Town of Washington, VT
Hazard Mitigation Plan
September, 2011

Prepared by the Town of Washington and CVRPC

TABLE OF CONTENTS

1. Introduction

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this Local Hazard Mitigation Plan is to provide a local mitigation plan that makes the Town of Washington more disaster resistant.

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous Project Impact efforts, FEMA and State agencies have come to recognize that it is less expensive to prevent disasters 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 the hazards are most severe and identify local actions that can be taken to reduce the severity of the hazard.

Hazard mitigation strategies and measures alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or land treatment, adapt to the hazard by modifying structures or standards, or avoid the hazard by preventing or limiting development.

2. Purpose

The purpose of this Local Hazard Mitigation Plan is to assist the Town of Washington in recognizing hazards facing the region and their community and identify strategies to begin reducing risks from acknowledged hazards. The long term and overall goal of this plan is to protect life and property from harm/damages caused by natural and man-made disasters.

3. Community Profile

The Town of Washington is 38.8 square miles and is located in the northwest quadrant of Orange County. It is bordered by Orange to the north, Corinth to the east, Chelsea to the south and Williamstown to the west. As stated in the *Washington Town Plan, 2003* Washington is "rugged and picturesque" and "hilly but not mountainous." With about 1,400 feet of topographical relief, Washington is located at the headwaters of three watersheds: the Winooski, the Waits and the White River.

As stated in the Town Plan "Washington is one of the least populous and most rural towns in the Central Vermont Region." According to the Washington Town Plan and based upon 2008 population estimates, Washington has a total population of 1,095 people living in approximately 528 housing units. From 2000 to 2008 the population had increased by 4.5%. In 2000, about 15 % of residents were employed in town; Washington is primarily a bedroom community. Development in Washington is primarily limited rural residential. Washington does not have zoning, but foresees future development continuing to be low-density scattered rural residential. At the time of writing this plan, no new commercial or residential developments were planned.

Vermont Route 110 is the principle vehicular transportation corridor through Washington and is the only paved road in town. The historic Village of Washington is located on Route 110 which is the hub of official activity.

The Green Mountain Power Corporation provides electrical service to residential and commercial development in the northern section of Washington, the remainder of the town is serviced by the Washington Electric Cooperative. A municipal water system provides water to 64 users and all other homes and businesses rely on individual or small-scale community wells and springs for their water supply and private waste water treatment systems. The State of Vermont now over see's all waste water permitting.

Washington does not have a local police department or a Town Constable. The Town has contracted with the Orange County Sheriff's Department, located in Chelsea. Fire protection is provided by the Washington Volunteer Fire Department with 23 active members. The Department is a member of the Capital Fire Mutual Aid System. According to the *Town of Washington, Vermont Annual Report* Volunteer Fire Department responded to 22 calls during the 2010. Washington also has a FAST Squad which responds to emergency medical situations in conjunction with the Barre Town Ambulance Service. The FAST Squad responded to a total of 42 calls during 2010.

The Town of Washington has an approved Rapid Response Plan that was adopted in 2006. The Washington Village School, the Universalist Church (seasonal), the Baptist Church and the Town Offices are designated as emergency shelters. Other potential seasonal shelters include the town airport hangers.

The Town Plan, adopted in 2003, includes discussion, goals, and objectives in regards to *Physical Geography*, *Utilities, Facilities, and Services*, and *Transportation*. Washington does not have zoning bylaws, but expects scattered rural low density development to continue. No future large or small scale developments are currently planned.

4. Planning Process and Maintenance

4.1 Planning Process

The Central Vermont Regional Planning Commission (CVRPC) and Town Clerk, Carol Davis, coordinated the Washington Local Hazard Mitigation Plan process. A meeting was held in Washington on March 31, 2011 in order to gain an inventory of the town's vulnerability to hazards and its current and future mitigations programs, projects and activities. Input was received from:

- Scott Blanchard, Select Board
- Harry Roush, Emergency Manager
- Carol Davis, Town Clerk

- Maxine Durbrow, Emergency Services
- Paul E. Beede Sr., Road Foreman
- Jennifer Mojo, CVRPC

The draft plan was made available to the public for comments at the Washington Town Clerks office. The Town Clerk will be responsible for collecting and considering comments. Washington does not have a public web page. The notice of the draft update is also available on the CVRPC blog until the plan is submitted to FEMA for final approval. Comments sent to CVRPC will be processed by the Assistant Planner and attached as an appendix. An announcement of the draft update was also issued in the CVRPC newsletter, which reaches over 150 people in the Region's 23 towns including the surrounding towns of Williamstown, Orange and Barre Town. Once the plan is conditionally approved by FEMA, the plan will go before the Select Board for adoption. The draft plan will also be shared with the fire department and road department, and at local meetings with other local, regional or state officials. During future updates, additional stakeholders who provide service to the jurisdiction and major business owners will be invited to the meetings.

Existing Mitigation Programs, Projects and Activities

The ongoing or recently completed programs, projects and activities are listed by mitigation strategy and were reviewed for the development of the plan. The Town Plan, 2010 Town Report, CVRPC's past Regional Mitigation Plan, and Basic Emergency Operations Plan, and past newspaper articles were reviewed for pertinent information. The 2008 culvert and short structure inventory, Stream Geomorphic Assessments of the Stevens Branch Williamstown and Barre City Upstream of the Confluence with the Jail Branch, and Washington DFIRM maps were reviewed as well.

<u>Community Preparedness Activities</u>

- Rapid Response Plan/ Basic Emergency Operations Plan
- Capital Equipment Fund
- School Emergency Evacuation Plan

<u>Insurance Programs</u>

- Participation in NFIP

<u>Land use Planning/Management</u>

- Washington Town Plan, 2003

<u>Hazard Control & Protective Works of Infrastructure and Critical Facilities</u>

- Maintenance Programs – bridge and culvert surveys
- Dry Hydrants - 5
- Clean Up Recovery Plan
- Capital Mutual Aid System

<u>Public Awareness, Training & Education</u>

- CPR Trainings
- School Fire Safety Program
- Fire safety educational programs
- First responder CPR & hazmat trainings

4.2 Plan Maintenance

The Washington Local Hazard Mitigation Plan will be updated and evaluated annually at a September Select Board meeting. Updates and evaluation by the Select Board will also occur within three months after every federal disaster declaration and as updates to town plan/zoning and river corridor plans come into effect. The plan will be reviewed by the Select Board, Town Clerk, Emergency Manager and public at the abovementioned September select board meeting. CVRPC will help with updates or if no funding is available, the Town Clerk and Emergency Manager will update the plan.

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, town newsletter and CVRPC newsletter and blog inviting the public to the scheduled Select Board (or specially scheduled) meeting. These efforts will be coordinated by the Town Clerk and Emergency Manger.

Updates may include changes in community mitigation strategies; new town bylaws, zoning and planning strategies; progress of implementation of initiatives and projects; effectiveness of implemented projects or initiatives; and evaluation of challenges and opportunities. If new actions are identified in the 5 year interim period, the plan can be amended without formal re-adoption during regularly scheduled Select Board meetings.

Washington shall also consider incorporation of mitigation planning into their long term land use and development planning documents. It is recommended the Town reviews and incorporates elements of the Local Mitigation Plan when updating the Municipal Plan and during development of flood hazard bylaws. The incorporation of the Local Mitigation Plan into the municipal plan, possible future zoning regulations and additional flood hazard bylaws will also be considered after declared or local disasters. The Town shall also consider reviewing future Stevens Branch Corridor planning documents for ideas on future mitigation projects and hazard areas.

5. Risk Assessment

5.1 Hazard Identification and Analysis

The following natural disasters were discussed and the worst threat hazards were identified based upon the likelihood of the event and the community's vulnerability to the event. Hazards not identified as a "worst threat" may still occur. Greater explanations and mitigation strategies of non "worst threat" hazards can be found in the State of Vermont's Hazard Mitigation Plan.

Hazard	Likelihood [1]	Community Vulnerability[2]	Worst Threat
Avalanche/ Landslide	Low	No	
Dam Failures	Med	Yes	✓
Drought	Low	No	
Earthquake	Low	No	
Extreme Cold	Med	No	
Flash Flood	Med	Yes	✓
Flood	Med	Yes	✓
Fluvial Erosion	Low	No	
High Wind	Low	No	
Ice Jam	Low	No	
Hurricane	Low	No	
Structure Fire	High	Yes	✓
Tornado	Med	Yes	✓
Water Supply Contamination	Low	No	
Wildfire/Forest Fire	Med	No	
Winter Storm / Ice Storm	Med	No	
Other –			

The Town of Washington identified the following disasters as presenting the worst threat to the community:

- Dam Failure
- Flash Flood/Flooding
- Structure Fire
- Tornado

A discussion of each significant hazard is included in the proceeding subsections and a map identifying the location of each hazard is attached (See map titled *Areas of Local Concern.*) Future updates will include profiles on hazards that are "highly likely." Each subsection includes a list of past occurrences based upon County-wide FEMA Disaster Declarations (DR-#) plus information from local records, a narrative description of the hazard and a hazard matrix containing the following overview information:

[1] High likelihood of happening: Near 100% probability in the next year.
Medium likelihood of happening: 10% to 100% probability in the next year or at least once in the next 10 years.
Low likelihood of happening: 1% to 10% probability in the next year or at least once in the next 100 years.

[2] Does the hazard present the threat of disaster (Yes)? Or is it just a routine emergency (No)?

Hazard	Location	Vulnerability	Extent	Impact	Likelihood
Type of hazard	General areas within municipality which are vulnerable to the identified hazard.	Types of structures impacted	Minimal: Limited and scattered property damage; no damage to public infrastructure contained geographic area (i.e., 1 or 2 communities); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities. Moderate: Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities) essential services are briefly interrupted; some injuries and/or fatalities. Severe: Consistent major property damage; major damage to public infrastructure (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and fatalities.	Dollar value or percentage of damages.	High: 10% to 100% probability within the next year or at least once in the next 10 years. Medium: less than 10% to 100% probability within the within the next year or less than once in the next 10 years.

Dam Failure

The Hands Mill Dam is located just south of the village area of Washington on the Jail House Branch of the Winooski River. Construction on the dam was completed in 1860. The dam is of earthen construction and is approximately 20 feet high and 325 wide. The pool behind the name is approximately 2 acres and stores about 12 acre feet of water including sediments. At maximum capacity the dam stores approximately 16 acre feet of water. To date, there have been no breaches of the dam or any major failure event. However, the probability of the dam failing increases daily.

An inspection in June 2007 by the VT Department of Environmental Conservation revealed that the dam is in poor condition and continues to deteriorate. An inspection in 2001 also revealed the poor condition of the dam. The inspection reveals that the dam is considered a significant hazard, and sudden failure of the dam would cause probably loss of life and property damage.

Recommendations from the report included – reconstruction of the dam; removal of the dam and restoration of the upstream channel; improved maintenance including clearing and brushing of the dam along the crest, upstream slope, downstream slop and ten feet below the dam; development of an emergency action plan to evacuate possible inundation areas and notify people downstream of the dam.

The Town of Washington would be most interested in removal of the dam, as it no longer serves a purpose. Alteration or reconstruction of the dam would require prior approval from the VT DEC as the dam impounds more than 500.000 cubic feet of water and sediment. Areas which could be inundated are Route 110, Creamery Road, the Town Clerks office, and Washington Village School. The Hazard Analysis Map highlights areas which could be affected by inundation if the dam were to break.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Dam Failure	Hands Mill Dam Downstream Areas – highlighted on map	East Village center, Washington School Church Roads downstream	Severe	$ 2,000,000 +	Medium – Increasing daily

Flooding/Flash Flooding

Federal Declarations (Orange County data)

- 8/28/2011 – DR 4022
- 5/28/2011 – DR 1995
- 7/2009
- 7/21/2008 – DR 1790
- 7/9/2007 – DR 1715
- 4/15/2007 – DR 2698
- 7/21/2003 – DR 1698
- 7/14/2000 – DR 1488

Washington, like other towns in Vermont is prone to flooding and flash flooding during rainy seasons and extreme weather events. The head waters of the Jail Branch are located in Washington. The River flows north to Barre City and Barre Town where it conjoins with the Stevens Branch of the Winooski River. Two studies have been conducted on the Jail and Stevens Branch to gauge the health of the river and identify flood prone areas, where construction should be avoided, and areas constricted by bridges/culverts.

Six of the nine largest floods have occurred in the past 35 years. These floods are a result of intense cloudbursts, hurricanes and snowmelt. A USGS study found that since 1970, an increase in precipitation has occurred due to climate change.

The greatest threat to flooding is caused by changes in land use and increased development near river banks and in type A floodplain areas. Increased development and encroachment of rivers and streams leads to greater volumes stormwater runoff and greater erosion of stream banks. Improperly built private driveways also disrupt stormwater flow and can overload culverts with additional stormwater. The Hazard Analysis Map highlights 11 road/stream intersections which are consistently flooded or need repair work from flooding. Two flooding events in July 2009 caused approximately $45,000 in damages at these stream/road intersections. The Scales Hill Road suffered the greatest amount of damage and needs replacement. Scales Hill Road is highlighted on the Hazard Analysis Map. Three other problem areas identified have bridges and culverts which are rated in poor or fair condition. These structures are located on Johnson Lane, Stellar Road and Williamstown Road. However, flooding is not limited to the intersections highlighted on the map.

The stream assessments make several recommendations to prevent help decrease the likelihood of flooding and flash flooding. These recommendations are to: have a 25ft no development buffer on all waterways, replace bridges which constrict the river, develop a culvert maintenance plan, and properly manage stormwater in developed areas (consideration of soils/deposits, septic systems, channel/fluvial migration zones.) Washington does participate in the NFIP. There is no floodplain data for the town of Washington and therefore no properties have been identified as being in the floodplain. DFIRM maps do identify some limited Zone A areas. Washington also does not have record of any repetitive loss properties. There are currently no large or small developments planned in Washington that would be considered in the floodplain.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Flooding/ Flash Flooding	Along Jail Branch and major tributaries which flow to Stevens Branch; highlighted intersections on Hazards Analysis Map	Bridges, culverts, roadways, Clerk's Office, Washington School, structures within 25 ft of waterway, See Hazard Analysis Map	Moderate	$100,000 for roadwork depending on severity – Higher if actual buildings are damaged (based off current grand list)	Medium

Structure Fire

A third of the calls received in 2010 by Washington's FAST squad were fire related incidents – chimney, stove pipe and oven fires. Although many structures in Washington are less than 100 years old, many residents heat their homes with wood or pellet burning stoves. The remoteness and distance from fire and emergency services of many homes also increases the likelihood of a home being completely, opposed to partially, destroyed by a fire. The south eastern section of

the town is more remote and more forested than the northern portion of the town. The Town Clerk's office does not have a sprinkler system, which is a great concern to Town residents. To date, there have been no large structure fires.

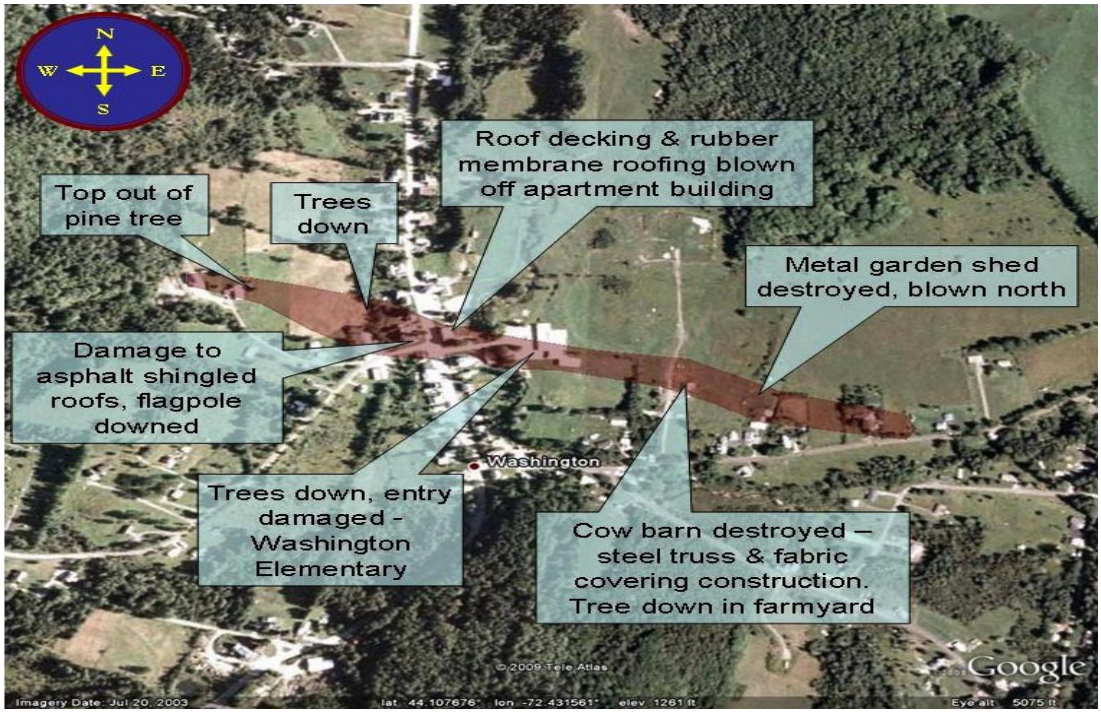
Hazard	Location	Vulnerability	Extent	Impact	Probability
Structure Fire	Town wide with emphasis on the south east section of town	Wood structures, especially older than 100 yrs, homes that use wood burning stoves for heat	Moderate	$150, 000 per home based on median grand list value	High

Tornado

Tornados in Vermont are especially rare due to the mountainous topography of the State. The National Weather Service reports that only about one tornado occurs in Vermont every two years. Only 32 tornadoes have occurred in Vermont between 1950 and 1995. On May 9, 2009 a tornado touched down in the northwest section of Washington. This area is highlighted on the Hazard Analysis Map. The tornado that occurred on this date was the second earliest confirmed tornado in Vermont since 1950.

The tornado was rated an EF1 on the enhanced Fujita scale and had winds around 100 mph. The path of the tornado was roughly a half mile long and traveled through the village of Washington before dissipating. No one was hurt in the tornado; however there was severe damage which occurred to trees and structures in the swath. A six unit apartment complex had its roof torn off. Damage also occurred to the roof of the Washington School in the village area.

The picture below is courtesy of the National Weather Service, and highlights the damage that occurred along the tornado path.



Hazard	Location	Vulnerability	Extent	Impact	Probability
Tornado	Valley areas, but hard to pinpoint exactly	Any structure in Path – mobile homes, multi-story buildings, older/historic structures	Minimal	$750,000	Medium

6 Mitigation

6.1 Town Plan (2003) Goals that Support Local Hazard Mitigation

- To plan for the public investment in the construction or expansion of infrastructure such as fire and police protection, emergency medical services, schools and solid waste disposal, and others, to meet future needs should reinforce the general character and planned growth patterns of the town.
- To provide for safe, convenient, economic and energy efficient transportation systems that respects the integrity of the natural environment.
- To protect and preserve important natural and historic, recreational, scenic and cultural features of the landscape including air, water, wildlife, and land resources.

The next time the Town of Washington updates its Town Plan, it may consider adding additional mitigation goals. Additional mitigation goals could include:

- To take actions to reduce or eliminate the long-term risk to human life and property from natural hazards.

Specific hazard mitigation strategies related to goals of the Plan include:

- Ensure existing and future drainage systems are adequate and functioning properly
- Preserve and prevent development in areas where natural hazard potential is high
- Provide residents with adequate warning of potential hazards
- Ensure that all residents and business owners are aware of the hazards that exist within Washington and ways they can protect themselves and insure their property
- Ensure that emergency response services and critical facilities functions are not interrupted by natural hazards
- Provide adequate communication systems for emergency personnel and response units

Hazard mitigation is a relatively new planning topic to Washington. Over the course of the next five years, Washington will look into incorporating more mitigation planning into their daily planning activities and projects. The mitigation goals and strategies outlined in this Local Mitigation Plan are the first steps in making Washington more disaster resistant. The hazards identified in this plan cause the greatest impacts and damage and are the priority hazards for the Town of Washington. In order to have continuous achievement of mitigation goals and implementation mitigation strategies, the Town will spend time each year assessing progress of and future funding sources for the outlined mitigation strategies. This session can be performed during Town Meeting Day or an annual session of another set date can be held during a public Select Board Meeting.

6.2 Proposed Hazard Mitigation Programs, Projects and Activities

Hazard mitigation programs, projects and activities that were identified for implementation at the Town PDM meeting:

<u>Dam Failure</u>

- Removal of the Hands Mill Dam
- Relocation of municipal facilities – Town Clerks office and Washington School out of dam inundation area
- Development of a cleanup recovery plan

<u>Flooding/Flash Flooding</u>

- Replacement and upgrade of Scales Hill Road Bridge

- Replacement and upgrade of Johnson Lane, Stellar Rd, and Williamstown Rd culverts and bridges
- Replacement and upgrade of highlighted problem culverts as prioritized by the Select Board and CVRPC culvert inventories
- Development of flood bylaws

Structure Fire

- Improved fire education for homeowners regarding heating homes safely during winter months and proper chimney/furnace maintenance
- Develop alternative water supplies/dry hydrants in south east section of town and more remote areas
- Installation of E911 numbers
- Sprinkler systems for municipal buildings – Clerks Office, Town Garage, Library, Fire Station
- Communications sign – includes fire hazard level and fire education (smoke detectors etc)

Tornado

- Installation of mobile home tie downs
- Improved town wide communications system and warning system
- Improved inter-town communication system – upgrade and supplement current equipment

NFIP

- Participate in NFIP training offered by the State and/or FEMA that addresses flood hazard planning and management

The Hazard Mitigation Activities Matrix (Attached) lists mitigation activities in regards to local leadership, possible resources, implementation tools, and prioritization. Prioritization was based upon the economic impact of the action, the Community's need to address the issue, the action's cost, and the availability of potential funding. The action's cost was evaluated in relation to its benefit as outlined in the STAPLEE guidelines. All flooding mitigation strategies were reviewed in light of the most recent flooding events.

Washington understands that in order to apply for FEMA funding for mitigation projects that a project must meet FEMA benefit cost criteria. The Town must also have a FEMA approved Local Mitigation Plan as well.

A High prioritization denotes that the action is either critical or potential funding is readily available and should have a timeframe of implementation of less than two years. A Medium prioritization is warranted where the action is less critical or the potential funding is not readily available and has a timeframe for implementation of more than two years but less than four. A Low prioritization indicates that the timeframe for implementation of the action, given the action's cost, availability of funding, and the community's need to address the issue, is more than four years.

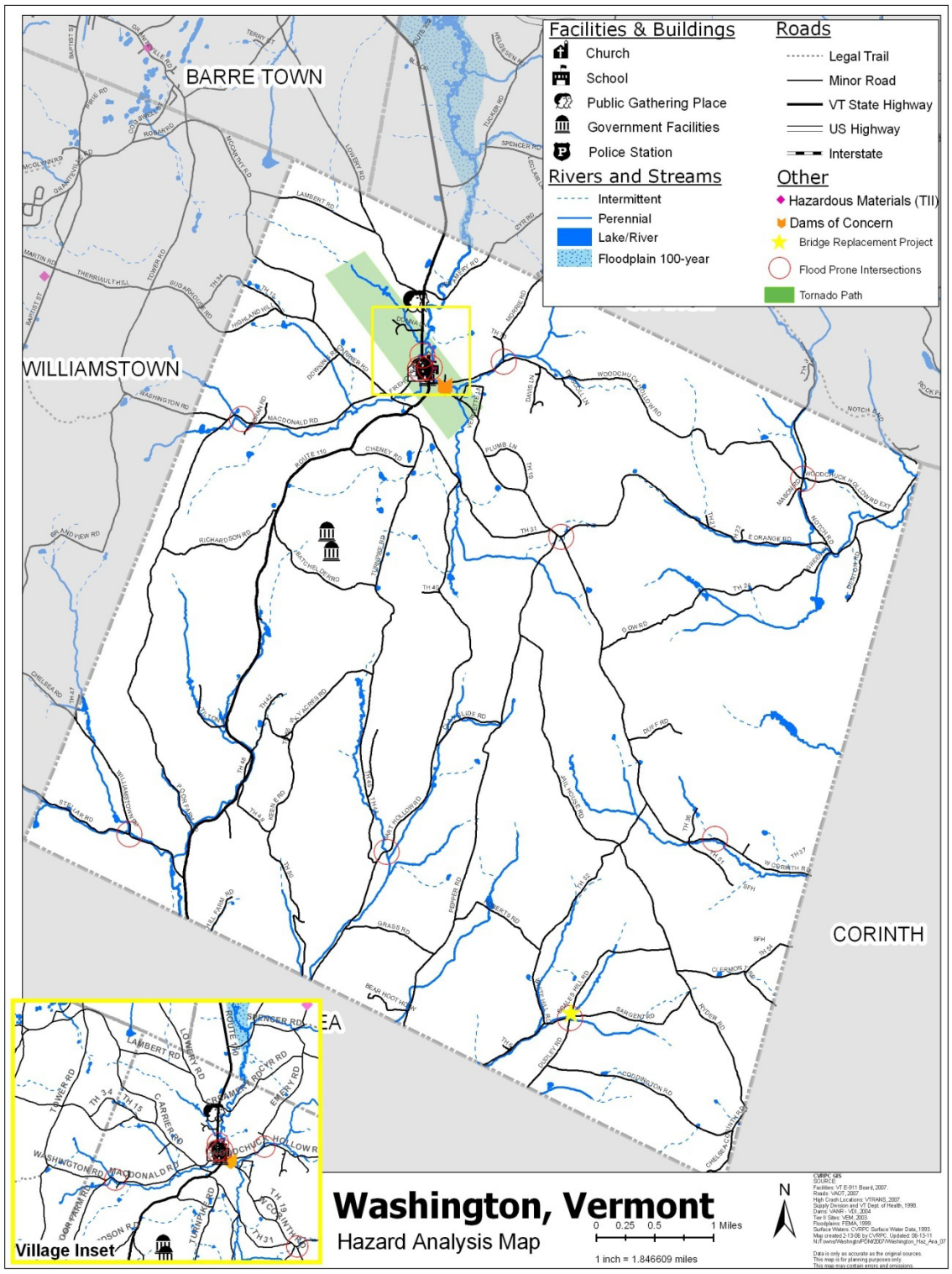
Attachments:
Hazard Activity Matrix
Hazard Analysis Map
Adoption Resolution

Hazard Mitigation Activities Matrix

Mitigation Action	Local Leadership	Prioritization	Possible Resources	Time Frame
Removal of Hands Mill Dam	Select board, ANR,	High	HMGP	ASAP – no more than 2 years
Development of Cleanup Recovery Plan	Select board, road dept, fire dept	Med	VEM, Red Cross,	2-3 years
Relocation of municipal facilities – Town Clerks office and Washington School out of dam inundation area	Select Board	Med	HMGP	4-5 years if dam is not removed
Replacement and upgrade of Scales Hill Road Bridge	Select Board, Road Crew	High	HMGP, general fund	2 years
Replacement and upgrade of Johnson Lane, Stellar Rd, and Williamstown Rd culverts and bridges	Select Board, Road Crew	Med	HMGP, general fund	3-4 years
Replacement and upgrade of highlighted problem culverts as prioritized by the Select Board and CVRPC culvert inventories	Select Board, Road Crew, CVRPC	Med	HMGP, general fund	3-4 years, inventories every 3 years
Development of flood bylaws	Select Board	Med	CVRPC	2-3 years
Improved fire education materials for homeowners regarding heating homes safely during winter months and proper chimney/furnace maintenance	Select board, fire department, Washington school children	Med	FM Global Fire Prevention Grant Program	2 years
Installation of E911 number signs	Road crew	High	General fund	1-2 years

Sprinkler system for Town Clerks office	Select board, fire department	Low	Dept of Homeland Security	4 years
Fire/Town event Communications Sign	Select board, volunteers, fire department	Med	Dept of Homeland Security, general fund	2 years
Develop alternate water supplies in remote south east sections of Town – dry hydrants	Fire department	Med	VT NRCS	4 years
Improved town wide/ inter town communications system – upgrade and supplement current equipment	Fire Department	Med	Dept Homeland Security Grant	3 years
Installation of mobile home tie downs	Select board, fire department, home owners	Low	HMGP	4-5 years
Participate in NFIP training offered by the State and/or FEMA that addresses flood hazard planning and management	Select board, planning commission	Med	General fund	3 years

Hazard Analysis Map



CERTIFICATE OF ADOPTION

The Town of Washington
Select Board
A Resolution Adopting the Local Hazard Mitigation Plan
_____ __, 2011

WHEREAS, the Town of Washington has worked with the Central Vermont Regional Planning Commission to identify hazards, analyze past and potential future losses due to natural and manmade-caused disasters, and identify strategies for mitigating future losses; and

WHEREAS, the Washington Local Hazard Mitigation Plan contains several potential projects to mitigate damage from disasters that could occur in the Town of Washington; and

WHEREAS, a duly-noticed public meeting was held by the Town of Washington Select Board on _____ __, 2011 to formally adopt the Washington Local Hazard Mitigation Plan;

NOW, THEREFORE BE IT RESOLVED that the Washington Select Board adopts the Washington Local Hazard Mitigation Plan.

_____
Chair of Select Board

_____
Member of Select Board

ATTEST

_____

Washington Clerk