to provide the review and participate in relevant meetings.

Implementation #3 – Prepare, collect, publish, advertise and distribute books, maps and other documents regarding environmental issues.

Implementation #5 – Educate residents on local natural resources and conservation needs.

5.1.5 Transportation Objectives and Implementation

Objective #1 (Existing Roadway Maintenance)

Maintain and upgrade the existing road network to the level necessary for operation in an economically sound way.

Implementation #1 - Appoint a Road Committee whose duties include developing and recommending multi-year road management plans, in which paving, maintenance, road re-construction standards and development impacts are considered.

Implementation #3 - Pursue replacement of undersized and problem public culverts.

Implementation #4 - Add transportation capital improvements to the town's capital budget.

Objective #2 (Speed Enforcement)

Reduce speeding and increase pedestrian safety on state and town roadways.

Implementation #1 – Examine and, where feasible, implement a variety of speed control techniques to ensure the safety of Westford residents on Westford's multi-use (e.g., vehicular, pedestrian, equestrian, biking) road network.

Implementation #2 - Continue and, where feasible, enhance the Town's commitment to speed enforcement via whatever alternative is most effective.

Implementation #3 - Address pedestrian/recreational use to the extent possible, and consider related traffic calming measures to increase safety (enforcement, stop signs, road marking, etc.).

Objective #3 (Paving)

Should the Town consider paving in the future the following statements should be considered to e determine whether paving will result in a cost efficient level of maintenance for the Town. Future economic development impacts should be considered in cost analysis.

Implementation #1 - Carefully consider all future paving projects by soliciting community input early in the process, and by providing the community with more information on the pros and cons of paving.

Implementation #2 - Conduct long-term cost/benefit analyses.

Implementation #3 - Ensure that proper road base and drainage infrastructure is in place prior to paving.

Objective #4 (Growth & New Roadways)

Provide a safe transportation system which is appropriate to the Town's present and expected growth and which provides suitable access to all parts of the community and safe passage for vehicles and pedestrians alike.

Implementation #1 - Investigate and, if desirable, implement road impact fees to maintain an adequate level of service and ensure new development pays a fair share of costs associated with increased road use resulting from new development.

Implementation #2 - Update and enforce specific road construction standards, to ensure that new road construction will be adequate for emergency vehicle access and its intended use.

Objective #5 (Alternative Transportation Options)

Encourage innovative transportation options such as greenways, an interconnected system of pedestrian paths and trails for walking, biking and recreation, the development of a park and ride facility (also known as a commuter lot) in Westford and the eventual provision of public transportation service via the Chittenden County Transportation Authority.

Implementation #1 - Investigate and pursue ways in which pedestrian access to the Town Common and surrounding buildings (especially the Town Office, Library, Market, Meeting House and Post Office) can be made safer and easier.

Implementation #2 – Investigate ways to make roads safer for all forms of travel including horses, biking, walking and plan for creation of a multi-use transportation system.

Objective #7 (Regional Transportation)

The Town shall actively work with the Chittenden County Metropolitan Planning Organization and the Vermont Agency of Transportation to coordinate on local projects as well as projects that may affect the use of Westford's roads as a corridor of travel.

Implementation #1 – The Town shall keep communications with the above mentioned groups open to ensure Westford is kept informed on transportation issues which could affect Westford.

Implementation #2 - The Town will work with the above groups to upgrade Vermont Route 128, especially in the area just south of the ledges, to ensure a safe roadway.

5.1.6 Facilities, Utilities, and Services Objectives and Implementation

Objective #1 (Infrastructure Use & Expansion)

Expand Westford's role in providing infrastructure so that higher density development can occur in the Town Center area.

Implementation #1 – Continue working toward development of a community wastewater disposal system.

Implementation #2 - Educate Westford residents on proper maintenance of septic systems and recent changes to state statutes regulating sewage disposal.

Implementation #3 - Ensure Zoning and Subdivision Regulations allow residents of the Town Center area to sufficiently use existing wastewater capacity such as by allowing mixed use development.

Implementation #4 - Investigate strategies to allow/encourage property owners to develop shared systems to expand wastewater capacity.

Implementation #5 - Investigate and pursue ways in which pedestrian access to the Town Common and surrounding buildings (especially the Town Library and Post Office) can be made safer and easier.

Implementation #6 - Make further aesthetic, safety, parking and traffic-calming improvements to the Town Center area, if economically feasible.

Objective #5 (Roadways)

Improve the quality of Town roadways.

Implementation #1 - Appoint an active Town Road Committee to update the 2003 Town Road Plan.

Implementation #2 - Investigate cost effective road maintenance and repair options and prioritize problem areas.

Implementation #3 - Investigate alternative/public transportation options for residents.

Implementation #4 - Investigate and, if desirable, implement road impact fees to maintain an adequate level of service and ensure new development pays a fair share of costs associated with road use resulting from new development.

Objective #6 (Law Enforcement)

Strive to make Westford a safer place to live and work.

Implementation #1 - Address residents' police protection and speed enforcement concerns by investigating a variety of methods and techniques to prevent crime and speeding throughout Town.

Objective #11 (Preparedness)

The Town will continual strive to keep the community safe, informed and prepared for potential disaster.

Implementation #1 - Update and annually review the Town Fire Ordinance to ensure public safety.

Implementation #2 - Adopt an Emergency Operations Plan, consistent with National Incident Management System, to ensure Town preparedness in cases of disaster. Annually update the Emergency Operations Plan contact list. Provide key emergency operations with National Incident Management System training. Continue ongoing coordination of Town and school emergency plans.

Implementation #3 - Investigate the availability of grant funds to purchase a generator for the school, which serves as the Town's emergency disaster center.

Implementation #4 – Investigate and, if desirable, implement fire impact fees to maintain an adequate level of service and ensure new development pays a fair share of costs associated with increased fire response services resulting from new development.

5.1.7 Energy Goals and Implementation

Objective #4 (Private Development)

The Town shall consider energy reduction and encourage renewable energy resources in the Zoning and Subdivision Regulations.

Implementation #3 - Consider developing safety, maintenance and decommissioning requirements of all hydro-powered and wind powered systems for the purposes of safety, noise, wildlife protection and aesthetics (see telecommunication tower requirements).

Implementation #4 - Consider adopting safety, maintenance, and decommissioning requirements of commercial photovoltaic systems.

5.1.8 Future Land Use

5.1.8.1 Objectives & Implementation – General

Objective #2 (Steep Slopes)

The Town shall prohibit the development and disturbance of lands unsuitable for development.

Implementation #1 - The Zoning and Subdivision Regulations shall severely limit the development on and re-contouring of steep slopes.

5.1.8.2 Objectives & Implementation – Town Center

Objective #1 (Town Center Infrastructure)

Expand Westford's role in providing infrastructure so that higher density development can occur in the Town Center area.

Implementation #1 – Continue working toward development of a community wastewater disposal system to serve the Town Center area.

Implementation #2 - Educate Westford residents on proper maintenance of septic systems and recent changes to state statutes regulating sewage disposal.

Implementation #3 – Without undue impact to the environment and when economically feasible, provide infrastructure in the Town Center area so that higher density development can occur, when environmentally and economically feasible.

Implementation #4 - Give due consideration to innovative water & sewer technology that could enhance development of the Town Center area.

Implementation #5 - Ensure the Zoning and Subdivision Regulations allow residents of the Town Center area to make good use of existing wastewater capacity such as by allowing mixed use development.

Implementation #6 - Investigate strategies to allow/encourage property owners to develop shared systems to expand wastewater capacity

Implementation #7 - Investigate and pursue ways in which pedestrian access to the Town Common and surrounding buildings (especially the Town Library and Post Office) can be made safer and easier.

Implementation #8 - Make further aesthetic, safety, parking and traffic-calming improvements to the Town Center area, where economically feasible.

5.1.8.3 Objectives & Implementation – Water Resources Overlay Area

Objective #1 (Water Resources)

Ensure that the quality and character of Westford's important water-related resources are protected, including wetlands, rivers, streams, ponds and source water protection areas and protect the public health by minimizing the adverse impacts of development on Westford's water related resources and adjacent lands.

Implementation #1 - The Zoning Regulations shall continue to incorporate the Water Resources Overlay area provisions.

Implementation #2 - Update the Water Resource Overlay area, as needed and as better information becomes available, while preserving the overall intent and features covered as discussed above.

Implementation #3 - Cooperate with local, regional, and State watershed groups on stream assessments, water quality monitoring, stream and wetland restoration projects, etc.

Implementation #5 - Adopt fluvial erosion hazard maps and associated regulations, when available.

Implementation #6 - Utilize the Bridge and Culvert Inventory to identify problem areas/infrastructure, investigate and pursue upgrades to problem bridges and culverts, and inform property owners of problem bridges and culverts as information and time become available. The Town shall not be held liable for damage caused by privately owned infrastructure.

Implementation #7 - Promote the re-vegetation of shores and stream banks.

5.1.8.4 Objectives & Implementation – Flood Hazard Overlay Area

Objective #1 (Flood Hazards)

Strive to ensure public and private property, and human life is protected to the fullest extent from the effects and dangers of flooding.

Implementation #1 - Pursue enrollment in the Community Rating System (CRS) 1 year after enrollment in the NFIP.

Implementation #2 - Amend the Zoning Regulations when appropriate and as additional information becomes available.

5.2 Existing Town of Westford Actions That Support Hazard Mitigation

Table 5-1 Existing municipal actions that support hazard mitigation, Town of Westford

Type of Existing Protection	Description /Details/Comments	Issues or Concerns
Emergency Response		
Police Services	Vermont State Police	
Fire Services	Westford VFD	
Fire Department Personnel	18 Volunteers	
Fire Department Mutual Aid Agreements	Essex, Underhill-Jericho, Fairfax	
EMS Services	Essex Rescue, Fairfax Rescue	
EMS Mutual Aid Agreements	various through VT EMS District #3	
Other Municipal Services		
Highway Services	Town Highway Department	
Highway personnel	3 FTE field personnel.	
Water / Sewer Department	None	
Planning and Zoning personnel	1 FTE Planning, 1 FTE Zoning	
Residential Building Code / Inspection	No local building code.	
Emergency Plans		
Municipal Emergency Operations Plan (EOP)	2007	
Municipal Rapid Response Plan	2006	
School Emergency/Evacuation Plan(s)	Yes	
Municipal HAZMAT Plan	None	
Primary Shelter	Westford School, 400 capacity	
Replacement Power, backup generator	None.	
Secondary Shelter	None designated.	
Replacement Power, backup generator	N/A	
Municipal Plans		
Town / Municipal Comprehensive Plan	2004, currently being updated.	
Zoning Bylaws and Subdivision Regulations	2008	
Hazard Specific Zoning (slope, wetland, conservation, industrial, etc.)	Water Resources Overlay District; Flood Hazard Overlay District	
Highway Access (curb cut) Policy	Application process, final decision by Selectboard	
Participation in National Flood Insurance Program (NFIP) and Floodplain/Flood Hazard Area Ordinance	Yes	In regular NFIP program as of 1/1/2010. Floodplain Hazard Areas are based DFIRMs.

Type of Existing Protection	Description /Details/Comments	Issues or Concerns
Open Space Plans; Conservation Funds	Conservation fund since 2004. Donations only; Selectboard will have final say over expenditures based upon recommendations from Conservation Commission.	
Culvert Inventory	2004	In addition to GPS point data, the inventory collects data on material, diameter, length and condition of the culvert. These inventories provide useful data to municipal highway departments to ensure consistent maintenance, repair, and replacement of culverts.

5.3 Town of Westford All-Hazards Mitigation Goals

The following goals were developed by CCRPC staff in 2004, and approved by Town of Westford officials during the development of this annex.

1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
3) Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan and as identified generally in the *Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan.*
4) Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and stormwater management and the planning and development of various land uses.
5) Maintain existing municipal plans, programs, regulations, bylaws and ordinances that directly or indirectly support hazard mitigation.
6) Consider formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5), as well as incorporation of proposed new mitigation actions into the municipality's/town's bylaws, regulations and ordinances, including, but not limited to, zoning bylaws and subdivision regulations and building codes.
7) Consider formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs especially, but not limited to, as they relate to public facilities and infrastructure, utilities, highways and emergency services.

5.4 Mitigation Actions

5.4.1 Current Capabilities and Need for Mitigation Actions

The Town Plan's policies that support hazard mitigation, and the existing mitigation actions, demonstrate the variety of policies and actions forming the foundation of this All Hazards Mitigation Plan. Generally, the Town considers its existing capabilities are adequate to address the identified priority hazards in this plan.

1) Severe Winter Storm – The Town regards its current hazard mitigation efforts carried out by the Town Highway Department as adequate to address winter storm impacts to local roads. Winter storms are often the cause of power loss and telecommunications failure.
2) Power Loss – The electric utility is responsible for restoring service. Tree trimming and vegetation management, coupled with maintaining adequate repair vehicles and personnel are the primary means of mitigation.
3) Telecommunications Failure – The landline and cellular service providers are responsible for restoring service. As with electric service, tree trimming and vegetation management, coupled with maintaining adequate repair vehicles and personnel are the primary means of mitigation.
4) Epidemic – The Town's abilities to mitigate an epidemic are limited. The Town relies on state and school efforts related to epidemic preparedness, prevention and mitigation, and medical facilities and services in neighboring communities for response.
5) Economic Recession – The Town considers its municipal plan as supportive of the goal of economic diversification which can serve to mitigate the impacts of a recession.
6) Flooding – Existing structures in the floodplain are at risk. The Town's zoning restricts new development in the designated flood hazard areas. The capabilities of the Town Highway Department to mitigate flood impacts on town roads are considered adequate.

5.4.2 Specific Mitigation Actions

Action #1: Continue and improve highway, culvert and bridge maintenance programs.

Status: Ongoing

Primary Responsible Entity: Town of Westford Highway Foreman

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VTrans grants; Municipal Operating and Capital budgets only if sufficient. Contingent on available resources and funding.

Progress since 2005: A general practice of the town is to increase the size of existing culverts when replaced to ensure adequate storm water flow and capacity. Furthermore, the town has been stone-lining ditches where needed. The town was awarded two Better Back Roads Grants in recent years. The first grant (2008) covered the cost of lining a ditch located off of Pettingill Road with stone and the second grant (2009) covered the cost of stabilizing the stream bank abutting Seymour Road.

Specific Identified Tasks:

1) Culvert Upgrades - Upgrade culverts and ditching along various roads to mitigate against repeated damages from stormwater or spring snowmelt. Specific project locations include:
   - A portion of Old Stage Road just south of Manley Road is in need of a new, larger pipe arch or concrete box culvert. Current 5 ft. culvert is inadequate during high flow events, causing water to wash over the road.

- The town is pursuing VTrans grant funds to replace a four foot culvert located on Huntley Road. This replacement would include the installation of a 6 foot box culvert.

2) Continued Monitoring of Vulnerable Infrastructure - Monitor various bridges and culvert locations that have erosion and scouring concerns. Specific project locations include:

   - Seymour Road Bridge, which is in poor condition and at some point in the future a new bridge will need to be constructed.

3) Road Improvement - Within political and financial restraints, consider re-engineering certain sections of roads to lower overall maintenance costs and improve overall capability of roads to handle current and projected traffic volumes.

4) Erosion / Landslide Mitigation - Undertake erosion or landslide mitigation projects at various locations where municipal roads regularly incur damage from adjacent rivers/streams and hillsides.

Rationale / Cost-Benefit Review:

These areas suffer low-level but consistent damage during heavy rains and snowmelt. Mitigating against these problems would reduce short and long term maintenance costs and improve the flow of traffic for personal and commercial purposes during flooding events.

Action #2: Evaluate capabilities of existing road and stormwater management infrastructure.

Status: Ongoing

Lead Responsible Entities: Town of Westford Highway Foreman; Westford Town Planner

Potential Partner Entities: VT ANR; Vermont Agency of Transportation (VTrans); CCRPC; CCMPO

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: Various Federal and State grants; municipal operating funds only if sufficient. Contingent on available resources and funding.

Progress since 2005: A ditch inventory was conducted in 2005 and town personnel are working on repairs. The town updates the ditch and culvert inventory annually. Bridges are inspected by the state, which sends town officials reports.

Specific Identified Tasks:

1) Infrastructure Assessment for Stormwater Vulnerability – Funding and staff resources permitting, assess the vulnerability and operational capability of municipal-owned roads, culverts and other stormwater management infrastructure to predicted stormwater and snowmelt in areas with a documented history of recurring problems. The infrastructure will be evaluated regularly prior to replacement or upgrades of the existing infrastructure. Separate analyses of all infrastructure in each municipality is not intended or warranted.

2) Infrastructure Assessment for Fluvial Erosion/Landslide Vulnerability – Funding and staff resources permitting, assess the operational capability and vulnerability of municipal-owned roads, culverts, bridges and other infrastructure to fluvial erosion of varying severity as determined by Strategy #3 below.

Rationale / Cost-Benefit Review: Conducting these vulnerability assessments will facilitate a targeted and effective approach to road and stormwater management infrastructure. This will prove useful in the development and implementation of municipal capital and operating plans as well as the development and implementation of grant-funded mitigation projects.

Action #3: Complete fluvial geomorphology assessment and develop strategies in response to identified risks.

Status: Ongoing

Primary Responsible Entities: Chittenden County Regional Planning Commission (CCRPC) and Agency of Natural Resources (VT ANR) (for assessments and mapping); Westford Town Planner (for ordinance changes and other actions).

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: The CCRPC secured FY-08 PDM funds which became operational in March 2009 to conduct fluvial erosion hazard assessments and river corridor planning efforts throughout the County. Some of these funds will remain in effect in 2010 and perhaps into 2011. Nonprofits may also secure private, state and town funds to conduct geomorphic assessments and river corridor plans. Continuation of assessments and strategy development is contingent upon individual municipalities and/or regional and local organizations, securing funding in partnership with ANR. The level of municipal participation is contingent upon the level of participation asked of staff and that such work would not hinder the ability of municipal staff to carry out their day-to-day municipal duties.

Progress since 2005: As of March 2009, Phase 1 assessments have been completed for the Browns River, Morgan Brook, Rogers Brook and some tributaries. A Phase 2 assessment is being completed on two short sections of the Browns River near the Essex and Fairfax town lines. ANR has issued a River Corridor Plan for the Browns River, and assessments are ongoing.

Specific Identified Tasks:

1) Fluvial Geomorphic Assessments - Funding permitting, continue to conduct Phase I and Phase II fluvial geomorphic assessments on streams and waterways in Westford. If using PDM funding, individual municipalities may select only a subset of streams upon which to perform these assessments and therefore may choose to assess only those stream sections where the history of flood and erosion damage, the history of channel management, and the proximity of existing or potential development or public infrastructure to the active channel makes an assessment a priority. Justification should be provided for streams, watersheds, or stream reaches not selected for fluvial assessment. Fluvial assessments shall follow the VT ANR Fluvial Geomorphic Assessment Protocols.
2) Fluvial Erosion Hazard Mapping - Within a year of completed geomorphic assessments for a waterway, funding permitting, a GIS provider should rate the fluvial erosion hazard for each assessed reach, and develop a fluvial erosion hazard map for the waterway, using the GIS extension known as SGAT (or Stream Geomorphic Assessment Tool) for assessed stream reaches. As assessments are completed, a map of all assessed waterways in the town should be created. This data will undergo town review and QA/QC by VT ANR before a final map is drawn.

3) River Corridor Management Plans – River Corridor Management Plans are encouraged for waterways where Phase I and Phase II assessments have been completed. Creating such a plan requires additional fieldwork and work with local landowners to identify acceptable reach-based management options that enable stream systems to reach equilibrium conditions. Management measures may include stream corridor buffer planting, culvert replacement and roadway improvements, berm removal, and corridor easements. Under Act 110, the Agency of Natural Resources will be identifying best management practices for shorelands and river corridors, and will be providing financial incentives, such as grants and pass-through funding, for municipalities to incorporate these practices into their zoning bylaws.

4) Fluvial Erosion Hazard Mitigation Implementation - Within five years of completing the final fluvial erosion hazard map, each participating municipality shall develop strategies to avoid or mitigate losses from the identified fluvial erosion hazards. These strategies may include the adoption and implementation of programs, mechanisms or regulations to prevent endangerment of persons and property in riparian corridor areas from fluvial adjustment processes. Efforts could range from a relatively simple, public information campaign about the map to the adoption of a municipal ordinance or by-law that restricts development in such hazard areas. Development of any such programs, mechanisms or regulations shall be under the sole direction of the Town of Westford Selectboard.

5) Flood Insurance Rating Map Updates - FEMA is updating the Flood Insurance Rating Map (FIRM) data for Chittenden County in 2009-2010. CCRPC will assist ANR in conducting outreach to municipalities on the Draft FIRM data. Municipalities are responsible for reviewing the draft FIRM data and reporting factual errors to VT ANR and FEMA. Municipalities are also responsible for updating floodplain regulations and zoning to meet FEMA requirements. CCRPC and VT ANR will assist municipalities in updating floodplain regulations and zoning bylaws.

Rationale / Cost-Benefit Review:

Continuing this project will require a sustained succession of grants, state appropriations and other funding to complete assessments in Westford. Successful completion will provide municipal and regional benefits. The municipality's fluvial erosion areas would be adequately and electronically mapped. This will enable the municipality to make residents and businesses aware of fluvial erosion hazards and potentially lead to municipally-directed programs, mechanisms and regulations that further mitigate against this hazard, protecting existing structures and infrastructure. Identifying fluvial erosion hazard areas could also help the municipality restrict future development in hazardous areas. More accurate knowledge of fluvial geomorphology will enable the community to have a better understanding of hazard areas and what mitigation measures might most effectively address those concerns. As demonstrated in *Table 3-1*, flooding is the most common and most significant hazard that can trigger a Federal disaster declaration in Westford. Along with an update to the flood hazard area maps, identifying the fluvial erosion hazard areas provides improved opportunities for the community to devise strategies to improve compliance with the National Flood Insurance Program.

Action #4: Conduct landslide hazard assessments and develop strategies in response to identified risk.

Status: Deferred / New (see below)

Primary Responsible Entities: Vermont Geological Survey and CCRPC (for assessments); Westford Town Planner (for strategy implementation).

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: Funding has been obtained from FEMA for a study of landslide vulnerability in Chittenden County. This will be undertaken by the Vermont Geological Survey in cooperation with Norwich University and CCRPC, and will be used to establish a protocol for assessing landslide hazards. After this study is completed, continuation of assessments and strategy development is contingent upon individual municipalities and/or regional and local organizations, securing state and federal grants in partnership with ANR. The level of municipal participation is contingent upon the level of participation asked of staff and that such work would not hinder the ability of municipal staff to carry out their day-to-day municipal duties.

Progress Since 2005: Landslide hazard assessment was combined with fluvial erosion hazard mitigation strategy in the 2005 plan. Work on this effort was contingent both on state development of a landslide hazard assessment protocol and funding to support assessment work. Since different assessment methods will be used for landslide hazards than for the fluvial erosion hazards, this new strategy has been established. The Vermont Geological Survey has recently obtained funding to develop a landslide hazards assessment protocol, based on data from Chittenden County.

Specific Identified Tasks:

1) Landslide Hazard Assessment Protocol – Develop a landslide hazard protocol to evaluate county slopes and waterways.
2) Landslide Hazard Assessment and Mapping – Once a protocol is developed, if funding is available, landslide hazards should be assessed and mapped in participating municipalities.
3) Landslide Hazard Mitigation Implementation – Based on the outcomes of the landslide hazard assessment and mapping, municipalities shall develop appropriate strategies to mitigate losses from the identified landslide hazards. These strategies may include the adoption and implementation of programs, mechanisms or regulations that aid in preventing endangerment of persons and property in these landslide areas from mass wasting failures associated with landslides. Development of any such programs, mechanisms or regulations shall be under the sole direction of the municipality's governing body. Efforts could range from a relatively simple, public information campaign about the map to the adoption of a municipal ordinance or by-law that restricts development in such hazard areas.

Rationale / Cost-Benefit Review:

Large scale landslides can cause significant environmental alteration to stream conditions, and may also cause severe damage to human structures and infrastructure. At this time, vulnerability to landslides in Chittenden County has not been systematically assessed. The issues of landslides and fluvial erosion are linked, so improving understanding of riparian landslide hazards would complement the extensive fluvial erosion studies that have taken place in recent years.

Successful completion will provide several benefits. Westford's landslide hazard areas would be adequately and electronically mapped. This will enable the town to make residents and

businesses aware of this hazard at a minimum and potentially lead to the adoption of municipally-directed programs, mechanisms and regulations that further mitigate against this hazard, protecting existing structures and infrastructure. Identifying a landslide hazard area could also help town officials to restrict future development in known hazard areas. More accurate knowledge of landslides will enable the community to have a better understanding of where potential problems are and what mitigation measures might most effectively address those concerns.

Action #5: Evaluate and improve capabilities of existing and potential public shelters/relocation sites.

Status: Ongoing

Primary Responsible Entities: Town of Westford Emergency Management Coordinator and Director; Westford VFD Chief; American Red Cross

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: Implementation through existing programs, contingent on available resources and funding.

Progress Since 2005: Back up power was installed by the Fire Dept. at the Town Garage/ Fire Station building during FY 2009. The Westford Selectboard is introducing an article at the 2010 Town Meeting to fund the required matching funds for the Vermont Emergency Management emergency shelter generator program. If passed, matching funds would be accrued over a three year period.

Specific Identified Tasks:

1) Existing Shelters - Continue to maintain relationships with existing designated American Red Cross Shelters.
2) Potential Shelters - Investigate capabilities of other buildings sufficient to serve as smaller shelters if public shelter is needed when school is in session or if only a relatively few number of residents need shelter. Likely candidates would include churches or other buildings with sufficient restrooms, cooking facilities and floor space.
3) Shelter Generators – Work with schools and other shelters to assist in obtaining grants or other funding for the purchase and installation of generators and/or electrical transfer panels to enable power replacement in the event of an outage.

Rationale / Cost-Benefit Review:

Improved familiarity with existing shelters and the identification of potential smaller shelters could potentially significantly reduce the physical, psychological and social impacts of a disaster.

Action #6: Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident; ensure town and school emergency plans are fully coordinated.

Status: Deferred/Ongoing (see below)

Primary Responsible Entities: Town of Westford Emergency Management Director and Coordinator; Westford Fire Chief; Westford School Principal

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: Implementation through existing programs, contingent on available resources and funding.

Progress Since 2005: This was originally two mitigation actions, one having to do with evacuation and sheltering plans and the other having to do with school emergency plans. These two actions have been combined as a result of discussions with Westford municipal officials.

Specific Identified Tasks:

1) Evacuation and Sheltering Exercises – Conduct evacuation drills or exercises and evaluate performance.
2) Evacuation and Sheltering Plans – Review evacuation, sheltering, and relocation plans based on results of drills, exercises, and actual incidents.
3) Emergency Operations Plan – Complete and adopt an Emergency Operations Plan for Westford. This plan should include an acceptance testing requirement of conducting a table top drill to stress test the assumptions built into the EOP and modify assumptions and procedures where appropriate. This drill should be conducted in conjunction with the Westford School and CCSU.
4) Emergency Plan Coordination – Continue coordination of town and school emergency plans.

Rationale / Cost-Benefit Review:

Familiarity with evacuation and sheltering could potentially significantly reduce the loss of life and psychological and social impacts of a disaster. Improved coordination between the town and school could potentially significantly reduce the loss of life and property damage.

Action #7: Raise public awareness of hazards, hazard mitigation and disaster preparedness.

Status: Ongoing (Consolidation of two previous mitigation actions. See below.)

Primary Responsible Entities: Westford Emergency Management Director and Coordinator; Westford VFD Chief; Westford Town Planner

Timeframe: May 2010 – April 2015

Funding Requirements and Sources: Implementation through existing programs, contingent on available resources and funding.

Progress since 2005: This was previously two closely related actions, one related to public awareness of hazard mitigation and disaster preparedness, and the other related to public awareness of hazards and disasters.

The town has distributed disaster preparedness pamphlets at the town office and officials have placed information regarding water resource overlay district and fire preparedness/safety in the town newsletter and on the front porch forum. The town has also made efforts to inform residents about floodplains, the NFIP and regulatory impacts related to flood hazard areas.

Specific Identified Tasks:

1) School Programs – Continue school programs to raise student awareness of hazards, safety, preparedness and prevention.

2) Family Programs – Continue family programs, such as car safety seat and bike safety programs, to raise family awareness of hazards, safety, preparedness and prevention.
3) Fire Prevention Programs – Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.
4) Other hazard awareness programs – Develop public awareness programs, based on all-hazards needs. Programs to address pandemic hazards, preparedness and mitigation may be appropriate given the risks posed by the H1N1 flu virus.

Rationale / Cost-Benefit Review: Improved awareness could potentially significantly reduce the loss of life and property damage. Improved awareness would also build understanding and public support for municipal mitigation actions to reduce potential infrastructure and liability costs.

5.4.3 Prioritization of Mitigation Strategies

The above mitigation actions were listed in order of priority. Descriptions of specific projects, where available, are listed in Section 5.4.2 and in Table 5-3 below. Because of the difficulties in quantifying benefits and costs, it was necessary to utilize a simple "Action Evaluation and Prioritization Matrix" in order to effect a simple prioritization of the mitigation actions identified by the jurisdiction. The following list identifies the questions (criteria) considered in the matrix so as to establish an order of priority. Each of the following criteria was rated according to a numeric score of "1" (indicating poor), "2" (indicating below average or unknown), "3" (indicating good), "4" (indicating above average), or "5" (excellent).

- Does the action respond to a significant (i.e. likely or high risk) hazard?
- What is the likelihood of securing funding for the action?
- Does the action protect threatened infrastructure?
- Can the action be implemented quickly?
- Is the action socially and politically acceptable?
- Is the action technically feasible?
- Is the action administratively realistic given capabilities of responsible parties?
- Does the action offer reasonable benefit compared to its cost of implementation?
- Is the action environmentally sound and/or improve ecological functions?

The ranking of these criteria is largely based on best available information and best judgment, as many projects are not fully scoped out at this time. The highest possible score is 45.

It is anticipated that, as municipalities begin to implement the goals and actions of their Mitigation Strategies, they will undertake their own analysis in order to determine whether or not the benefits justify the cost of the project. Also, all proposed FEMA mitigation projects will undergo a benefit-cost analysis using a FEMA BCA template and approved methodology.

Table 5-2 Westford action evaluation and prioritization matrix

Action Evaluation and Prioritization Matrix **Town:** Westford

5 = Excellent 4 = Good 3 = Average

2 = below average (or unknown) 1 = poor

Rank	Mitigation Action	Responds to significant (likely or high risk) hazard	Likelihood of funding	Protect threatened infrastructure	Implemented quickly	Socially / Politically acceptable	Technically Feasible	Administratively Realistic	Reasonable cost to benefit	Environmentally sound	TOTAL SCORE
1	Continue and improve highway, culvert and bridge maintenance programs	5	3	5	4	4	5	4	5	3	38
2	Evaluate capabilities of existing road and stormwater management infrastructure	5	3	5	3	3	5	4	5	4	37
3	Complete fluvial geomorphology assessment and develop strategies in response to identified risk	3	3	4	3	3	5	4	3	5	33
4	Complete landslide hazard assessment and develop strategies in response to identified risk.	3	4	3	3	4	3	4	3	4	31
5	Evaluate capabilities of existing and potential public shelters	2	3	2	4	3	5	3	4	2	28
6	Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident; ensure town and school emergency plans are fully coordinated	3	2	2	2	3	4	2	4	2	24
7	Raise public awareness of hazards, hazard mitigation and disaster preparedness.	2	3	2	2	3	4	2	3	2	23

5.5 Implementation and Monitoring of Mitigation Strategies

The following table is intended to aid municipal officials in implementing the mitigation actions for Westford and to facilitate the annual monitoring of the plan as outlined in the Multi-Jurisdictional All-Hazards Mitigation Plan.

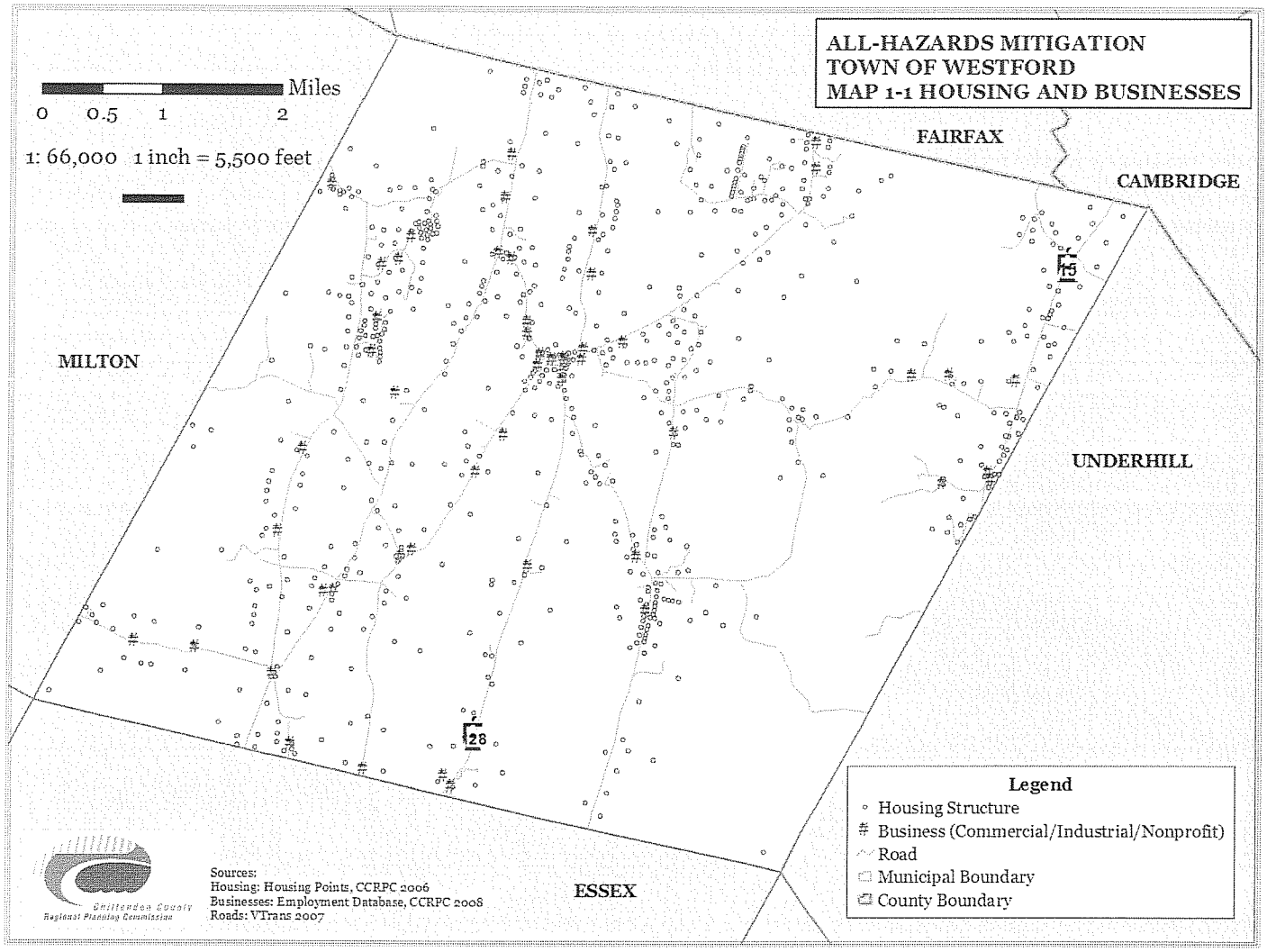
Table 5-3 Westford All-Hazards Mitigation Plan Implementation Matrix

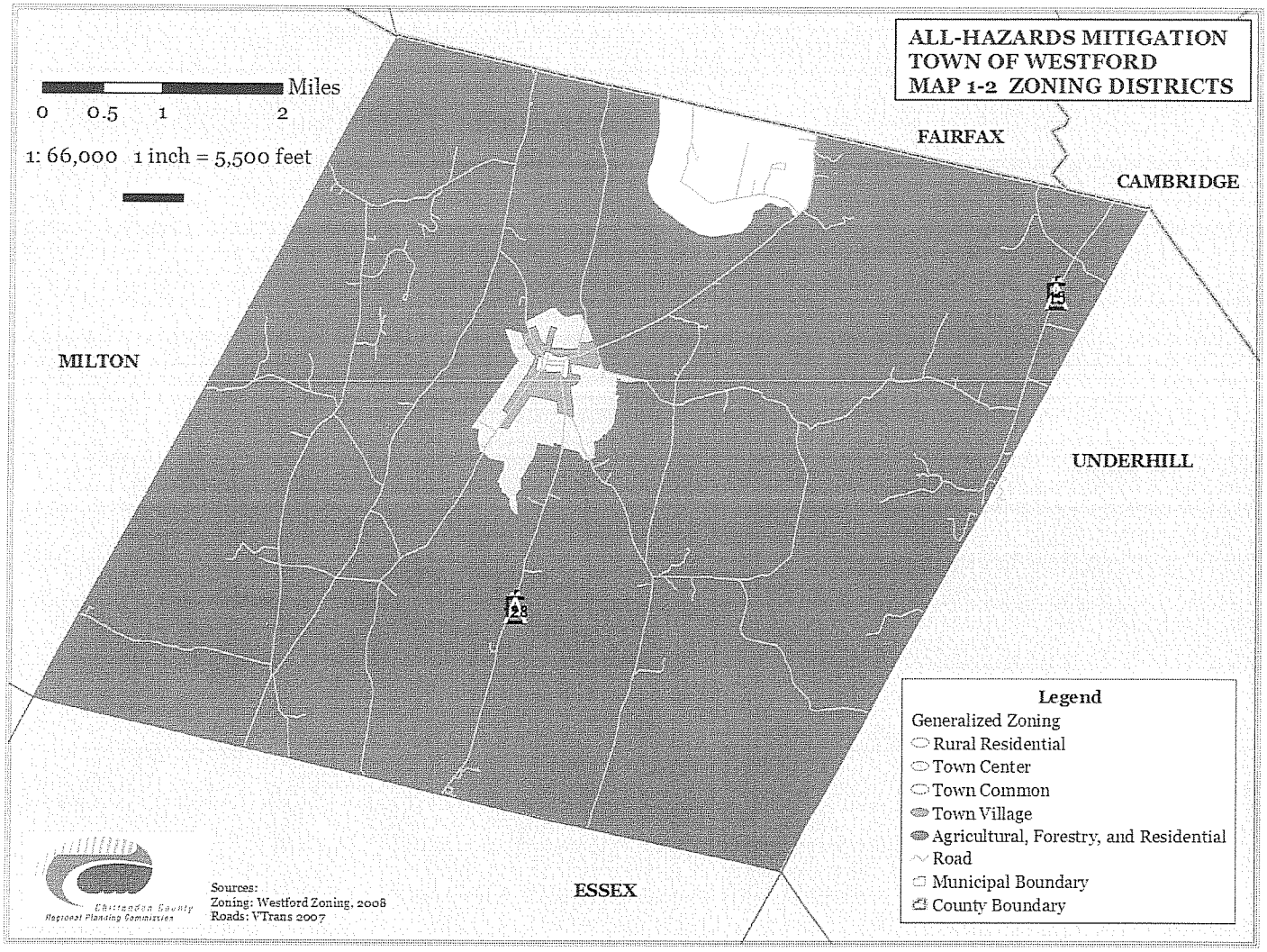
Action	AHMP Page #	Primary Responsible Entity	Task	Brief Description	Progress
#1 Continue and improve highway, culvert and bridge maintenance programs.	30	Highway Foreman	Culvert Upgrades	Upgrade culverts and ditching along roads to mitigate against repeated damages from stormwater or spring snowmelt. Specific project locations include: • A portion of Old Stage Road just south of Manley Road	
	31	Highway Foreman	Continued Monitoring of Vulnerable Infrastructure	Monitor bridges and culverts with erosion and scouring concerns: • Seymour Road Bridge	
	31	Highway Foreman	Road Improvement	Consider re-engineering certain road sections to lower overall maintenance costs and improve overall capability of roads to handle current and projected traffic volumes.	
	31	Highway Foreman	Erosion/Landslide Mitigation	Undertake erosion or landslide mitigation projects where roads regularly incur damage from adjacent rivers/streams and hillsides.	
#2 Evaluate capabilities of existing road and stormwater management infrastructure.	31	Highway Foreman, Town Planner	Assessment for Stormwater Vulnerability	Assess the vulnerability and operational capability of municipal roads, culverts and stormwater infrastructure.	
	31	Highway Foreman, Town Planner	Assessment for Fluvial Erosion / Landslide Vulnerability	Assess the vulnerability and operational capability of municipal roads, culverts, bridges and other infrastructure to fluvial erosion.	

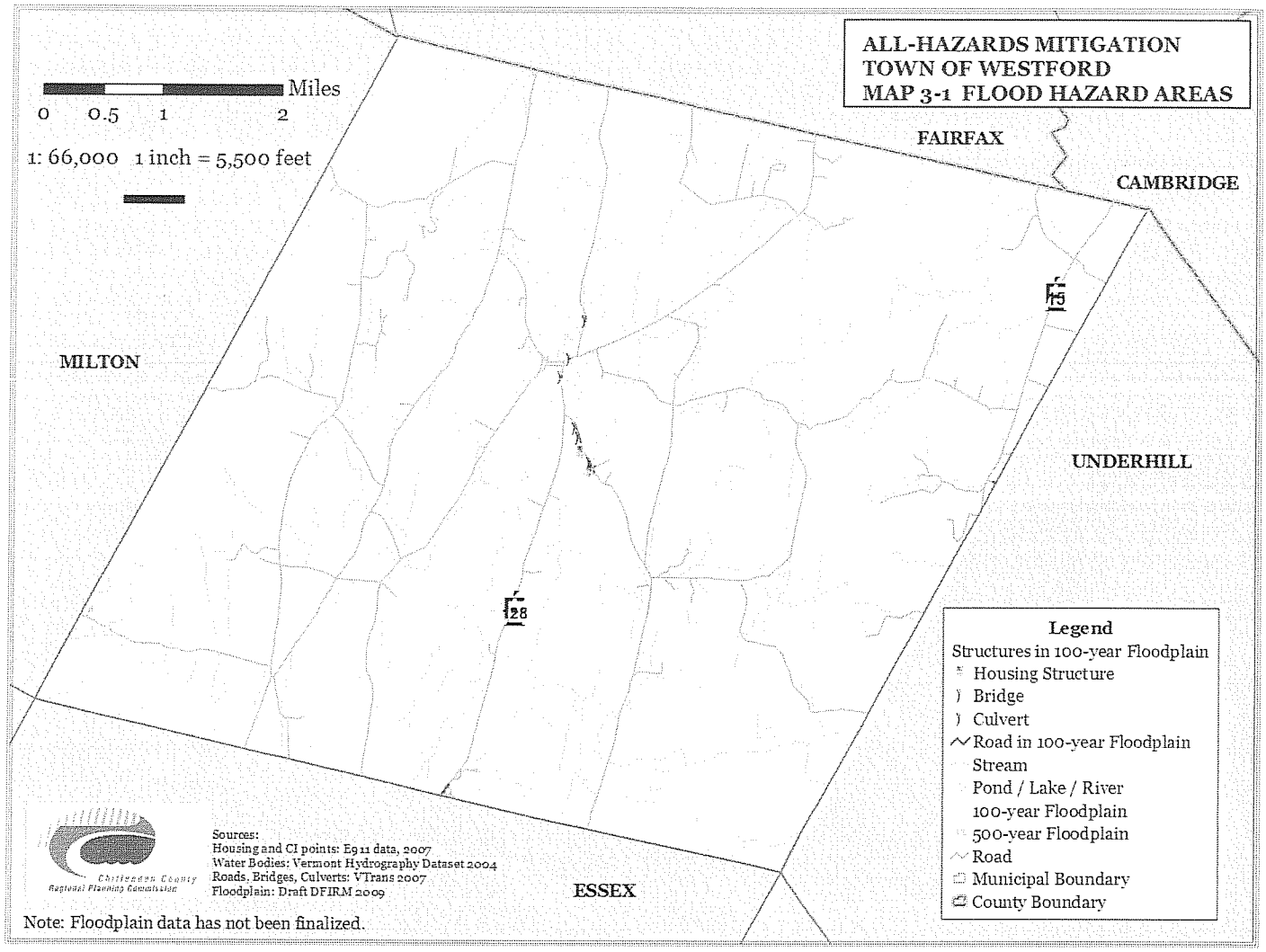
Action	AHMP Page #	Primary Responsible Entity	Task	Brief Description	Progress
#3 Complete fluvial geomorphology assessment and develop strategies in response to identified risk.	32	CCRPC, VT ANR	Fluvial Geomorphic Assessments	Conduct Phase I and Phase II fluvial geomorphic assessments on streams and waterways in Westford.	
	32	CCRPC, VT ANR	Fluvial Erosion Hazard Mapping	Rate the fluvial erosion hazard for each assessed reach and develop a fluvial erosion hazard map for the waterway using SGAT. Create map of all assessed reaches. Submit to VT ANR for QA/QC.	
	33	TBD, determined by funding.	River Corridor Management Plans	Where Phase I and II assessments are complete, develop a River Corridor Management Plan.	
	33	Town Planner	Fluvial Erosion Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified fluvial erosion hazards.	
	33	Town Planner	Flood Insurance Rating Map Updates	Review draft FIRM data. Develop strategies to mitigate losses from identified flood hazards.	
#4 Complete landslide hazard assessments, and develop strategies in response to identified risk.	34	Vermont Geological Survey	Landslide Hazard Assessment Protocol	Develop a landslide hazard protocol to evaluate county slopes and waterways.	
	34	Vermont Geological Survey, other appropriate entities TBD.	Landslide Hazard Assessment and Mapping	Funding available, landslide hazards should be assessed and mapped in participating municipalities.	
	34	Town Planner	Landslide Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified landslide hazards.	
#5 Evaluate capabilities of existing and potential public shelters.	35	Emergency Management Director; Fire Chief	Confirm Existing Shelter Capability	Confirm capabilities of existing shelters, maintain and improve upon if needed.	

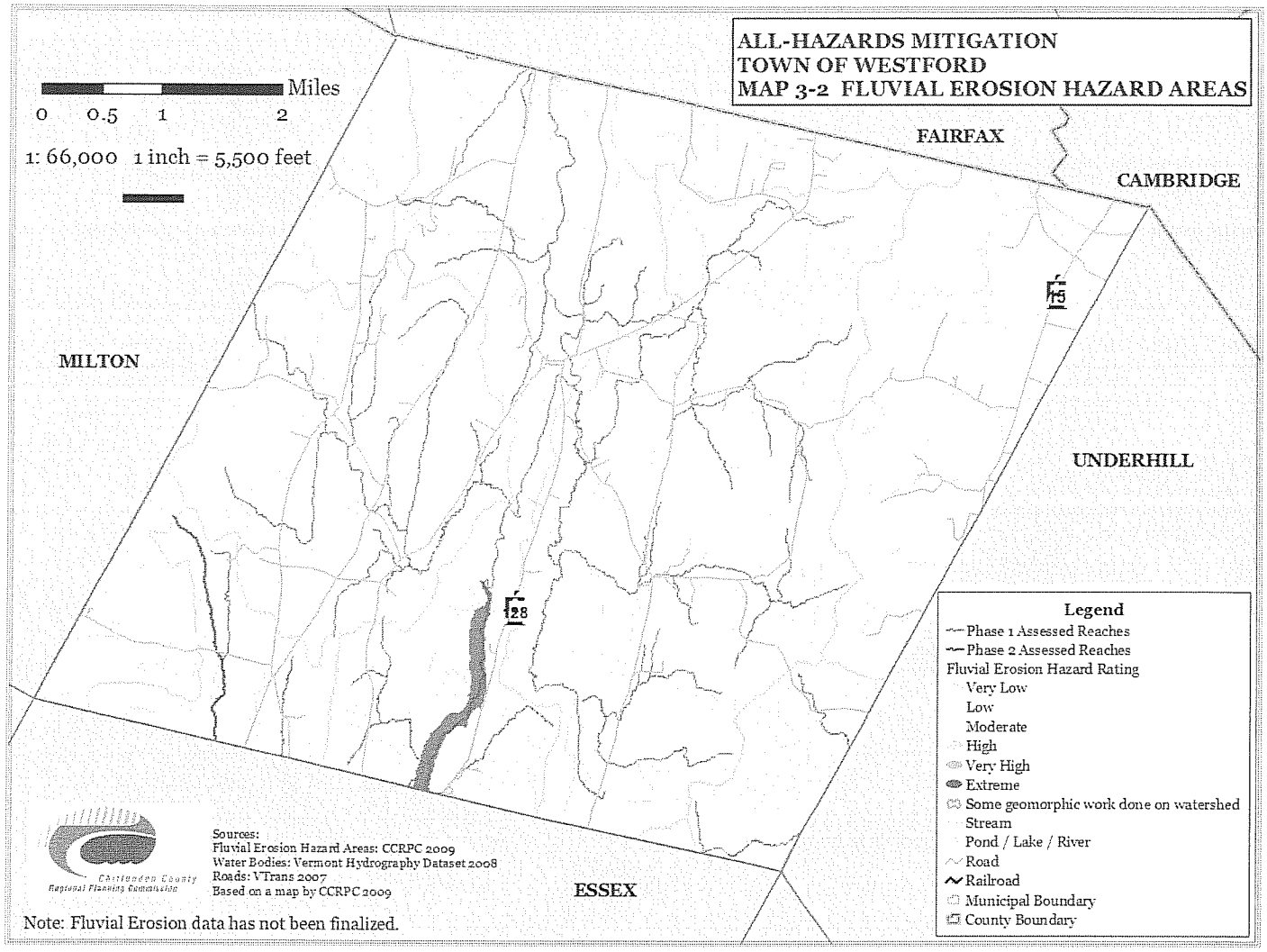
Action	AHMP Page #	Primary Responsible Entity	Task	Brief Description	Progress
#5, continued.	35	Emergency Management Director; Fire Chief	Investigate Alternate Shelters	Investigate capabilities of other buildings sufficient to serve as smaller shelters.	
	35	Emergency Management Director; Fire Chief	Shelter Generators	Work with schools and other shelters to obtain funding for the purchase of generators and/or electrical transfer panels. Maintain practice of shifting electrical power as needed to provide power to critical sites.	
#6 Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident; ensure town and school emergency plans are fully coordinated.	36	Emergency Management Director, Fire Chief	Evacuation and Sheltering Exercises	Conduct evacuation drills or exercises and evaluate performance.	
	36	Emergency Management Director, Fire Chief	Evacuation and Sheltering Plans	Review evacuation, sheltering, and relocation plans based on results of drills, exercises, and actual incidents.	
	36	Emergency Management Director, Fire Chief, School Principals	Emergency Operations Plan	Complete and adopt an Emergency Operations Plan for Westford. Plan should include a requirement to conduct a table top drill to stress test assumptions built into the EOP and modify procedures where appropriate. Drill should be conducted in conjunction with Westford School and CCSU.	
	36	Emergency Management Director, School Principals	Emergency Plan Coordination	Continue coordination of town and school emergency plans.	

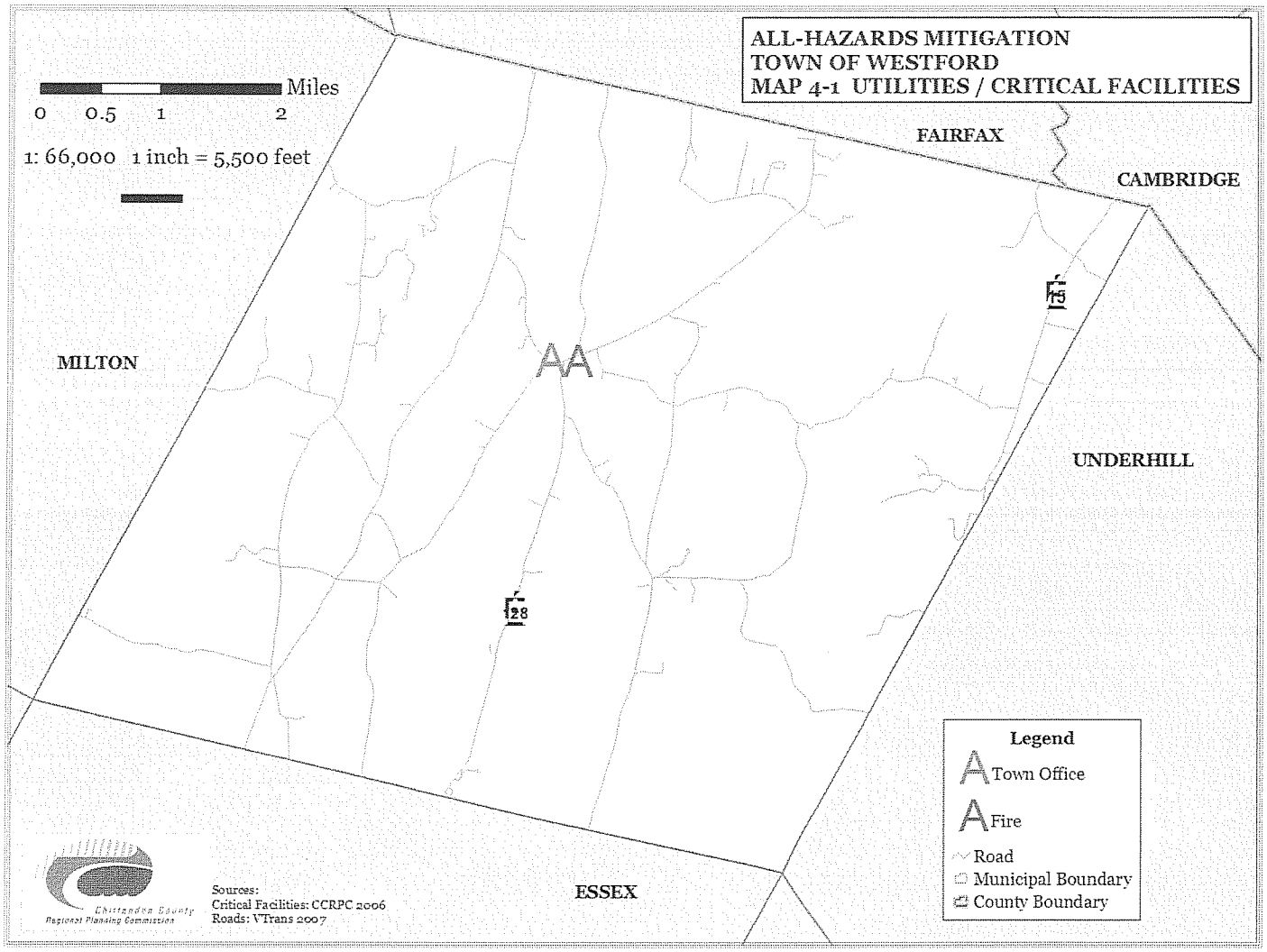
Action	AHMP Page #	Primary Responsible Entity	Task	Brief Description	Progress
#7 Raise public awareness of hazards, hazard mitigation and disaster preparedness.	36	Fire Chief, Emergency Management Director	School Programs	Continue school programs to raise student awareness of hazards, safety, preparedness and prevention.	
	37	Fire Chief, Emergency Management Director	Family Programs	Continue family programs, such as car safety seat and bike safety programs, to raise family awareness of hazards, safety, preparedness and prevention.	
	37	Fire Chief, Emergency Management Director	Fire Prevention Programs	Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.	
	37	Fire Chief, Emergency Management Director	Other hazard awareness programs	Develop public awareness programs, based on all-hazards needs. Programs to address pandemic hazards, preparedness and mitigation may be appropriate.	


ALL-HAZARDS MITIGATION
TOWN OF WESTFORD
MAP 1-1 HOUSING AND BUSINESSES
Miles
0 0.5 1 2
1: 66,000 1 inch = 5,500 feet
FAIRFAX
CAMBRIDGE
MILTON
UNDERHILL
ESSEX
Legend
Housing Structure
Business (Commercial/Industrial/Nonprofit)
Road
Municipal Boundary
County Boundary
Sources:
Housing: Housing Points, CCRPC 2006
Businesses: Employment Database, CCRPC 2008
Roads: VTrans 2007


ALL-HAZARDS MITIGATION
TOWN OF WESTFORD
MAP 1-2 ZONING DISTRICTS
Miles
0 0.5 1 2
1: 66,000 1 inch = 5,500 feet
FAIRFAX
CAMBRIDGE
MILTON
UNDERHILL
ESSEX
Legend
Generalized Zoning
Rural Residential
Town Center
Town Common
Town Village
Agricultural, Forestry, and Residential
Road
Municipal Boundary
County Boundary
Chittenden County Regional Planning Commission
Sources:
Zoning: Westford Zoning, 2008
Roads: VTrans 2007


ALL-HAZARDS MITIGATION
TOWN OF WESTFORD
MAP 3-1 FLOOD HAZARD AREAS
Miles
0 0.5 1 2
1: 66,000 1 inch = 5,500 feet
FAIRFAX
CAMBRIDGE
MILTON
UNDERHILL
ESSEX
128
15
Legend
Structures in 100-year Floodplain
Housing Structure
Bridge
Culvert
Road in 100-year Floodplain
Stream
Pond / Lake / River
100-year Floodplain
500-year Floodplain
Road
Municipal Boundary
County Boundary
Chittenden County Regional Planning Commission
Sources:
Housing and CI points: E911 data, 2007
Water Bodies: Vermont Hydrography Dataset 2004
Roads, Bridges, Culverts: VTrans 2007
Floodplain: Draft DFIRM 2009
Note: Floodplain data has not been finalized.


ALL-HAZARDS MITIGATION
TOWN OF WESTFORD
MAP 3-2 FLUVIAL EROSION HAZARD AREAS
Miles
0 0.5 1 2
1: 66,000 1 inch = 5,500 feet
FAIRFAX
CAMBRIDGE
MILTON
UNDERHILL
ESSEX
128
15
Legend
Phase 1 Assessed Reaches
Phase 2 Assessed Reaches
Fluvial Erosion Hazard Rating
Very Low
Low
Moderate
High
Very High
Extreme
Some geomorphic work done on watershed
Stream
Pond / Lake / River
Road
Railroad
Municipal Boundary
County Boundary
Chittenden County Regional Planning Commission
Sources:
Fluvial Erosion Hazard Areas: CCRPC 2009
Water Bodies: Vermont Hydrography Dataset 2008
Roads: VTrans 2007
Based on a map by CCRPC 2009
Note: Fluvial Erosion data has not been finalized.


ALL-HAZARDS MITIGATION
TOWN OF WESTFORD
MAP 4-1 UTILITIES / CRITICAL FACILITIES
Miles
0 0.5 1 2
1: 66,000 1 inch = 5,500 feet
FAIRFAX
CAMBRIDGE
MILTON
UNDERHILL
ESSEX
AA
15
128
Legend
Town Office
Fire
Road
Municipal Boundary
County Boundary
Chittenden County Regional Planning Commission
Sources:
Critical Facilities: CCRPC 2006
Roads: VTrans 2007