TOWN OF COLCHESTER, Vermont
2017 All-Hazards Mitigation Plan

Annex 5 to the
2017 Chittenden County Multi-Jurisdictional
All-Hazards Mitigation Plan

Prepared by:

The Chittenden County Regional Planning Commission
and the
Town of Colchester, Vermont

Adopted by the Town of Colchester Selectboard on May 9, 2017

Approved by FEMA on June 1, 2017

U.S. Department of Homeland Security
FEMA Region I
99 High Street, Sixth Floor
Boston, MA 02110-2132

FEMA

JUN 01 2017

Lauren Oates
State Hazard Mitigation Officer
Vermont Department of Public Safety
45 State Drive
Waterbury, Vermont 05671-1300

Dear Ms. Oates:

We would like to congratulate the participating jurisdiction and the State of Vermont for their dedication and commitment to mitigation planning. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I Mitigation Planning Team has completed its review of the 2017 Chittenden County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan and determined it meets the requirements of 44 C.F.R. Pt. 201. This plan approval includes the following participating jurisdiction that provided a copy of their resolution adopting the plan. The newly approved jurisdiction is highlighted in **bold.**

Colchester Milton Richmond Williston

With this plan approval, the community above is eligible to apply to the Vermont Division of Emergency Management & Homeland Security for mitigation grants administered by FEMA. Requests for mitigation funding will be evaluated individually according to the specific eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in your community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Complete information regarding the CRS can be found at http://www.fema.gov/national-flood-insurance-program-community-rating-system, or through your local floodplain administrator.

JUN 01 2017

The 2017 Chittenden County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of March 6, 2017** in order to maintain eligibility for mitigation grant funding. We encourage Chittenden County Regional Planning Commission communities to continually update the plan's assessment of vulnerability, adhere to its maintenance schedule, and implement, when possible, the mitigation actions proposed in the plan.

Once again, thank you for your continued dedication to public service demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please do not hesitate to contact Melissa Surette at (617) 956-7559.

Sincerely,

Paul F. Ford
Acting Regional Administrator

PFF: ms
cc: Ben Rose, Recovery and Mitigation Section Chief, VT DEMHS
Stephanie Smith, Hazard Mitigation Planner, VT DEMHS

Enclosure

CERTIFICATE OF ADOPTION
Date: 5/9/2017

TOWN OF COLCHESTER VERMONT SELECTBOARD
A RESOLUTION ADOPTING THE 2017 Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and Annex #5, the 2017 Town of Colchester All-Hazards Mitigation Plan (Plan).

WHEREAS, the Town of Colchester has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2017 Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and Annex #5, the 2017 Town of Colchester All-Hazards Mitigation Plan** which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Colchester has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for **the 2017 Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and Annex #5, the Town of Colchester All-Hazards Mitigation Plan (Plan)** under the requirements of *44 CFR 201.6;* and

WHEREAS, the **Plan** specifically addresses hazard mitigation strategies, and Plan maintenance procedures for the Town of Colchester; and

WHEREAS, the **Plan** recommends several hazard mitigation actions (projects) that will provide mitigation for specific natural hazards that impact the Town of Colchester with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this **Plan** will make the Town of Colchester eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Town of Colchester Selectboard:

1. The **2017 Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and Annex #5, the 2017 Town of Colchester All-Hazards Mitigation Plan (Plan)** is hereby adopted as an official plan of the Town of Colchester;

2. The respective officials identified in the mitigation action plan of the **Plan** are hereby directed to pursue implementation of the recommended actions assigned to them;

3. Future revisions and **Plan** maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and

4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Colchester this 9th day of May 2017.

Selectboard Chair

Selectboard Member

ATTEST
Karen Richard
Town Clerk

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 Colchester;
- 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 top three Hazards by type with the most risk in Colchester are:

Natural Hazards:	Severe Winter Storm, Flooding, & Fluvial Erosion
Technological Hazards	Water Pollution, Hazardous Materials Incident & Power Loss
Societal Hazards	Crime, Economic Recession & Epidemic

Section 4: Vulnerability Assessment discusses buildings, critical facilities and infrastructure in designated hazard areas, vulnerable populations 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 2014 Colchester 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, and public works. This section presents the following municipal 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) Mitigation 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 muncipality'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 includes the following Mitigation Actions planned by the Town:

Category A: Operate a Stormwater Utility to mitigate Severe Rainstorms, Water Pollution and Fluvial Erosion

- Action A-1: Establish municipal stormwater utility
- Action A-2: Street Sweeping and Catch Basin Cleaning
- Action A-3: Review of land development proposals
- Action A-4: Annual upgrades to stormwater infrastructure

Category B: Implement Flow Restoration Plans and Phosphorus Control Plan to mitigate Severe Rainstorm, Water Pollution and Fluvial Erosion

- Action A-1: Implement Flow Restoration Plans for Morehouse & Sunderland Brooks
- Action A-2: Begin Implementation of Phosphorus Control Plan

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

Table of Contents

List of Tables

[Note: See appendices of Chittenden County Multi-Jurisdictional AHMP for weblinks to the various data sources used to generate many of the tables noted above.]

List of Figures

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. St. Michael's College, located in Colchester, is discussed separately in an appendix to this annex.

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 Colchester. Community planning can aid 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 *2013 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, Mitigation, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where they are most severe, and to identify actions that can be taken to 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.

- Flood Mitigation Assistance Grant Program (FMAGP) funds will be available only to communities that have adopted a local Plan
- 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.
- With regards to contributions from the State of Vermont (under the Emergency Relief Assistance Fund) to cover the non-Federal share of Public Assistance project costs, a community without a plan, would have to cover 17.5% of the overall project cost compared to only 7.5% to 12.5% of the cost if it had a plan in place.

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 such as in emergency operations plans, comprehensive plans (aka "town plans"), capital improvement plans and budgeting, open space plans, and stormwater master plans..

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) Hazard mitigation planning should take into account the multiple risks and vulnerabilities of the significant hazards in the County due to its mixed urban-suburban-rural nature, its economic importance to the State and its significant presence of public and private infrastructure.

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 the regional land use and transportation planning program conducted by the Chittenden County Regional Planning Commission.
7) Maintain existing mechanisms or develop additional processes to foster regional cooperation in hazard mitigation, specifically and emergency management planning, generally.

1.6 Town of Colchester: Demographics and Development Characteristics

The Town of Colchester *(cf. Figure 1.1)* is located in the northwestern area of Chittenden County and is bounded on the west by Lake Champlain, on the south by Burlington, Winooski, and South Burlington, on the east by Essex, and on the north by Milton. It encompasses 37.15 square miles.

Based on U.S. Census data, the University of Vermont's Center for Rural Studies reports a municipal population of 17,067 people in 2010. Selected population characteristics are as follows:

Table 1-1 Town of Colchester, selected population characteristics, 2010

Category	Number	%
Total Population	17,067	--
Median Age	35.4 years	--
Population age 65 years and over	1,634	9.6
Population (and %) under 10 years old	1,686	9.9
Population (and %) in group quarters	1,833	10.7

U.S. Census Bureau, 2010 Census of Population and Housing, Population and Housing Unit Counts

The following shows the types of housing within Colchester, also based on the 2010 U.S. Census data:

Table 1-2 Town of Colchester, selected housing unit data, 2010

Category	Number	%
Total Housing Units	7,104	--
Occupied housing units	6,314	88.9
Vacant housing units	790	11.1
Vacant housing units used for seasonal, recreational or occasional use	521	7.3
Detached 1-unit housing units	3,939	58.6
Housing units with 5 or more units in structure	639	9.4
Mobile homes	595	8.8
Housing structures built in 1939 or earlier	807	12.0

U.S. Census Bureau, 2010 Census of Population and Housing, Population and Housing Unit Counts

The concentration of residential and commercial/industrial development in Colchester is shown in *Figure 1.2*. Residential development is heaviest along the following roads:

- Porters Point Road, Airport Road, Holy Cross Road, Bean and Macrae Road, all located in the Prim and Heineberg Roads neighborhood
- US Route 2A in the Colchester Village neighborhood
- North of US Route 2 and Jasper Mine Road along Watkins and Mayo Roads
- Blakely Road, Williams Road, and Lakeshore Drive in the Town Services Center neighborhood
- Severance Road by the Essex Town border
- Malletts Bay Avenue by the Winooski Town border
- Fort Ethan Allen along Route 15.

Commercial and/or industrial development is concentrated along the following roads:

- Heineberg and Prim Roads
- US Routes 2 & 7 in the Exit 16 area off US I-89
- West Lakeshore Drive
- US Route 2A in the Village of Colchester and at the junction of Routes 2A, 2, and 7
- The junction of US Routes 2 & 7 in the Exit 17 area off US I-89
- Jasper Mine Road

Agricultural fields are most common in the northern third of the town but are also present in the Shipman Hill area along Malletts Bay Avenue, the vicinity around Mill Pond and Parsons Road, and some portions of Route 7 north of Severance Corners. With regards to other land uses, town zoning is depicted in *Figure 1.3.*

Table 1-3 Town of Colchester, Population Growth, 1960-2014

Year	Population
1960	4,718
1970	8,776
1980	12,629
1990	14,731
2000	16,986
2010	17,067
2014	17,384

April 1 census counts for 1960, 1970, 1980, 1990, 2000 and 2010; July 1 estimates for 2014

1.7 Summary of Planning Process

As noted above the update of this municipal All Hazard Mitigation Plan (AHMP) was part of the planned 2016 update of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and the municipal AHMPs that are annexes to the Multi-Jurisdictional Plan. The CCRPC, with funding provided by the State of Vermont via a FEMA Hazard Mitigation Grant, began this update process in the spring of 2015.

1.7.1 Planning and Development of the 2017 All-Hazards Mitigation Plan Colchester Annex

CCRPC staff met several times with various Town staff and officials during the course of the development of this plan. Initial Meetings focused on the following issues:

1. Reviewing the matrix used in 2011 to identify and prioritize hazards facing the City, and determining whether the overall scoring still makes sense
2. Discussing any newly significant hazards in the City and identifying any new actions that could be taken to address them.
3. Discussing any progress that has been made on the strategies and tasks from the 2011 plan.

These first set of meetings were held on:

- October 16, 2015

  Attendees included: Sarah Hadd, Director of Planning & Zoning; Karen Purinton, Planner; Sgt. Jeffrey Bean, Administrative Sergeant, Police Dept.

- February 9, 2016

  Attendees included: Warner Rackley, Assistant Public Works Director; Floyd Sheesley, Public Works Operations Manager

In addition, the following materials were reviewed:

1. Town of Colchester Land Development Regulations

2. Town of Colchester Comprehensive Plan
3. FEMA information on prior disasters
4. The 2013 Vermont All-Hazards Mitigation Plan
5. Information from Vermont Agency of Natural Resources on fluvial erosion hazards and flood hazards
6. Information from the Vermont Agency of Transportation on town roads, bridges, culverts and high crash locations.
7. Information from the Vermont Department of Emergency Management and Homeland Security on prior disaster and hazardous materials reporting.
8.

1.7.2 Opportunities for involvement in the planning process and formal public review and governing body approval

Emergency management planners are obligated to provide opportunities for the general public, neighboring communities, local, regional and state agencies, development regulation agencies and other interests to be involved in the review and development of Hazard Mitigation Plans. Additionally, the CCRPC, as a public agency is obligated to provide public notice and opportunities for input into its programming and processes. With regard for public involvement in the develop of the first drafts of this Municipal AHMP *prior to release of public drafts*, there was no formal solicitation process to recruit or invite the public to come to staff level meetings wherein the first process of updating data in the old 2011 Plan. That being said, however, the public has been free to review the 2011 Plans on the CCRPC website since they were first posted in 2011. Additionally as noted in Section 1.10.2.4 of the Multi-Jurisdictional AHMP, in the period before the first municipal draft AHMPs were publicly released in August 2016 (see below) there were twelve public meetings held by the CCRPC Board and the Plan Update Committee wherein the overall Hazard Mitigation planning process was discussed including the content and purpose of the local, Municipal AHMPs as well as the planned timeline for their development starting in 2015 and extending well into 2016. *[Note that opportunities for public review and development of the Multi-Jurisdictional AHMP are described in Section 1.10.2 of the that document.]*

Commencing with an August 5**,** 2016 press release and with a comment deadline of August 19, 2016, the CCRPC issued a press release and also posted to all of the electronic bulletin boards of Front Porch Forum in every municipality in the County to solicit and receive comments on the first drafts of this Town of Richmond All-Hazards Mitigation Plan as well as the AHMPs of the other 18 municipalities in the County. On August 5, 2016, emails to the same state agency staff and executive directors of neighboring Regional Planning Commissions as noted above, were also sent to encourage their review and comment. The public, agency staff and RPC staff were directed to provide comments to Dan Albrecht, Senior Planner at the CCRPC.

With regard to opportunities for public involvement and input from neighboring communities in development of individual Local All-Hazards Mitigation Plans including this Plan for the **Town of Colchester** opportunities were as follows:

a) On August 5, 2016, the CCRPC posted all the first drafts of the 18 local AHMPs on the CCRPC website and via various means (press release, electronic newsletter, etc) made the public aware of the opportunity to comment. The public was advised to send comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.
b) On August 5, 2016 the CCRPC staff sent direct emails to the Agency staff noted above notifying them as well of the opportunity to review the 18 local AHMPs posted on the CCRPC website and encouraging them to send any comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.
c) On August 5, 2016 direct emails were also sent to the municipal Mayors/ Managers/ Administrators and/or Clerks of the abutting 12 communities outside of Chittenden County (South Hero, Georgia, Fairfax, Cambridge, Stowe, Waterbury, Duxbury, Fayston, Lincoln, Starksboro, Monkton and Ferrisburgh) that abut the County, notifying them of the opportunity to review the 18 local AHMPs posted on the CCRPC website and encouraging them to send any comments directly to Dan Albrecht, CCRPC Senior Planner by August 19, 2016.

No comments were received on the draft Town of Colchester AHMP prior to the August 19th deadline. Additionally, no inquiries were received concerning this AHMP after August 19th through December 31, 2016 while the Plan was posted on the CCRPC website.

1.7.3 Submission of drafts to VDEMHS and FEMA for Review and adoption process

On June 20, 2016 the first draft of this local Town of Colchester AHMP was sent to the Vermont Department of Emergency Management and Homeland Security (VDEMHS) for review. Comment and required revisions were received from VDEMHS on August 8, 2016. CCRPC staff, working in concert with municipal staff, then made revisions to the Plan to address the required revisions and formal submissions to VDEMHS and FEMA then progressed as follows:

The revised final draft annex was submitted to VDEMHS and FEMA for formal review and approval pending municipal adoption on March 17, 2017. On April 17, 2017 FEMA Region One issued a notice that the Town of Colchester AHMP was approved pending adoption by the relevant municipal governing body. On April 26, 2017 CCRPC staff provided the final versions of the Multi-Jurisdictional Plan and this Municipal Annex to the Town manager for distribution to the Town of Colchester Selectboard members. CCRPC also provided draft language for a resolution of adoption to be discussed at a regularly scheduled and properly warned Town of Colchester Selectboard meeting on May 9, 2017

The revised annex was adopted by the Selectboard on May 9, 2017 and a copy of the resolution sent to VDEMHS and FEMA Region One on May 12, 2017. On June 1, 2017 issued a letter that the Town of Colchester's Plan was formal approved

1.7.4. Monitoring, Evaluation and Updating of the Plan

Section 6 of the Multi-Jurisdictional AHMP document provides extensive details on the role each municipality and the Chittenden County RPC will play to be certain that progress on the implementation of this local AHMP is monitored and evaluated and that the AHMP is updated as

needed and no later than its anticipated expiration in early 2022. In short, the Town of Colchester will:

- in the fall of 2017 and each fall thereafter, the municipal departments as noted in Section 5.5 as the conclusion of this document shall respond to CCRPC's questionnaire seeking information on the status (progress, problems if any, etc.) of each identified mitigation strategy detailed in Section 5;
- in the fall of 2018 and the fall of 2018, provide information to aid CCRPC in its more comprehensive review of the Multi-Jurisdictional AHMP and this local AHMP which will address issues such as goals, risks, resources, implementation problems, and partners;
- provide at least one representative of the Town to participate as a member of the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan Update and Review Committee which, after the current Plan update process is completed, to resume meeting in 2018; and
- participate in the Plan update process (assumed to commence in 2020 and conclude by early 2022).

Finally, it should be reemphasized that the Town of Colchester may review and update their own programs, initiatives and projects more often by working directly with the State Hazard Mitigation Officer (SHMO) based on changing local needs and priorities. Formal changes to individual municipal annexes may be made at any time by each municipality's governing body in order to reflect changing conditions, priorities, and opportunities during the 5-year life cycle of their single jurisdiction plan.

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 in *Figure 4.1*.

2.1.1 Profiled Hazards

This Plan profiles six (6) Natural Hazards: Severe Winter Storm, Flooding, Fluvial Erosion, Severe Rainstorm, Extreme Temperatures and Wildfire. Prior to this discussion of Hazards and the subsequent analysis of Risk and Vulnerability, it will be first helpful to summarize the general state of knowledge regarding Location, Extent and Impact in the Town of Colchester:

Hazard (section of MJAHMP where discussed)	**Are Location data available?**	**Are Extent data available?**	**Are Impact data available?**
Severe Winter Storm (2.1.1.1)	No, occurs across the municipality and not mapped	No, only long-term data is at single point of National Weather Service station in South Burlington. Data may or not be applicable to the Town of Colchester.	Yes, if FEMA declares disaster. See 3.3 below.
Flooding (2.1.1.3)	Yes, 100 & 500 year flood areas delineated in the municipality. *See Figure 2.1*	*Yes but only at a few discrete locations with gauge data such as a USGS gauge on the Winooski River upstream of the Town and long-term data on Lake Champlain water levels maintained at Burlington. See Figure 2.2 below.	Yes, if FEMA declares disaster but co-mingled with fluvial erosion and severe rainstorm hazards events. See 3.3 below.
Fluvial Erosion (2.1.1.4)	Yes, fluvial erosion hazards areas (now termed river corridor protection areas) are mapped in the municipality. *See Figure 2.1.*	Though fluvial erosion is considered a significant hazard in the municipality, the number of feet-acres of soil lost in any one event has not been recorded nor is	Yes, if FEMA declares disaster but data co-mingled with flood and severe rainstorm events. See 3.3 below.

		there a record with such data.	
Severe Rainstorm (2.1.1.2)	No, occurs across the municipality and not mapped. Damage locations are mapped but damages can just as easily be a function of poorly designed road and/or driveway drainage as it is a function of heavy rain exceeding infrastructure capacity.	*Yes but only long-term data is at single point of National Weather Service station in South Burlington.	Yes, if FEMA declares disaster but data co-mingled with flood and fluvial erosion events. See 3.3 below.
Extreme Temperatures (2.1.1.5)	No, occurs across the municipality and not mapped.	*Yes but only at single point of National Weather Service station in South Burlington	†Data not systematically collected on impacts.
Wildfire (2.1.1.6)	No, can occur across the municipality and not mapped.	Some compiled data on a countywide basis as shown in the Multi-Jurisdictional Plan but no systematic data collected after 2010.	‡Data not systematically collected on impacts.

** It is useful to note that while this NWS data is reliable it represents one discrete location in a county that has an area of 620 square miles in area. Likewise, while there are likely other systematic point-specific records being collected by individuals, business or organizations these data do not appear to be easily accessible. Finally, even if such data were accessible, only if the data was collected by mutually compatible means would it be useful.*

†An intensive search of municipal public works records may reveal documentation of some prior repair or labor costs associated with frozen or burst sewer and/or water pipes caused by Extreme Cold. However, such analysis would show where past events happened not the location of inadequately buried pipes which might be vulnerable to future events.

‡ An intensive search of fire department records may reveal documentation of locations and acres burned caused by Wildfire. However, such analysis would show where past events happened but would not show the location of areas susceptible to future events (warnings by the US Forest Service and local fire departments are not location-specific) nor the location of individuals who are likely to unwisely burn trash or leaves or fail to extinguish a campfire during dry conditions.

This Plan profiles several Technological Hazards. Prior to this discussion of Hazards and the subsequent analysis of Risk and Vulnerability, it will be first helpful to summarize the general state of knowledge regarding Location, Extent and Impact in the Town for these hazards

Hazard (section of MJAHMP where discussed)	**Are Location data available?**	**Are Extent data available?**	**Are Impact data available?**
Water Pollution (2.2.1)	Impaired streams that lack adequate biota are identified. The following streams are identified as "impaired" by the VT-DEC: Sunderland Brook Morehouse Brook The Town is subject to the requirements of a Municipal Separate Storm Sewer System (MS4) Permit as well as the Vermont Clean Water Act.	Phosphorus-loading for general locations is known but non-point sources are varied and dispersed. Road segments that could discharge runoff into local streams have been identified and will be formally inventoried in 2017 or 2018	Annual budgetary impacts to individual municipalities are significant but vary depending upon location.
Hazardous Materials Incident (2.2.2)	Storage locations are known. Incidents occurring during transportation could occur anywhere.	Rough estimates of spill amounts are recorded.	No formal data readily available on cleanup costs.
Power Loss (2.2.3)	Outage locations are not mapped.	During an actual outage some data is recorded on duration although typically this is stated as "x,000 customers within the power company's service area".	Outage data is broad and refers to total customers within a county.
Invasive Species (2.2.4)	Several species known to occur in Lake Champlain.	No formal damage has been documented to date	No formal damage has been documented to date

Multi-Structure Fire (2.2.5)	Could happen anywhere within the more developed portions of the municipality	Data not formally collated across agencies	Data not formally collated across agencies
Major Transportation Incident (2.2.6)	Depending upon type of incident, could happen anywhere	No formal database of damages.	Varies depending upon type of incident.
Water Supply Loss (2.2.7)	Water distribution systems are mapped. Specific locations of temporary service outages are not known to be mapped.	Data not formally collated across agencies	Data not formally collated across agencies
Sewer Service Loss (2.2.8)	Sewer lines are mapped. Specific locations of temporary service outages are not known to be mapped.	Data not formally collated across agencies	Data not formally collated across agencies
Natural Gas Service Loss (2.2.9)	General areas of services are known but specific locations of service outages are not recorded.	Information for this rare occurrence not publicly available.	No formal damage has been documented to date.
Telecommunications Failure (2.2.10)	Depending upon type of incident, could happen anywhere	Information for this rare occurrence not publicly available.	No formal damage has been documented to date
Other Fuel Service Loss (2.2.11)	Distribution points of fuels such as firewood, fuel oil and propane are individual addresses and not mapped nor publicly available.	No formal loss of service has been documented.	No formal damage has been documented to date

The following discussion of societal hazards is based upon qualitative information from discussions with Chittenden County law enforcement professionals as well as quantitative data from the State of Vermont.

Hazard (section of MJAHMP where discussed)	**Are Location data available?**	**Are Extent data available?**	**Are Impact data available?**
Crime (2.4.1.1)	Significant incidents could happen anywhere in the municipality.	Data collection is not standardized across municipalities.	Significant socio-economic impacts
Economic Recession (2.4.1.2)	Would occur across the community.	Historic data on unemployment levels & poverty rates	Longer lasting impacts hard to measure below county level
Terrorism (2.4.1.3)	The FBI does not share a list of potential targets.	Unknown but assumed to be significant if incident occurs	Unknown but assumed to be significant if incident occurs
Civil Disturbance (2.4.1.4)	County-wide. Significant incidents can happen anywhere. The likelihood of an event may not be geographically likely but rather related to the type of event (political event, sporting event, protest, etc.)	No formal damage has been documented to date	No formal damage has been documented to date
Epidemic (2.3.1.5)	Could happen anywhere	Data not formally collated across agencies	Other than 1917 Influenza epidemic no formal damage has been documented to date
Key Employer Loss (2.3.1.6)	Depending upon type of employer	No formal database of damages.	No formal database of key employer loss is maintained

2.1.2 Non-profiled hazards

Naturally-occurring Radiation As noted in the Multi-Jurisdictional Plan document, this hazard is not formally profiled or assessed for risk or vulnerability. However, Town officials feel it is appropriate to include this brief assessment. Due to the composition of the underlying bedrock, Colchester is one of two towns in Chittenden County that has an elevated natural radiation risk. Air and ground-based geological surveys of the town have found that some areas have elevated levels of radiation in the water supply due to anomalies in the bedrock. While public water supplies are regularly tested, private wells in rural areas are also affected by radiation. Most of the affected areas are rural locations in the eastern part of the town.

SECTION 3: RISK ASSESSMENT

3.1 Mapped Hazard Areas

3.1.1 Flood Hazard Areas

The *2007 Colchester Town Plan* describes flood hazard areas in the following manner:

> *Twelve percent of the land area in Colchester has been identified as wetlands or floodplains. The majority of the floodplain area in Colchester lies along Lake Champlain and the Winooski and Lamoille Rivers. The fertile floodplain of the Winooski River, often referred to as the Intervale, is involved in active agricultural production and contains a substantial portion of the Town's working lands. The 100 year flood elevation of Lake Champlain (Zone A), as determined by the Federal Flood Insurance Program is at 102 feet above sea level and is depicted on the FIRM maps. Minimum federal standards prohibit any construction within the designated "floodway" and require any development within the 100 year floodplain (Zone A) to be built on sufficient fill to avoid being subject to flood hazard. Development within the Flood Zone is now prohibited but significant development predated the regulations and there are more than 100 structures located in the flood hazard zone.*

A simple GIS intersection analysis reveals that portions of town roads are located within the 100-year floodplain, as are culverts, bridges, and utility poles. Unfortunately, this level of analysis does not take into account the fluvial geomorphology (volume, velocity, direction, etc.) nor, more importantly, 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.

Figure 2.1 shows the current extent of the FEMA-FIRM flood hazard area in Colchester, as well as structures, infrastructure, and critical facilities located in the flood hazard area. Flooding is discussed extensively in the multi-jurisdictional AHMP, but it is worth noting here that Colchester has a large number of commercial and residential structures in the 100-year floodplain, compared to other municipalities in the county. Many of these are located along the low-lying shoreline of Lake Champlain. The extensive development of the lakeshore makes Colchester more vulnerable than most other municipalities to lakeshore flooding. Two of the repetitive-loss properties in Chittenden County are located in Colchester.

Note that a good portion of this area consists of the shoreland of Lake Champlain. The Base Flood Elevation of Lake Champlain established by FEMA is 102.0 feet while flood stage established by the National Weather Service is 100 ft. These stages are defined as follows:

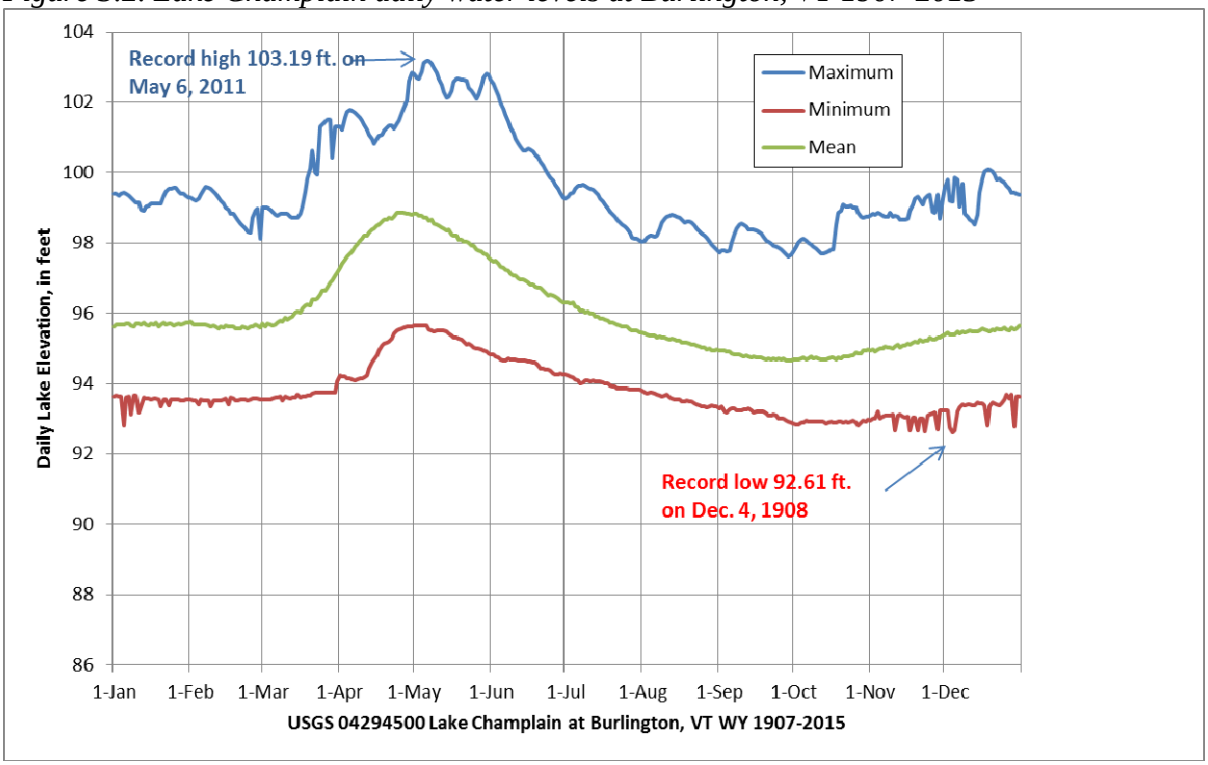
100 ft. Water begins to enter some lake front properties. Water also begins to threaten low lying roads, piers, and docks. Wave action can compound flooding on windward facing shorelines.

101. Flooding becomes serious, and wave erosion on windward shores becomes a problem. If lake ice is present, structural damage can occur.

102 ft. Severe flooding occurs, with widespread inundation of lake side properties, and closure of low lying roads.

The following graph shows the water levels measured along the Burlington waterfront over the last 100+ years.

Figure 3.2. Lake Champlain daily water levels at Burlington, VT 1907-2015



The winter of 2015-2016 experienced relatively little snowfall and the summer of 2016 (as of July 31, 2016) has been relatively dry in terms of rainfall. Water levels in Lake Champlain dropped quite low in the fall of 2016 almost matching the record low of 1908 with a peak trough of 93.26 ft. on both October 16th and October 17th before climbing back to 94 ft. on October 31st.

3.1.2 Fluvial Erosion Hazard and River Corridor Areas

During development and adoption of both the 2005 and 2011 Multi-Jurisdictional Plan and the municipal AHMPs, threats from stream erosion were identified as Fluvial Erosion Hazard (FEH) Areas through the analytical lens of Stream Geomorphic Assessment (SGA). The SGA approach is still used by the Vermont Agency of Natural Resources but the Vermont General Assembly adopted two related terms that are now used in managing fluvial erosion hazards. ANR now identifies and maps

- *River Corridor* which is the land area adjacent to a river that is required to accommodate the dimensions, slope, planform, and buffer of the naturally stable channel and that is necessary for the natural maintenance or natural restoration of a dynamic equilibrium condition, as that term is defined in 10 V.S.A. §1422, and for minimization of fluvial erosion hazards, as delineated by the Agency in accordance with the ANR Flood Hazard Area and River Corridor Protection Procedures.
- *River Corridor Protection Area* means the area within a delineated river corridor subject to fluvial erosion that may occur as a river establishes and maintains the dimensions, pattern, and profile associated with its dynamic equilibrium condition and that would represent a hazard to life, property, and infrastructure placed within the area. The river corridor protection area is the meander belt portion of the river corridor without an additional

allowance for a riparian buffer to serve the functions of bank stability and slowing flood water velocities in the near-bank region .

Some level of geomorphic assessment has been completed for most of the streams that run through Colchester. Fluvial Erosion Hazard areas have been identified for some of these waterways. Notably, sections along the banks of the Winooski River, Indian Brook, and Sunderland Brook have been identified as having high to extreme fluvial erosion hazard. *Figure 2.1* shows the progress of geomorphic assessments and identified Fluvial Erosion Hazard areas in Colchester.

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 two such properties located in the Town of Colchester. Both are residential properties.

One on Colchester Point Road which suffered a loss on April 26, 1996 and one on Horizon View which suffered a loss on September 9, 2011.

The status of the town participation's in the National Flood Insurance Program is as follows:

Initial Flood Hazard Boundary Map	Initial Flood Insurance Rate Map	Current effective Map Date	Date of joining Regular NFIP	Date of most recent Community Assistance Visit
08/23/74	03/01/82	07/18/11	03/01/82	05/21/15

Of particular interest is the fact that the Town of Colchester is the first municipality in Chittenden County to obtain a Community Rating System from FEMA. Colchester was designated a level 8 community effective May 1, 2016 resulting in a 10% premium discount on flood insurance.

The Town Zoning Administrator with assistance from the Planner and the Town's Development Review Board (DRB) monitor compliance with the National Flood Insurance Program. The DRB reviews and adjudicates applications for development within the floodplain including any proposed new construction in the SFHA which is highly regulated. The Town also works with DEC to respond to any local requests for Floodplain identification including questions about mapping.

3.2 Other Information

3.2.1 1998 Ice Storm Damage (DR-1201)

Many areas of the town suffered damage. The hills surrounding Mallets Bay were particularly hard hit.

3.2.2 Severe Rainstorms

In prior versions of this Annex and the County Plan, damage to roads, culverts and bridges from thunderstorm events was discussed as either the result of flooding or fluvial erosion. It was assumed that overflowing nearby streams, rivers or lakes were the cause of the damage. Analysis has shown that this damage is caused by intense, localized thunderstorms which cause excessive and rapid water flows on and over paved and gravel roads, roadside ditches, driveway culverts, stormwater systems, etc. In many cases, damaged infrastructure is located nowhere near a formally mapped Floodplain or Fluvial Erosion Hazard Area or River Corridor. This was the case in more recent FEMA-declared disasters in the summer of 2013 and 2015. Because of this new information, CCRPC has decided to add "Severe Rainstorm" to the 2016 Update to the County Plan and its annexed local AHMPs. While past damage locations can sometimes be mapped (depending upon the degree and accuracy of data collection efforts) this may or may not provide any degree of predictability of the potential locations for future events.

The Town has a significant number of gravel roads which are especially vulnerable to damage during intense rainstorms.

High Winds and Lightning: Ridgeline and hilltop homes as well as homes located in the midst of mature forests are the most vulnerable to damage from falling trees and tree limbs. According to the National Climatic Data Center, lightning has struck and damaged structures in Colchester several times since 1995, although local officials indicate that many more lightning incidents have occurred in that timeframe. Additionally, various high wind events have been specifically identified as affecting Colchester by the National Climatic Data Center since 1993, though, as with lightning, local officials indicate that there are numerous unrecorded high wind incidents.

3.2.3 High Crash Locations

The following High Crash Locations have been identified by the Vermont Agency of Transportation in the Town of Colchester.

Table 3-1 Town of Colchester high crash road sections, 2010-2014

ROUTE	SYSTEM	MILEAGE	AVERAGE COST / ACCIDENT
CHURCH RD., COLCHESTER, PORTER POINT RD., COLCHESTER	Urban Collector (u)	0.000 - 0.040	$15,900
US-2, I-89	Minor Arterial (u)	1.830 - 2.030	$49,692
US-2, I-89	Principal Arterial (u)	2.040 - 2.150	$35,706
US-7, I-89	Principal Arterial (u)	0.170 - 0.230	$20,814
US-7, VT. 127 TH, COLCHESTER, SEVERANCE ROAD, COLCHESTER	Principal Arterial (u)/Minor Arterial (u)	1.940 - 2.040	$32,190
US-7, VT-2A	Principal Arterial (u)/Minor Arterial (u)	3.580 - 3.650	$23,819
VT. 127 TH, COLCHESTER, E. LAKESHORE DR., COLCHESTER	Minor Arterial (u)/Urban Collector (u)	3.170 - 3.250	$17,650
VT. 127 TH, COLCHESTER, PORTER POINT RD., COLCHESTER	Minor Arterial (u)/Urban Collector (u)	0.860 - 0.940	$26,056
VT. 127 TH, COLCHESTER, W. LAKESHORE DR., COLCHESTER	Minor Arterial (u)	2.170 - 2.230	$52,691
VT-2A, EAST ROAD, COLCHESTER, MILL POND ROAD, COLCHESTER	Minor Arterial (u)/Urban Collector (u)	1.430 - 1.510	$27,048

Source: Vermont Agency of Transportation

3.2.4 Road Infrastructure Failure

There are twenty long bridges in Colchester inventoried by the Vermont Agency of Transportation. None one of these bridges in the Town are rated Scour Critical with regards to fluvial undermining of the bridge structure. Some of the most vulnerable infrastructure are road culverts. For a listing of culverts identified as "geomorphically-incompatible" either due to inadequate size or improper alignment, see Section 4.2.2.

3.2.5 Hazardous Substances

Hazardous material release is discussed as a possible hazard in the Multi-Jurisdictional All-Hazards Mitigation Plan. According to VDEMHS, as of May 2016 there are several reported hazardous material storage sites in Colchester. Sites that contain large amounts of fuel or store what VEM calls Extremely Hazardous Substances are more likely to cause significant problems

in a hazardous materials incident. (Note that sites that are listed twice in the table below contain both petroleum products and hazardous materials.)

Table 3-2 Town of Colchester, Hazardous Materials and Petroleum Products storage and/or use locations

Vermont Department of Public Safety	394 Hegeman Ave
Vermont Department of Public Safety	394 Hegeman Ave
Bayside Triple M Deli	88 Heineberg Dr Colchester, Vt
Bourne's Energy (Colchester LP Plant-359 Jasper Mine Rd)	359 Jasper Mine Road
Bourne's Energy (Colchester LP Plant-359 Jasper Mine Rd)	359 Jasper Mine Road
BURLINGTON 1	1500 HEGEMAN AVENUE
Champlain Cable Corp	175 Hercules Drive
Chimney Corners Garage	400 US Route 7
Chimney Corners Garage	400 US Route 7
COCO-Lakeshore Maverick	816 West Lakeshore Drive
Colchester Breezy Acres Pump Station	3946 Route 7
Colchester Jiffy Mart	133 Blakely Road
Colchester Research Facility	208 S Park Drive
COLCHESTER SHELL	156 ROOSEVELT HIGHWAY
Colchester Sunderland Pump Station	Route 7
Colchester Wastewater Pump Station #2	164 Hercules Drive
Costco Wholesale (314)	218 LOWER MOUNTAIN VIEW
Costco Wholesale (314)	218 LOWER MOUNTAIN VIEW
Cumberland Farms #8028	146 College Parkway
Cumberland Farms #8028	146 College Parkway
Fab-Tech Inc.	480 Hercules Drive
Fairpoint EQUIP SLC (FPT- VT4747006)	PORTERS POINT RD RT 1 6
Fletcher Allen Health Care - Fanny Allen Hospital (FAH Campus)	109 College Parkway
Fletcher Allen Health Care - Fanny Allen Hospital (FAH Campus)	109 College Parkway

Fletcher Allen Health Care - Fanny Allen Hospital (FAH Campus)	109 College Parkway
Fort Ethan Allen Garage	189 Troy Avenue
Fort Ethan Allen Garage	189 Troy Avenue
GMP Colchester Service Center	163 Acorn Lane
GMP Colchester Service Center	163 Acorn Lane
GMP Gorge Plant #16	154 Gorge Road
GMP Gorge Plant #16	154 Gorge Road
GMP Iroquois substation #81	193 Macrae Rd.
GMP Malletts Bay Substation #34	420 Bay Road
Hayward Tyler Inc.	480 Roosevelt Highway
Hayward Tyler Inc.	480 Roosevelt Highway
Hazelett Strip-Casting Corporation	135 West Lakeshore Drive
Hazelett Strip-Casting Corporation	135 West Lakeshore Drive
Hazelett Strip-Casting Corporation (Brentwood)	63 Brentwood Dr
J&B LEASING, INC.	964 HERCULES DRIVE
J&B LEASING, INC.	964 HERCULES DRIVE
Maplefields @ Chimney Corners	651 Roosevelt Hwy
Maplefields @ Colchester	414 Roosevelt Hwy Suite 100
NEW PENN (26)	123 Orion Drive
NEW PENN (26)	123 Orion Drive
Pyrofax Energy (Colchester)	70 Lee Court
Pyrofax Energy (Colchester)	70 Lee Court
RCC - COLCHESTER	302 Mountain View Drive
RCC - MALLETS BAY - USID102923	PRIM ROAD
RCC - ST MICHAELS	265 HEGEMAN
Reinhart FoodService, LLC	784 Hercules Dr.
Ryder Transportation Services #1256 c/o Coca-Cola	46 Hercules
S. B. Collins, Inc. - (Finelli's) -Colchester	3436 Roosevelt Hwy
Schwan's Home Service, Inc. - 111070	30 Jimmo Drive

Shaw's #7515	66 Mountain View
Shelburne Limestone Corp - Colchester	1949 Main St.
Simon's Chimney Corners Store & Deli	6387 Roosevelt Highway
Simon's College Parkway	883 College Parkway
Simons Four Corners	89 Heinesberg Drive
SMC - Alliot Hall -South Campus	154 Place St. Michael's
SMC - Canterbury Hall - South Campus	134 Cashman Road
SMC - Cashman Hall - South Campus	24 Cashman Road
SMC - Cheray Science Hall - South Campus	426 College Parkway
SMC - DuPont Hall - North Campus	123 Ethan Allen Ave.
SMC - Founders Hall - South Campus	424 College Parkway
SMC - Hamel Hall - North Campus	33 Ethan Allen Ave.
SMC - International Commons - South Campus	107 Cashman Road
SMC - Joyce Hall - South Campus	102 Place St. Michael's
SMC - Linnehan Hall - North Campus	169 Ethan Allen Ave.
SMC - Lyons Hall - South Campus	460 Campus Road
SMC - Pontigny Hall - South Campus	62 Cashman Road
SMC - Receiving - North Campus	513 Hegeman Ave.
SMC – Residence Hall IV – South Campus	170 Cashman Road
SMC - Ross Gymnasium - South Campus	132 Campus Road
SMC - Ryan Hall - South Campus	86 Place St. Michael's
SMC - Salt Shed	Campus Road Extension (River Side of Rte. 15, past cemetery)
SMC - St Edmund's Hall - South Campus	22 Campus Road
SMC - Townhouses 313 thru 318 - South Campus	382 Sulllivan Lane
SMC - Trades Building (Carpenters, Painters, Electricians) - North Campus	427 Hegeman Ave.
SMC - Vehicles/Grounds Shop - North Campus	377 Hegeman Ave.
Suburban Propane, LP	70 Lee Court

Town of Colchester Highway Garage	711 Blakely Road
U.S. Postal Service Colchester MPO	218 Mallets Bay Avenue
Verizon Wireless Colchester 3 (VT2662576)	4151 Roosevelt Highway
Verizon Wireless Colchester Switch (RCC) (ID:4789023)	302 Mountain View Dr
Verizon Wireless COLCHESTER_2_VT - New Build (VT17093393)	off Prim Road
Verizon Wireless Malletts Bay (ID:59788)	Prim Road Broadacres Rd
Verizon Wireless MILTON 2 VT - New Build (ID:19079706)	Clay Point Road
Verizon Wireless ST MICHAELS (ID:5360609)	365 Troy Ave
Verizon Wireless Winooski VT (VT3341923)	354 Mountain View Drive
Vermont Army National Guard - Camp Johnson	789 National Guard Road
Vermont Blacktop Corporation	84 Whitcomb Street
Vermont Gas Systems - Peak Shaving Facility	27 Champlain Drive
VT Department of BGS	424 Hegeman Ave.
VT Department of BGS	26 Woodside Lane
Weather Surveillance Radar - (WSR-88D) Site - Department of Commerce/National Oceanic and Atmospheric Administration/National Weather Service	National Guard Road, Gate 9 Compound - Camp Johnson National Guard Post
S. Mazza Farmstand, Bakery & Greenhouse Inc.	277 Lavigne Road

Town officials have identified additional hazardous material storage sites of concern, such as the University of Vermont labs, the Albany College of Pharmacy, and Burlington Foods.

3.2.6 Air Transportation Incident

Burlington International Airport and the Vermont Air National Guard Base use the air space over Colchester for incoming and departing flights. Municipal officials express concerns that a problem during takeoff or landing might result in a crash in Colchester, or that the Lime Kiln Bridge connecting Colchester and South Burlington might be closed in the event of a major incident at the airport or Air National Guard Base.

3.2.7 Non-Profiled Hazard: Preliminary Data on Landslides

Two of the study sites in the Vermont Geological Survey's 2012 report *"Protocol for Identification of Areas Sensitive to Landslide Hazards in Vermont*" (discussed in Section 2.1.17 of the Multi-Jurisdictional AHMP) are Clay Point and Indian Brook. The report first notes:

> *The Clay Point site area lies along the shoreline of Lake Champlain in northern Colchester just south of the mouth of the Lamoille River. This site area was included because it is located along a stretch of relatively natural shoreline that has not been heavily developed. Figure 4 shows a map of the Clay Point site area. The site area is relatively flat with steep bluffs down to the lake. The bluffs are approximately 20 meters high at a 35 to 40 (degree) angle. Lake terraces, about 10 meters above lake level, are also present along the shore and through the site area. The terrace slopes are 6 to 10 meters high at a 20 to 25 (degree) angle.*
>
> *[*One report]….. *maps the surficial geology at the site area as pebbly medium coarse to medium fine sand. Stratigraphy of the bluffs showed a layer of sand, about 15 meters thick, overlying a 5m thick clay layer. Sporadic outcrops of till occur at the base of the bluffs. Because of its location along the shore, the Rivers Management Program has not identified any mass failures within the site area. One slide in the site area was identified by a colleague who lives in that area and knew of the project. Three other slides were identified by employees at Camp Kiniya. All landslides occurred in the bluffs along the shoreline. The shoreline in this area is subject to wind and wave erosion from the lake to the west and erosion and sedimentation from currents exiting the mouth of the Lamoille River. It should also be noted that in the spring of 2011 when the field work at Clay Point was conducted, rainfall was higher than normal and lake levels were approximately 6 feet above normal, so the toes of the bluffs were experiencing more erosion than normal. This undoubtedly caused the initiation of most of the slides. When the lake level is normal, a sloping sandy beach separates the bluffs from the water. The beach provides some measure of protection from erosion, however, some land owners have installed rock walls to further protect the bluffs. The three larger slides in the area exhibit primarily translational movement, and affect the entire bluff. One smaller slide at Camp Kiniya seems to be rotational, affecting only the lower part of the slope.*

After applying the protocol at this Clay Point site, the report concluded:

> *that the best map to show landslide susceptibility at this site area is the slope-distance to stream/lake map. This map is shown in Figure 11.*

The study also used Indian Brook as a study site noting:

> *Indian Brook is in central Colchester and drains into Malletts Bay. Route 127 crosses the middle of the site area and Interstate 89 is just to the west of the site area. Figure 5 shows a map of the Indian Brook site area. Indian Brook is a meandering stream in the site area with a flood plain about 75 m wide. Sediments in the valley are mapped as alluvium ….…with medium to fine sand and clay mapped in the slopes bordering the flood plain and the flatter areas above the slopes. Till and silt-clay deposits are mapped in the upland regions of the site area. The site area is within the boundary of the marine deposits of the Champlain Sea. However, the large, low-angle rotational slides that were identified in the La Platte River site area were not identified during earlier surficial geologic mapping of the Indian Brook area….. or in this study.*

[It was pointed out during the completion of this report]…..

> *that the sandy deposits exposed in the Indian Brook valley are deltaic deposits formed by the Lamoille River as it emptied into the Champlain Sea. The deposits at the La Platte River site area, although of a similar age, have considerable fine-grained silt and clay in the deeper parts. The sandy deposits at Indian Brook are thus unlikely to be subject to low-angle landsliding.*
>
> *Six mass failures were identified in the site area by the Rivers Management Program. Five landslides were visited as part of the initial assessment of the site area. The slides were translational slides with one rotational slump seen at the northwestern part of the site area.*

After applying the protocol at this Indian Brook site, the report concluded:

> *the most influential parameters were slope and roughness. A map combining these was made and is shown in Figure 12.*

Excerpted below are the maps referenced in the report.

Figure 3.3 Preliminary landslide analysis, Clay Point

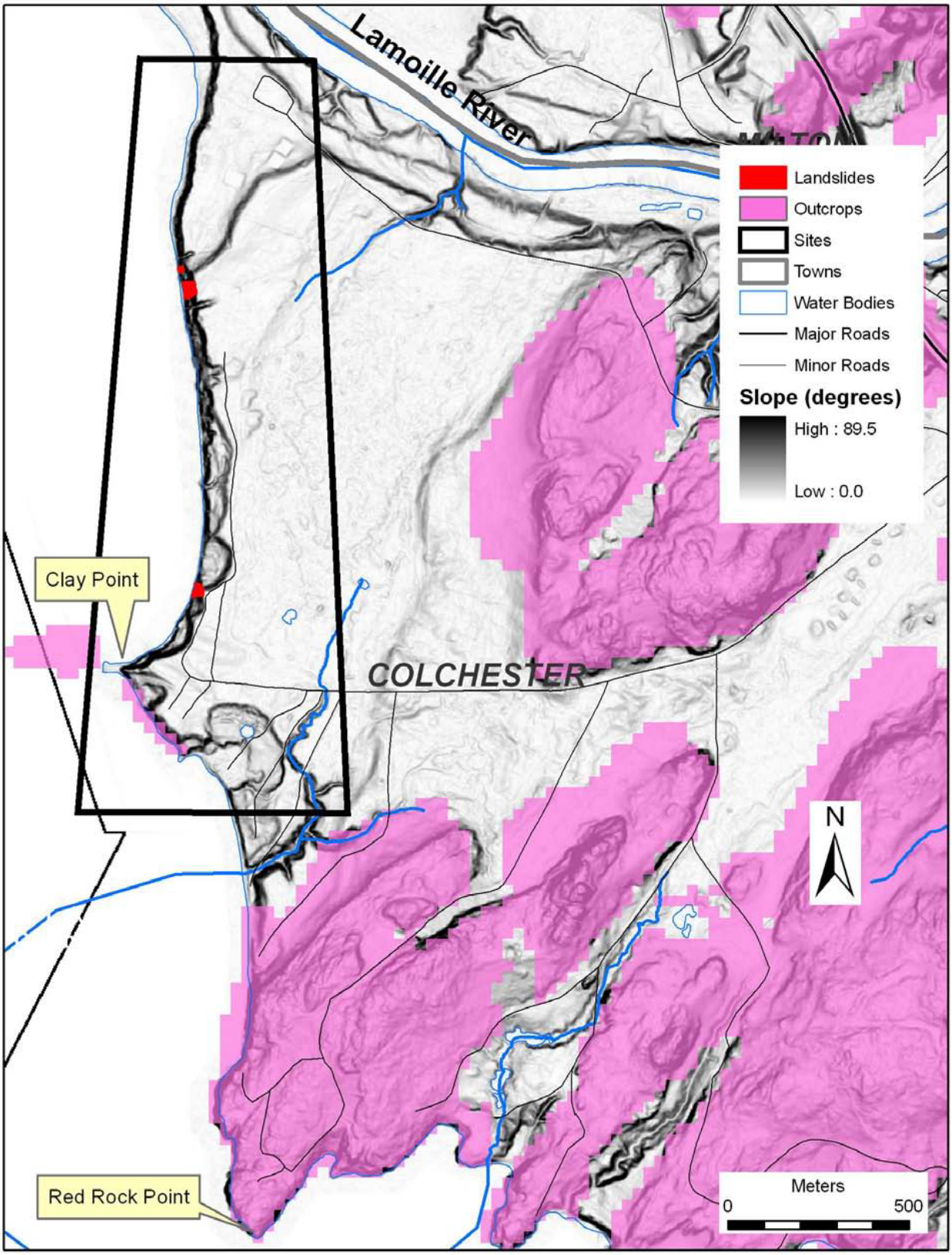
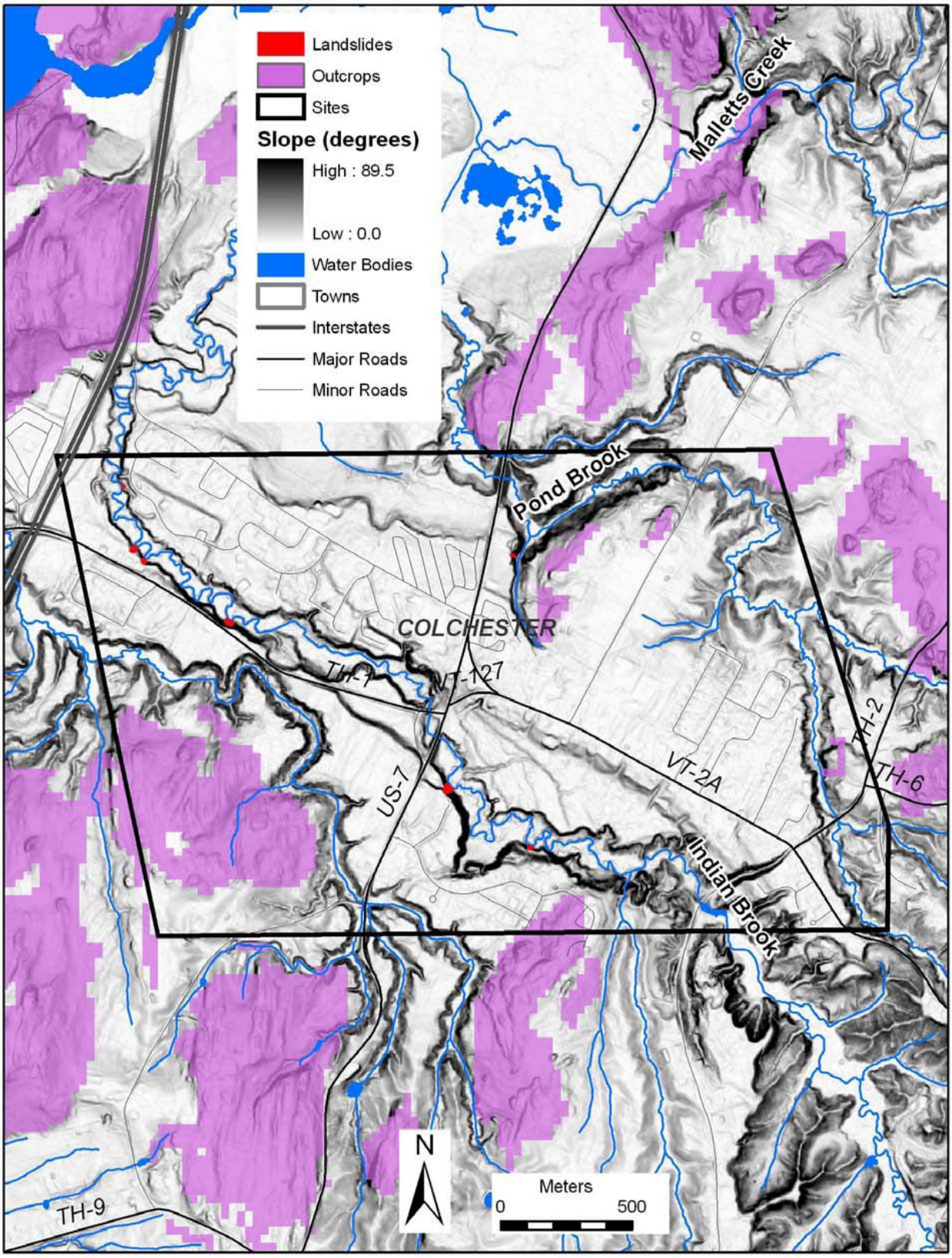


Figure 3.4 Preliminary landslide analysis, Indian Brook



3.3 Previous FEMA-Declared Natural Disasters and Snow Emergencies

3.3.1 Public Assistance

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

Table 3-3 Town of Colchester, FEMA-declared disasters and snow emergencies, 1990-2015.

Date (FEMA ID#)	Type of Event	Total Repair Estimates
April 1993 (DR 990)	lakeshore flooding	$336,961
January 1996 (DR 1101)	winter thaw flooding	$32,184
January 1998 (DR 1201)	ice storm	$226,747
July 1998 (DR 1228)	flooding	$124,477
April 2001 (EM 3167)	snow emergency	$27,049
August 2004 (DR 1559)	flooding	$58,364 at 5 sites in FEMA declaration; ca. $350,000 total cost for East Lakeshore Drive, 80% reimbursement from Federal Aid system funds from FHWA
June 2011 (DR 1995)	flooding	$862,089 (primarily lakeshore flooding)
June 2013 (DR 4120)	flooding	$4,817

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 Colchester 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:

- April 1993: Road repairs, culvert replacements, bridge repairs at following locations: Goodsell Point Road, East Lakeshore Drive, Buckingham Drive Storm Water Pump Station, Delta Park, Causeway Trail, and Bay Road.
  Sandbag operation-Townwide
  Debris Removal-Townwide
- January 1996 : Road repairs, culvert replacements, bridge repairs at following locations: West Lakeshore Drive, Pine Island Road, Middle Road, Brigham Hill Road, Curve Hill Road, Coon Hill Road,
  Miscellaneous Damage-Townwide
  Equipment Damage
- January 1998: Widespread debris removal from effects of ice storm.
  Public Property-Townwide
  Bayside Park, Brigham Hill Road, Coon Hill Road
- July 1998: Road repairs, culvert replacements, bridge repairs at following locations: Brigham Hill Road, Coon Hill Road, Galvin Hill, Middle Road
- April 2001: Increased contractual costs for snow removal

- August 2004: Road repairs, culvert replacements, bridge repairs at following locations: East Lakeshore Drive, Middle Road, Shetland Lane, Curve Hill Road, Poor Farm Road, Brigham Hill Road, Sand Road
- June 2011:

G - Recreational or Other	Causeway Park, Colchester, Vermont, A recreational walking and Bike Path. - End Damage "The Cut"
C - Roads & Bridges	Closed Drainage System Outfall Pipe Damage, Corner of Landing Ave, & Buckingham Drive, Colchester VT - Project Location
G - Recreational or Other	Causeway Park, Colchester, Vermont, A recreational walking and Bike Path. - Colchester-South Hero Town Line
C - Roads & Bridges	Williams Road, Paved Class III Town Roadway # 22. - Williams Road Damage Area
A - Debris Removal	Town of Colchester, Category A Debris Removal. Town Wide. - Town Office
B - Protective Measures	Town of Colchester, Category B Protective Measures. Town Wide. - Colchester Town Office Location
C - Roads & Bridges	MacCrae Road, 22¿ Gravel Road Area of Roadway Class III Town Road # 35. - MacCrae Road Damage Site
G - Recreational or Other	Bilado Park, Walking Trail - Bilado Park Damage Area
G - Recreational or Other	Town Of Colchester Drainage Ditch and Closed System Cleaning and Repairs. - Catch Basin In Closed Darinage System
G - Recreational or Other	Bay Side Park & Beach Gabions, Fill, and Slope Damage. - Bay Side Park Location
G - Recreational or Other	Town Of Colchester Drainage Ditch and Closed System Cleaning and Repairs. - 18" CMPInlet MacRae Road
G - Recreational or Other	Causeway Park, Colchester, Vermont, A recreational walking and Bike Path. - Start Damage
G - Recreational or Other	Town Of Colchester Drainage Ditch and Closed System Cleaning and Repairs. - Way Point In Ditch
G - Recreational or Other	Town Of Colchester Drainage Ditch and Closed System Cleaning and Repairs. - Start Ditch Damage
G - Recreational or Other	Causeway Park, Colchester, Vermont, A recreational walking and Bike Path. - Causeway Bridge

- June 2013:

C - Roads & Bridges	Ethan Allen Detention Basin - Ethan Allen Detention Basin

See *Figure* 3.1. to see locations where repairs funded in part with FEMA Public Assistance took place for disasters between 2001 and 2015.

3.3.2. Individual Assistance funds

As noted in Section 3.3 of the County Plan, due to privacy concerns, the individual homes or businesses which received Individual Assistance funds in connection with the two Federal disasters in 2011 (Spring flooding and Tropical Storm Irene in September) are not public information. However, the names of the streets of such homes or businesses from which claims are filed is available as are the funds provided. With regards to the Town, individual claims were filed at residences or business located on the following streets. As the data shows, in some cases, on some streets, several properties were damaged in connection with the Spring 2011 flooding. These streets are shown in *Figure 3.1.1.*

BARTLETTS WAY	1	$1,908.00
BEAN RD	1	$30,187.93
BELAIR DR	2	$15,519.50
BLAKELY RD	1	$328.73
BRAELOCH RD	1	$3,250.41
BROADLAKE RD	6	$35,721.90
BUCKINGHAM DR	3	$19,865.82
BURNHAM LN	1	$677.30
CAMP KINIYA RD	1	$5,705.16
CHURCH RD	2	$30,374.07
CLAY POINT RD	2	$17,480.97
COLCHESTER POINT RD	2	$51,532.70
DUNLOP WAY	2	$25,552.87
E LAKESHORE DR	1	$16,385.90
EAGLE PARK DR	1	$2,940.16
FORMAN DR	1	$584.60
HIDDEN OAKS DR	1	$620.03
HORIZON VIEW DR	1	$7,741.05
JOEY DR	1	$2,317.51
LANDING AVE	1	$28,619.08
LIBERTY LN	1	$2,293.87
LOGAN DR	1	$2,633.86
MAIN ST	1	$768.22
MALLETTS BAY CAMPGROUND	1	$3,436.00
MARBLE ISLAND RD	1	$1,361.72
NIQUETTE BAY RD	1	$4,197.64
NOTTINGHAM CT	2	$2,724.83
PORTERS POINT RD	1	$788.29
PRIM RD	1	$2,394.00
RED ROCK RD	1	$12,593.18
SEVERANCE RD	1	$4,227.19
SPAULDING EAST SHORE	1	$188.95
SUNDERLAND WOODS RD	1	$678.91
THAYER BAY RD	2	$15,464.37

TIMBERLAKE DR	1	$3,504.72
WHISPERING PINES	3	$1,165.95
WILLIAMS RD	4	$2,842.11
WOODBINE DR	3	$1,538.14

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 at various meetings in 2016. 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.

As explained in detail in Section 3.4 of the Multi-Jurisdictional Plan, for the 2011 Plan, the following Hazards were considered to occur or have the potential to occur with sufficient frequency and/or severity to be profiled for Risk Estimation in that Plan:

Natural Hazards:

- Drought
- Flooding
- Fluvial erosion
- High winds
- Landslide
- Lightning
- Multi-structure urban fire
- Radiological (natural)
- Wildfire
- Winter storm

Technological Hazards:

- Gas service loss
- Hazardous materials incident
- Major transportation incident
- Military ordnance incident
- Power loss
- Radiological incident
- Sewer service loss
- Telecommunications failure
- Water service loss

Societal Hazards:

- Crime
- Civil disturbance
- Economic recession
- Epidemic
- Key employer loss
- Terrorism

For the 2017 update, the CCRPC and its All-Hazards Mitigation Plan Update Committee made slight changes to this list by consolidating some hazards or delineating hazards with more specificity as follows:

Natural Hazards:
- Flooding
- Fluvial erosion
- Severe rainstorm
- Wildfire
- Severe winter storm
- Extreme Temperatures

Technological Hazards:
- Hazardous materials incident
- Major transportation incident
- Multi-structure fire
- Natural gas service loss
- Pollution
- Power loss
- Sewer service loss
- Telecommunications failure
- Water service loss
- Invasive Species

Societal Hazards:
- Crime
- Civil disturbance
- Economic recession
- Epidemic
- Key employer loss
- Terrorism

3.4.1 Natural Hazards

For the 2011 Hazard and Risk Estimation analysis for Colchester, the following natural hazards received the highest risk ratings out of a possible high score of 80:
- Severe Winter Storm (60)
- Flooding (28)
- Fluvial Erosion (20)

For this 2017 update, the following natural hazards received the highest risk ratings out of a possible high score of 80: see the table below:
- Severe Winter Storm (60)
- Flooding (28)
- Fluvial Erosion (20)
- Severe Rainstorm (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. Colchester has areas with a high fluvial erosion hazard rating. Severe rainstorms also bring high winds that often have trees along roads, and town officials have expressed concern over the effect of high winds on improperly moored boats on Mallets Bay.

Table 3-4 Natural hazards risk estimation matrix, Colchester

		Severe Winter Storm	Flooding	Fluvial Erosion	Severe Rainstorm	Extreme Temperatures	Wildfire
Area Impacted							
Key:	0 = No developed area impacted						
	1 = Less than 25% of developed area impacted		1	1	1		1
	2 = Less than 50% of developed area impacted						
	3 = Less than 75% of developed area impacted						
	4 = Over 75% of developed area impacted	4				4	
Consequences							
Health & Safety Consequences							
Key:	0 = No health and safety impact						
	1 = Few injuries or illnesses		1	1	1	1	1
	2 = Few fatalities or illnesses	2					
	3 = Numerous Fatalities						
Property Damage							
Key:	0 = No property damage					0	
	1 = Few properties destroyed or damaged			1	1		1
	2 = Few destroyed but many damaged	2	2				
	2 = Few damaged and many destroyed						
	3 = Many properties destroyed and damaged						
Environmental Damage							
Key:	0 = Little or no environmental damage				0	0	
	1 = Resources damaged with short-term recovery		1	1			1
	2 = Resources damaged with long-term recovery	2					
	3 = Resources destroyed beyond recovery						
Economic Disruption							
Key:	0 = No economic impact					0	
	1 = Low direct and/or indirect costs			1	1		1
	2 = High direct and low indirect costs	2	2				
	2 = Low direct and high indirect costs						
	3 = High direct and high indirect costs						
Sum of Area & Consequences Scores		***12***	***7***	***5***	***4***	***5***	***5***
Probability of Occurrence							
Key:	1 = Unknown but rare occurrence						
	2 = Unknown but anticipate an occurrence						
	3 = 100 years or less occurrence						3
	4 = 25 years or less occurrence		4	4		4	
	5 = Once a year or more occurrence	5			5		
TOTAL RISK RATING							
	Total Risk Rating =	**60**	**28**	**20**	**20**	**20**	**15**
	Sum of Area & Consequences Scores						
	x Probability of Occurrence						

3.4.2 Technological Hazards

For the 2011 Hazard and Risk Estimation analysis for Colchester, the following technological hazards received the highest risk ratings out of a possible high score of 80:

- Power Loss (50)
- Water Service Loss (32)
- Telecommunications Failure (28)
- Major Transportation Incident (28)

For this 2017 update, the following hazards received the highest risk ratings out of a possible high score of 80: see the table below:

- Power Loss (30)
- Major Transportation Incident (28)
- Sewer Service Loss (20)
- Invasive Species (20)

Power service outages, although relatively short-lived, occur on an annual basis and can cause significant disruption as can a significant transportation incident such as on Interstate 89 which bisects the town. With regard to sewer service failure, the majority of Colchester does not have sewer service, so a failure would not affect much of the town. However, officials are concerned about the vulnerability of large numbers of on-site wastewater systems to high groundwater, especially in areas near Lake Champlain. Invasive species, especially waterborne ones, have the potential to cause significant damage to the tourism industry in Colchester.

Table 3-5 Technological hazards risk estimation matrix, Colchester

		Power Loss	Major Transportation Incident	Sewer Service Loss	Invasive Species	Water Service Loss	Telecommunications Failure	Multi-Structure Fire	Pollution (algal bloom, etc.)	Gas Service Loss	Other Fuel Service Loss	Hazardous Materials Incident
Area Impacted												
Key:	0 = No developed area impacted											
	1 = Less than 25% of developed area impacted	1	1	1	1	1	1	1	1			1
	2 = Less than 50% of developed area impacted									2	2	
	3 = Less than 75% of developed area impacted											
	4 = Over 75% of developed area impacted											
Consequences												
Health & Safety Consequences												
Key:	0 = No health and safety impact				0				0			
	1 = Few injuries or illnesses	1		1		1	1	1		1	1	1
	2 = Few fatalities or illnesses		2									
	3 = Numerous Fatalities											
Property Damage												
Key:	0 = No property damage				0	0	0		0			
	1 = Few properties destroyed or damaged		1	1				1		1	1	1
	2 = Few destroyed but many damaged	2										
	3 = Few damaged and many destroyed											
	4 = Many properties destroyed and damaged											
Environmental Damage												
Key:	0 = Little or no environmental damage	0				0	0	0		0	0	
	1 = Resources damaged with short-term recovery		1	1					1			
	2 = Resources damaged with long-term recovery				2							2
	3 = Resources destroyed beyond recovery											
Economic Disruption												
Key:	0 = No economic impact											
	1 = Low direct and/or indirect costs			1	1			1	1			1
	2 = High direct and low indirect costs		2			2	2			2	2	
	2 = Low direct and high indirect costs	2										
	3= High direct and high indirect costs											
Sum of Area & Consequences Scores		***6***	***7***	***5***	***4***	***4***	***4***	***4***	***3***	***6***	***6***	***6***
Probability of Occurrence												
Key:	1 = Unknown but rare occurrence										1	1
	2 = Unknown but anticipate an occurrence									2		
	3 = 100 years or less occurrence											
	4 = 25 years or less occurrence		4	4		4	4	4				
	5 = Once a year or more occurrence	5			5				5			
TOTAL RISK RATING												
	Total Risk Rating =	**30**	**28**	**20**	**20**	**16**	**16**	**16**	**15**	**12**	**6**	**6**
	Sum of Area & Consequences Scores											
	x Probability of Occurrence											

3.4.3 Societal Hazards

For the 2011 Hazard and Risk Estimation analysis for Colchester, the following societal hazards received the highest risk ratings out of a possible high score of 80:

- Economic Recession (24)
- Epidemic (21)
- Key Employer Loss (16)
- Crime (16)

For this 2017 update, the following hazards received the highest risk ratings out of a possible high score of 80: see the table below:

- Crime (25)
- Economic Recession (24)

- Epidemic (21)

Although crime did not have a high score on the risk estimation matrix, Colchester has some vulnerability to property crime due to the variety of businesses located in its area. Drug crime is also of concern to local officials. Economic recession is highly ranked for both its direct impacts and its secondary effects on health, safety, and the environment as demonstrated in the recession of 2008-2009. Crime also tends to increase in recessions. The likelihood of an epidemic is difficult to gauge, but its consequences could be severe. Colchester's police department has a continuity of operations plan to put into effect in the case of an epidemic, but other town services do not.

Table 3-6 Societal hazards risk estimation matrix, Colchester

		Crime	Economic Recession	Epidemic	Key Employer Loss	Civil Disturbance	Terrorism
Area Impacted							
Key:	0 = No developed area impacted						
	1 = Less than 25% of developed area impacted	1				1	1
	2 = Less than 50% of developed area impacted		2	2	2		
	3 = Less than 75% of developed area impacted						
	4 = Over 75% of developed area impacted						
Consequences							
Health & Safety Consequences							
Key:	0 = No health and safety impact				0		
	1 = Few injuries or illnesses		1			1	1
	2 = Few fatalities or illnesses	2		2			
	3 = Numerous Fatalities						
Property Damage							
Key:	0 = No property damage		0	0	0		
	1 = Few properties destroyed or damaged	1				1	1
	2 = Few destroyed but many damaged						
	3 = Few damaged and many destroyed						
	4 = Many properties destroyed and damaged						
Environmental Damage							
Key:	0 = Little or no environmental damage	0		0	0	0	0
	1 = Resources damaged with short-term recovery		1				
	2 = Resources damaged with long-term recovery						
	3 = Resources destroyed beyond recovery						
Economic Disruption							
Key:	0 = No economic impact						
	1 = Low direct and/or indirect costs	1				1	
	2 = High direct and low indirect costs				2		2
	2 = Low direct and high indirect costs		2				
	3 = High direct and high indirect costs			3			
Sum of Area & Consequences Scores		***5***	***6***	***7***	***4***	***4***	***5***
Probability of Occurrence							
Key:	1 = Unknown but rare occurrence						
	2 = Unknown but anticipate an occurrence						2
	3 = 100 years or less occurrence			3		3	
	4 = 25 years or less occurrence		4		4		
	5 = Once a year or more occurrence	5					
TOTAL RISK RATING							
	Total Risk Rating =	**25**	**24**	**21**	**16**	**12**	**10**
	Sum of Area & Consequences Scores						
	x Probability of Occurrence						

3.4.4 Hazard Summary

According to the risk estimation analysis, the highest rated hazards by type for Colchester are:

Natural Hazards

- Severe Winter Storm (60)
- Flooding (28)
- Fluvial Erosion (20)
- Severe Rainstorm (20)

Technological Hazards

- Power Loss (30)
- Major Transportation Incident (28)
- Sewer Service Loss (20)
- Invasive Species (20)

Societal Hazards

- Crime (25)
- Economic Recession (24)
- Epidemic (21)

It should be noted that the two natural hazards on the list—flooding and severe winter storm—could also be the cause of the highest-rated technological hazards, power loss. Colchester's risk for societal hazards is less than for natural and technological hazards. Winter storms are the highest rated hazard for Colchester, due in large part to their widespread nature and frequent occurrence.

SECTION 4. VULNERABILITY ASSESSMENT

As discussed in Section 4 of the County Plan, typical vulnerabilities from the County's common hazards consist primarily of:

- damage to public infrastructure especially roads and culverts;
- temporary closures of roads and bridges including from debris;
- temporary loss of power and/or telecommunications, and
- temporary isolation of vulnerable individuals such as the elderly or those in poverty.

More specifically, these vulnerabilities typically occur in association with the Profiled Natural Hazards as follows:

Table 4-1 Town of Colchester: Natural Hazards and typical vulnerabilities

Hazard	Typical vulnerabilities	Occasional additional vulnerability
Severe Winter Storm	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals	-budget impacts from debris cleanup
Flooding	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals' properties and businesses
Fluvial Erosion	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals' properties and businesses
Severe Rainstorm	-temporary closures of roads and bridges including from debris; -temporary loss of power and/or telecommunications, and -temporary isolation of vulnerable individuals -damage to public infrastructure	-budget impacts from road/bridge closures and repairs to public infrastructure -damages to individuals' properties and businesses
Extreme Temperatures	-damage to public infrastructure	-budget impacts due to

	-loss of water service	needed repairs
Wildfire	-damage to private property	

Relative to the County as a whole the Town of Colchester has a higher vulnerability to:

- Fluvial Erosion due to high number of stream culverts
- Flooding due to the town's extensive shoreline along Lake Champlain and the transit of the Winooski and Lamoille Rivers that form the Town's northern and southern boundaries.

Vulnerabilities with regard to Technological Hazards are harder to project as these incidents occur with less frequency and less predictability.

Table 4-2 Town of Colchester: Technological Hazards and typical vulnerabilities

Hazard	**Typical vulnerabilities**	**Occasional additional vulnerability**
Major Transportation Incident	-temporary closures of transportation infrastructure -injuries, deaths	-if major event, potential long term closure of infrastructure.
Power Loss	-temporary loss of electrical service -temporary impacts to vulnerable individuals -damage to public infrastructure	-if extended event, damage to perishable goods or business income. -if extensive loss, potential budget impacts to service providers.
Hazardous Materials Incident	-temporary closures of roads and bridges during cleanup.	-if large event, potential high cleanup costs. -injuries to persons
Water Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Gas Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Telecommunications Failure	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Other Fuel Service Loss	-temporary loss of service -temporary impacts to vulnerable	-if extensive loss, potential budget

	individuals	impacts to service providers.
Sewer Service Loss	-temporary loss of service -temporary impacts to vulnerable individuals	-if extensive loss, potential budget impacts to service providers.
Water Pollution	-ongoing budgetary impacts due to permit requirements.	-if repeat events, impacts to tourism-based businesses
Invasive Species	-small but ongoing cost to monitoring level of occurrence	-unknown at this point.

Relative to the County as a whole the Town of Colchester has a slightly higher vulnerability to:

- Major Transportation Incident due to the transit of a railroad line and Interstate 89 through the Town.
- Invasive Species due to extensive Lake Champlain shoreline.

With regard to Societal Hazards, vulnerabilities are typically more dispersed among individuals and societal sectors compared to the natural environment and to technology which is fixed.

Table 4-3 Town of Colchester: Societal Hazards and typical vulnerabilities

Hazard	**Typical vulnerabilities**	**Occasional additional vulnerability**
Crime	-increased demands on police services and social services	-injuries -deaths
Epidemic	-temporary closures of schools, businesses, places of assembly -increased demand on medical services	-if an epidemic is widespread and long-lasting, impact could be severe
Key Employer Loss	-loss of economic activity -loss of portion of tax base -increased demands on social services	-effects increased if employer is of significant size
Economic Recession	-loss of economic activity -increased demands on social services -some loss of tax revenue	-effects increased if event is of extended duration
Civil Disturbance	-injuries to persons -damage to public and private property	-budget impacts to police services depending upon severity of event -deaths
Terrorism	-injuries to persons -damage to public and private	-budget impacts to police services

	property	depending upon severity of event -deaths

Relative to the County as a whole there are insufficient data to conclude whether the Town is more vulnerable to one of the six Societal Hazards noted above.

With regard to the vulnerability of critical facilities, infrastructure and vulnerable populations, quantitative and locational data for the Town are available as follows.

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." *Figure 1.4* shows the geographic distribution of some critical facilities and utilities. The table below identifies critical facilities in Colchester, excluding critical facilities designated as hazardous materials and petroleum storage sites, which are shown in Section 3.2.5. Critical facilities located on the Saint Michael's College campus are listed in the College Appendix to this annex. This list includes all critical facilities, not only the facilities located in designated hazard areas.

Table 4-4 Critical facilities in the Town of Colchester

Facility Type	Number of Facilities
Food Production Center	2
Veterinary Hospital / Clinic	5
Education Facility	5
College / University	2
EMS Station	1*
Hospital	1
Fire Station	3*
Emergency Shelters	3
Emergency Operations Center	1
Energy	3
Government and Military	2
Information and Communications	13
Police Station	1
Mail and Shipping	1
Public Attractions and Landmark Buildings	1

Source: VCGI, Colchester Town Officials
**Additional emergency response facilities are identified in the Saint Michael's College Appendix.*

None of these facilities are located in mapped Flood Hazard Areas.
None of these facilities are located in mapped River Corridor Protection Areas.
None of these facilities are located in mapped River Corridors.

An important concern for the Town is the ability of police and rescue services to be able to access all sections of Town. Currently, West Lakeshore Drive is the only road connecting these services to neighborhoods along and west of VT 127. If this road is closed or blocked for any reason, police and rescue services could only access those neighborhoods by detouring through Winooski and Burlington's New North End.

4.2 Infrastructure

4.2.1 Town Highways

The following is a statistical overview of roads in the Town of Colchester. These tables show the range of road types within the town, from Interstate 89 to unimproved unpaved roads. The different road types have different hazard vulnerabilities. Unpaved roads are more vulnerable to being washed out in a flood or heavy storm, while traffic incidents are more likely to occur on large, arterial roads.

Municipal highways, bridges and dams are well mapped in Chittenden County. The following three tables show the diversity of municipal highways and road surface in the Town.

The Vermont Agency of Transportation divides municipal (town) highways into various classes as follows:

Class 1 town highways are subject to concurrent responsibility and jurisdiction between the municipality and VTrans. Class 1 town highways are state highways in which a municipality has assumed responsibility for most of the day to day maintenance (pot hole patching, crack filling, etc.). The state is still responsible for scheduled surface maintenance or resurfacing. In Chittenden County Class 1 highways are generally paved.

Class 2 town highways are primarily the responsibility of the municipality. The state is responsible for center line pavement markings if the municipality notifies VTrans of the need. The municipality designates highways as Class 2 with approval from VTrans. These are generally speaking the busier roads in a given town second to Class 1. In Chittenden County, most Class 2 highways are generally paved although in the more isolated areas these are gravel roads.

Class 3 town highways are the responsibility of and designated by the municipality. These are to be maintained to an acceptable standard and open to travel during all seasons. In Chittenden County, Class 3 roads are both paved or gravel.
.

Class 4 town highways are all other highways and the responsibility of the municipality. These are generally closed during the winter and minimally maintained and almost exclusively dirt.

Table 4-5 Town highway mileage by class, Town of Colchester

Class 1	Class 2	Class 3	Class 4	State Hwy	Fed Hwy	Interstate	Total 1, 2, 3, State Hwy
	21.120	65.610	1.150	3.934	9.156	9.774	90.664

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

Table 4-6 Town highway mileage by surface type, Town of Colchester

Paved	Gravel	Soil or Graded	Unimproved	Impassable	Unknown	Total
100.391	11.54	2.763	0	1.23	0.5	116.421

Total Known	Total Unpaved	% Paved	% Unpaved
115.921	15.53	86.6%	13.4%

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

As noted in the previous section, and in the *2007 Colchester Town Plan*, West Lakeshore Drive is the only road in the Town connecting the neighborhoods along and west of VT 127 with the rest of the Town. This creates access and congestion problems, as well as a public safety concern.

See *Figure 3.2* for locations of paved vs. gravel and/or soil roads.

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 (aka Special Flood Hazard Area or 100-year floodplain.) and /or the River Corridor Protection Area (aka Fluvial Erosion Hazard Area)

Table 4-7 Bridges located in SFHA and RCPA

BridgeType / Number	Location	Mile-point	Route Name	Year Built	SFHA?	RCPA ?	Stream
PRECAST CONC ARCH	0.04 MI TO JCT US7	001354	C2001	1992	Yes	Yes	Indian_rmpsfeh_040412
ROLLED BEAM	0.16 MI TO JCT W C3 TH17	000000	C3015	1960	Yes	No	
T BM WIDEN W ROLL BM	1.0 MI N JCT. VT.2A	004696	US7	1924	Yes	No	

2-SP CONCRETE SLAB	0.24 MI TO JCT W VT2A	001350	MILL POND ROAD	1940	Yes	Yes	Indian_rmpsfeh_040412
R. C. BOX CULVERT	0.1 MI.S JCT VT2A S & TH1	003370	US7	1929	Yes	Yes	Indian_rmpsfeh_040412
CONCRETE SLAB	2.0 MI N JCT VT 2A	005408	US7	1924	Yes	No	
3-SP CONT ROLLED BM	1.3 MI S EXIT 17	096566	I89	1964	Yes	No	
STEEL CULVERT	1.5 MI N EXIT 16 I89	092950	I89	1964	Yes	Yes	Sunderland Brook RMPSFEH 012009
CGMPP/ALUM SLEEVE	2.7 MI S EXIT 17 I89	095183	I89	1964	Yes	No	
B10					Yes	Yes	Indian_rmpsfeh_040412

As noted in Section 4 of the County Plan, a large portion of the County's stream have had detailed Phase II Stream Geomorphic Assessments conducted. With regards to Colchester, studies identify specific stream reaches where fluvial erosion is a concern as well as where infrastructure, primarily culverts, as noted in the table below (and illustrated in *Figure* 2.1) is at risk.

Table 4-8 Culverts with a geomporphic compatibility rating of "Mostly Incompatible" or "Incompatible"

Bankfull Width	Compatibility Score	Town	Location	GisRoadName	StreamName
45.45	7	Colchester	Jct. W/ Poor Farm Rd.	POOR FARM RD	Unnamed
13.12	8	Colchester	Near VT National Guard property	HERCULES DR	Tributary to Sunderland Brook
21.31	8	Colchester	Coon Hill Road Crossing of reach T1.03	COON HILL RD	Allen (Petty) Brook

22.52	9	Colchester	Near farm by Shipman's Lane	MALLETTS BAY AV	Sunderland Brook
38.75	9	Colchester		ROOSEVELT HWY	Unnamed
33.33	9	Colchester	.75 Mi N Main St.	MIDDLE RD	Pond Brook
15.38	9	Colchester	Jct. w/ Juniper Dr.	RAYMOND RD	Unnamed
22.14	10	Colchester	.25 Mi N Depot Rd.	EAST RD	Pond Brook
32.26	10	Colchester	Just E VT-7	COON HILL RD	Allen Brook
33.33	10	Colchester	Driveway #1711 off VT-2A		Unnamed
11.54	10	Colchester	Just before Y	SUGARBUSH FARM RD	Unnamed

Mostly incompatible 5<GC<10
% Bankfull Width + Approach Angle scores < 2

Fully incompatible 0<GC<5
% Bankfull Width + Approach Angle scores < 2 AND Sediment Continuity + Erosion and Armoring scores < 2

Structure mostly incompatible with current form and process, with a moderate to high risk of structure failure. Re-design and replacement planning should be initiated to improve geomorphic compatibility.
Structure fully incompatible with channel and high risk of failure. Re-design and replacement should be performed as soon as possible to improve geomorphic compatibility.

Information on dams is available from two sources: a database of dams regulated by the Vermont Department of Environmental Conservation and the National Dam Inventory maintain by the U.S. Army Corps of Engineers.

There are two dams in Colchester regulated by DEC and one dam regulated by the Federal Energy Regulatory Commission. Further information is redacted from this Plan. Requests for information from Town officials on these dams may be made to the Town of Colchester's Emergency Management Director.

4.2.3 Water, Wastewater and Natural Gas Service Areas

A large number of residents and business receive water service through the Champlain Water District, with the remainder using private or community wells. Almost all residents and business dispose of wastewater through septic systems with the exception of property owners in the southeast portion of the Town that abuts South Burlington and Essex. Property owners in the former grounds of the Fort Ethan Allen complex are served by the Town of Essex's municipal water and wastewater treatment systems while St. Michael's College is served by the City of

South Burlington's system. Vermont Gas services a significant portion of the town and has plans to continue to expand service. (cf. *Figure 1.4*).

4.2.4 Electric Power Transmission Lines and Telecommunications Land Lines

Three VELCO high tension power transmission lines run through the Town (cf. *Figure 1.4*).

. Two substations and a power generation station are also located in the Town. Above ground telecommunication land lines run along the street grid.

4.3 Estimating Potential Losses in Designated Hazard Areas.

A simple GIS intersection of esite data with the FIRM floodplain data indicates the following with regards to structures located in mapped flood hazard areas *(cf. Figure 2-1)*:

- There are a total of 6,434 structures within the municipality
- There are 67 residential structures and 14 commercial/industrial structures located within the 100-year floodplain primarily along Lake Champlain.
- Based on 2015 median grand list value, the estimated potential losses due to a major flood event inundating the floodplain and destroying all of these structures is $7,987,591.
- Note that this estimate only takes structures into account, however. It does not account for loss of building contents or business losses.

A simple GIS intersection of esite data with the 2016 River Corridor Protection Area (RCPA) data *(cf. Figure 2-1)* indicates the following with regards to structures vulnerable to Fluvial Erosion.

- There are a total of 6,434 structures within the municipality
- There are four residential structures and two commercial/industrial structures located in the RCPA. Based on 2015 median grand list value, the estimated potential losses due to a major stream erosion event in the area destroying all six structures are $855,704.
- Note that this estimate only takes structures into account, however. It does not account for loss of building contents or business losses.

At this time, a more detailed analysis of potential losses to infrastructure, and agricultural lands cannot be made. Such an analysis would require individual site visits and analysis conducted by both river geomorphologists and structural engineers which is beyond the capacity of the CCRPC due to funding limitations.

4.4 Vulnerable Populations

In the case of Colchester, census data more detailed than the Town's boundaries is not available to see if there are concentrations of either elderly populations or low-income populations. In other words, the boundaries form one single census tract. Demographic information on the relative percentages of vulnerable populations is as follows:

Table 4-9 Vulnerable populations, Colchester

	Colchester	Chittenden County	Vermont	National
Percent Minority (non-white)[1]	5.6%	7.7%	4.8%	26.7%
Children <18 in poverty[1]	16.0%	11.1%	14.8%	21.6%
Families w/children in poverty[1]	11.9%	10.5%	13.4%	17.8%
Families w/ female householder, no husband present w/children in poverty[1]	37.1%	37.0%	37.4%	40%
Population, age 65+ in poverty[1]	3.6%	6.5%	7.5%	13.4%

[1]*US Census Bureau, 2010-2014, American Community Survey*

Given the coarseness of the available data, CCRPC is not able to determine specific locations with a concentration of vulnerable individuals within individual municipalities. However, a useful analysis known as a Social Vulnerability Analysis has been prepared by the Vermont Department of Health. Data for the Town is shown in *Figure 4.1.*

The Social Vulnerability Index (SVI) draws together 16 different measures of vulnerability in three different themes: socioeconomic, demographic, and housing/transportation. The 16 individual measures include poverty, unemployment, per capita income, educational attainment, health insurance, children/elderly, single parent households, disability, minority, limited English, location of apartment buildings, mobile homes, crowding, no vehicle access, and population living in group quarters. The measures are combined to create relative vulnerability index. For every vulnerability measure, census tracts above the 90th percentile, or the most vulnerable 10%, are assigned a flag. The vulnerability index is created by counting the total number of flags in each census tract. It is important to remember that this Social Vulnerability Index is just a first step in screening for populations that may be more or less vulnerable to a variety of hazard. Depending on the situation, different measures could be more or less important and should be looked at more closely. These data are NOT saying that one census tract is more vulnerable than another. Rather it is saying that there is a higher concentration of various vulnerable populations living within a tract and seeks to identify the conditions that make a population vulnerable.

4.4 Land Use and Development Trends Related to Mitigation

As noted at the introduction, Colchester's land use is primarily 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 4-10 Structures compared to zoning, Town of Colchester

Colchester Structures	Esite Count	Percent		Colchester Zoning	Area (mi^2)	Percent
Residential	5841	90.78%		Agricultural	6.459551	10.88%
Commercial	316	4.91%		Agricultural Mixed Use	0.207576	0.35%
Industrial	42	0.65%		Business	0.722293	1.22%
Institutional / Infrastructure	94	1.46%		Commerical	0.499783	0.84%
Mass Assembly	17	0.26%		Floodplain	28.25763	47.60%
Leisure / Recreation	6	0.09%		General Development One	1.555202	2.62%
Natural Resources	17	0.26%		General Development Two	1.829311	3.08%
Total:	6333	98.43%		General Development Three	0.488331	0.82%
				General Development Four	1.108141	1.87%
				Industrial	1.037353	1.75%
				Mobile Home Park	0.410839	0.69%
				Residential One	7.823223	13.18%
				Residential Two	2.657974	4.48%
				Residential Three	2.626787	4.43%
				Residential Five	2.22742	3.75%
				Residential Ten	1.450043	2.44%
Total Esites:	6434			Total Area:	59.36145	

Source: 2015 e911 Data and Town of Colchester Regulations, Note: The structure categories relate to the Land Based Classification System (LBCS) used in the 2011 AHMP not E-911 site types. E-911 site types were assigned to each LBCS category to create synergy between the 2011 AHMP and 2017 AHMP.

4.4.1 Conserved or Undevelopable Parcels

The *Colchester Open Space Plan* developed by the Planning Commission was adopted by the Select Board on February 22, 2000. The Open Space Plan inventories existing open spaces and natural areas and provides recommendations on what parcels should be preserved and how the Town should initiate preservation of these parcels. A significant portion of the Town is either public land or conserved land:

Table 4-11 Town of Colchester, acres of conserved land

Acres	Acres of Public Land	Percent Public	Acres of Conserved Land	Percent Conserved	Total Public & Conserved	Percent Conserved Land
23,807.65	2,354.19	10%	690.46	3%	3,044.74	13%

4.4.2 Recent and Future Development

Growth in Colchester is anticipated to continue to occur at previously developed locations and at the designated mixed use growth area known as Severance Corners (located at the corners of Blakely Road, Severance Road, and US Routes 2 & 7), and Exit 17 (located at the junctions of US Routes 2 & 7 around Exit 17 of I-89). At this time, the only 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. Additionally, the Town also regulates development near other waterbodies and wetlands. As a result, little to no development is likely to take place in flood hazard areas or river corridor

protection areas. These zoning requirements effectively mitigate damages from Flood and Fluvial Erosion hazards to future structures.

As shown in *Figure 4.2*, from 2011 through 2014, the municipality has seen 82 housing units (in single family and multi-family structures) and 12 new commercial/industrial buildings constructed. **None** of these new housing units or new buildings are located in the SFHA, River Corridor or River Corridor Protection Area.

As best can be ascertained based upon data maintained by the Chittenden County RPC and the Town of Colchester, since the adoption of the last municipal AHMP in 2011, development activity in the Town has not significantly increased vulnerability. Additionally, through at least 2021, there is no known or projected development of new buildings or infrastructure anticipated to be constructed in areas known to be particularly vulnerable to Natural Hazards.

SECTION 5: MITIGATION STRATEGY

5.1 Existing *2014 Colchester Town Plan* Policies That Support Hazard Mitigation

These tasks are described in the 2014 Colchester Town Plan. The following selected excerpts illustrate how mitigation planning and activities is formally promoted and supported through the Town Plan.

Land Use (divided by selected neighborhood)

West Lakeshore Drive
2. Land use plans should take into account the viability of on-site septic as well as municipal sewer.
3. Development in this area should meet the highest possible standards to protect water quality in Malletts Bay.

Bean / Macrae
2. Development should be sensitive to existing environmental issues such as drainage issues, marginal soils, unstable river banks, wildlife habitat, and floodplains.

Severance Road
1. Any consideration of density increases should adequately address traffic safety on Severance Road, storm water impairments to Sunderland Brook, and on-site septic capacity. Density increases must not adversely impact existing agricultural uses or the planned Circ Highway

East Lakeshore Drive Vicinity
1. Areas along the Lake should continue to be a priority for conservation particularly those areas immediately adjacent to existing Town or State owned lands.
2. Reconstruction of structures between East Lakeshore Drive and the Lake should preserve views from the road of the Lake and provide for adequate bank stabilization.
3. Water quality remains a high concern in this neighborhood. The Town should continue to encourage the upgrading of on-site septic systems within this area and educate homeowners on system maintenance. To this end, an on-site sewage disposal management program could be developed.

Marble Island / Malletts Head
5. The natural area, with views, at the crest of Malletts Head should be considered for acquisition by a Land Trust or the Town

Malletts Bay Avenue
2. The adjacent floodplains and wetlands are undevelopable and should continue to be excluded from density calculations for development.

Northeast Quadrant
Property owners and residents should be made aware of the radioactive bedrock properties and new development should not increase the degree of human exposure to these properties.

Natural Resources

1. The Town should continue to encourage new development as well as re-development that is sensitive to the Lake views.
2. The Town will strive to work with other organizations and governments to find long-term cost effective solutions to water quality issues
3. The Town should work with its neighbors within the Winooski River Basin to improve water quality
4. New development and redevelopment of properties along the Winooski and Lamoille Rivers should stabilize the banks and meet current setbacks in order to limit threats to water quality as well as threats to public infrastructure and public welfare.
5. Colchester should maintain its current Flood Plain Zoning District standards prohibiting any new floodplain construction to protect the public good.
6. The Town should maintain its cooperation with Federal Agencies in reviewing floodplain projects.
7. The Town should work with the State and Federal permitting agencies to provide consistency in regulating wetlands to the greatest extent practicable.
8. Colchester should maintain its Water Protection Overlay District and adapt these regulations as needed to comply with all applicable State requirements.
9. The Town should evaluate connectivity between significant natural resources that would foster wildlife habitat.
10. The Town will continue to work with State agencies to determine suitable alternatives for sandplain areas.
11. Efforts to sustain and enhance on-site interpretive resources and awareness of Open Space resources should be supported by the Town.
12. The Town of Colchester should continue to maintain and enhance its GIS system in part to better delineate and define geographic data as well as involve the public in management and stewardship of natural resources.
13. Wildlife habitat mapping should be enhanced.
14. As development occurs on smaller and smaller lots, PUD minimum lot size and other requirements should be reviewed to ensure continued compliance with the intent of these regulations.
15. Large tracts of undeveloped land should be comprehensively planned for connectivity to adjacent parcels and natural areas. Well-thought-out conservation plans are encouraged as well as comprehensive plans of large tracts.
16. The Colchester Land Trust should assist the Town in open space conservation efforts and to work with these Boards and Departments to achieve Town open space goals.
17. Management plans should be developed or sustained for the Town's various natural areas, parks, conserved land, and public parcels that include significant natural resources.
18. The Town encourages the development of management plans for privately held lands that contain significant natural resources as well as privately conserved land such as PUD open space lots.

19. The Town should develop a policy of prioritization for land acquisition and study preferred financing options.
20. The 2000 Open Space Plan should be referenced for specific, high-priority parcels for conservation and recommended conservation techniques.

21. Care should be taken to conserve important features and mitigate any long term adverse impacts of development to natural resource areas of significance listed within this Chapter.

Transportation
1. Roadway construction and reconstruction projects should address stormwater treatment and required stormwater permitting. Stormwater treatment for all impervious surfaces, including parking lots, is a good practice to preserve and enhance water quality.
26. The Town shall continue to partner with the Vermont's Highway Bridge Program to maintain its infrastructure.

Utilities and Services
9. As the Town continues to grow, it should ensure that property owners have access to municipal water supply systems in an effort to provide safe, efficient, and affordable potable water for the community where possible.
10. Water lines should be looped wherever feasible to ensure continuity of water pressure.
11. The Town should take appropriate actions to ensure adequate water supply for the implementation of its land use goals. During the term of this plan, the Town should work to implement, in conjunction with the Fire Districts, the recommendations of the current 20-year water needs analysis project.
……..…..
14. The Town should continue its current efforts regarding stormwater and, where feasible, expand these efforts.
15. The Town should evaluate implementing a stormwater utility.
16. The Town will continue to work to ensure that pre-emption devices are installed on all new and retrofitted traffic lights.
17. The effect of land use goals and fire protection services on one another should be recognized and a balance sought. As Colchester strives to implement its land use goals, the Town should continue the dialogue with fire protection agencies to minimize adverse impacts to fire services while fulfilling its land use goals.
……
19. Protecting surface water from stormwater impacts is a high priority in review of proposed developments

5.2 Existing Town of Colchester Actions That Support Hazard Mitigation

The following table illustrates how mitigation activities and plans are carried out by various municipal departments, and whether such capabilities are adequate to address hazard vulnerabilities and whether the department, if needed, has the ability to improve policies and programs and programs to unmitigated vulnerabilities.

Table 5-1 Existing municipal capabilities addressing hazard mitigation, Town of Colchester

Types of Programs & Policies	**Description / Details**	**1) Adequacy of municipal capabilities to address hazards 2) and ability to expand upon or improve policies & programs**
Highway Services	Town Highway Department	1) Generally adequate with regard to mitigating the impacts of common hazards. 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages

		caused by Severe Rainstorm, Fluvial Erosion and Water Pollution.
Highway personnel	8 FTE field personnel	1) Generally adequate with regard to mitigating the impacts of common hazards. 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages caused by Severe Rainstorm, Fluvial Erosion and Water Pollution.
Water / Sewer Department	Water-Yes; Sewer-No	1) Generally adequate with regard to mitigating the impacts of common hazards. 2) However, the Public Works Department, through the strategies noted below is taking on a stronger role to mitigate against damages caused by Severe Rainstorm, Fluvial Erosion and Water Pollution.
Water / Sewer Personnel	4 FTE personnel in Water (not municipal employees), .75 in Sewer, 2 personnel addressing stormwater/drainage issues (not municipal employees).	1) Generally adequate with regard to mitigating the impacts of common hazards.. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Planning and Zoning personnel	3 FTE Planning staff plus 1 FTE Zoning Administrator	1) Generally adequate with regard to mitigating the impacts of common hazards.. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Residential Building Code / Inspection	Yes	1) Generally adequate with regard to mitigating the impacts of common hazards. New construction must obtain a building permit. 2) No need to expand upon or improve policies & programs with regard to hazards under its purview.
Building Inspectors	1 FTE Building Inspector, 1 FTE Life Safety Inspector	1) Staffing levels adequate. 2) Note that commercial properties open to the public and all multi-family buildings of 3 units or more must be inspected and permitted by the Vermont Division of Fire Safety.
Town / Municipal Comprehensive Plan	2014	1) As noted at the start of Section 5, several elements of the municipal Comprehensive Plan promote Hazard Mitigation. 2) The Town substantially updated its Plan in 2016.
Zoning Bylaws and Subdivision Regulations	2016	1) Generally adequate with regard to mitigating the impacts of common hazards. 2) No need, at this time, to expand upon or improve policies & programs with regard to hazards under its purview as bylaws were just updated.
Hazard Specific	Flood Hazard	1) Generally adequate with regard to mitigating the impacts of

Zoning (slope, wetland, conservation, industrial, etc.)	Overlay; Shoreline District	common hazards.. 2) No need at this time, to expand upon current flood hazard bylaws.
Participation in National Flood Insurance Program (NFIP) and Floodplain/ Flood Hazard Area Ordinance	Yes / Yes	1) New DFIRMS adopted in 2011. The Town Zoning Administrator and the Town's Development Review Board (DRB) monitor compliance with the National Flood Insurance Program. The DRB reviews and adjudicates applications for development within the floodplain. 2) The Town obtained Community Rating System designation in 2016. No need at this time to expand further upon NFIP participation
Open Space Plans; Conservation Funds	Open Space Plan	1) Yes 2) Municipality considers regulatory programs and voluntary conservation efforts as adequate to address any hazard mitigation concerns.

The following table illustrates how Emergency Preparedness, Response & Recovery actions are carried out in the Town.

Table 5-2 Existing municipal emergency services & plans, Town of Colchester

Type of Existing Protection	**Description /Details/Comments**
Emergency Services	**Emergency response personnel may have overlapping responsibilities with other town response organizations.**
Police Services	Town of Colchester
Police Department Personnel	~28 Paid FTE Officers, 1.5 Paid FTE Admin, 6 Full Time Dispatchers, 2 Part Time Dispatchers
Fire Services	Colchester VFC (private); Mallets Bay VFD (private), St. Michael's College FD (subsidiary of Colchester FD)
Fire Department Personnel	~38 Volunteers (Colchester VFD), 40 Volunteers (Mallets Bay VFD)
Fire Department Mutual Aid Agreements	Colchester, Winooski, Burlington, Airport, VHMRT
EMS Services	Colchester Rescue (private, includes Colchester Technical Rescue), St. Michael's College Rescue Note: Colchester Technical Rescue provides water rescue services to the larger region, and may need more space to store equipment in the future.
EMS Personnel	4 paid FTE personnel, 35 volunteers (Colchester Rescue)
EMS Mutual Aid Agreements	various through VT EMS District #3

Emergency Plans	
Local Emergency Operations Plan (LEOP)	2016
Primary Shelter	Colchester High School.
Replacement Power, backup generator	Covered by generator
Secondary Shelter	Colchester Middle School.
Replacement Power, backup generator	Covered by generator

5.3 Town of Colchester All-Hazards Mitigation Goals

The following goals were listed in the 2005 and 2011 versions of this Plan and re-approved by Town of Colchester officials during the development of this 2017 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.

With regard to a more formal process by which the Town will integrate the requirements of this mitigation plan into the Town's Comprehensive Plan, as required by Vermont law, municipalities must update their Comprehensive Plans every eight years. During any update process undertaken while this Plan document is in effect, the Town will review the recommended Actions detailed below to see if formal incorporation within the Comprehensive Plan (or any Plan implementation tasks) is warranted. Additionally, as the CCRPC is tasked with also reviewing and approving each such municipal comprehensive plan for consistency with various requirements in state statute and consistency with the Chittenden County Regional Plan (aka the *ECOS 2013 Plan*). This review includes a detailed staff critique with recommendations for improvement. This CCRPC review provides another opportunity to formally integrate elements of this local AHMP into the Town's Comprehensive Plan. This Town process and the CCRPC review, however, will likely not take place during the 5-year life of this Plan as the Town just completed an update to its Comprehensive Plan in 2016.

With regard to a more formal process by which the Town will integrate the requirements of this mitigation plan while developing the Town's annual capital improvement plans/budgets, for

periods , the Town will review the recommended Actions detailed below to see if formal incorporation within these annual capital plans is warranted prior to annual review and voting by Town residents. Additionally, CCRPC staff can assist the town with drafting grant applications to fund mitigation projects.

5.4 Mitigation Actions

The table below records the strategies from the 2011 Plan and progress on their implementation. This table also encapsulates the Town's decision making with regards to which Actions to continue, which to establish as new actions and which to discontinue. During the development of this Municipal AHMP and its parent Multi-Jurisdictional AHMP, FEMA staff indicated to the CCRPC a need to separate out or remove strategies which are more properly considered to be Preparedness, Response or Recovery strategies rather than Mitigation. Additionally, upon revisiting and reviewing the 2011 actions and devising action for this 2017 local AHMP CCRPC and municipal staff thought it would be best to focus on known and likely actions with a high likelihood of implementation versus consideration of more expansive but largely aspirational strategies.

Table 5-3 Progress on the Strategies of the 2011 Colchester All-Hazards Mitigation Plan

Action **Primary Responsible Entity**	**Task**	**Brief Description**	**Progress since 2011 and tasks for 2017 Plan**
#1 Complete fluvial geomorphology assessment and develop strategies in response to identified risk.			
CCRPC, VT ANR	Fluvial Geomorphic Assessments	Conduct Phase I and Phase II fluvial geomorphic assessments on streams and waterways in Colchester.	**Completed.** **REMOVE FROM 2017 PLAN.**
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.	**Completed.** **REMOVE FROM 2017 PLAN.**
TBD, determined by funding.	River Corridor Management Plans	Where Phase I and II assessments are complete, develop a River Corridor Management Plan.	No formal Plans developed but assessments identified various potential projects. Various improvements undertaken discussed below. No need for formal Plan identified. **REMOVE FROM 2017 PLAN**
Director of Planning & Zoning; Director of Public Works	Fluvial Erosion Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified fluvial erosion hazards.	Mallets Creek: --A temporary repair using a steel plate was made to a 14 ft. culvert at crossing with East Road. --At Middle Road crossing, two 42" culverts were replaced

			Allen Brook: --a new 30 ft. span on Colchester pond road location was installed in 2013 Indian Brook: at Mill Pond Road, a new, wider and higher bridge was installed. **No new formal projects identified. Town considers existing zoning bylaws to provide adequate protection from erosion hazards.** **REMOVE FROM 2017 PLAN.**
Director of Planning & Zoning; Director of Public Works	Flood Insurance Rating Map Updates	Review draft FIRM data. Develop strategies to mitigate losses from identified flood hazards.	Yes, new DFIRMs went into effect and new CRS status obtained in 2016. **No new actions planned with regards to flood insurance maps. REMOVE FROM 2017 PLAN.**
#2 Evaluate capabilities of existing road and stormwater management infrastructure			
Director of Public Works	Infrastructure Assessment for Stormwater Vulnerability	Assess the vulnerability and operational capability of municipal roads, culverts and stormwater infrastructure.	1, Yes, town reviews data collected at "VT culverts" online database 2, With help from consultant, town developed Integrated Water Resources Management Plan to identify water quality and stormwater concerns. **Some small studies may be undertaken in the future but no discrete "assessment" task for new plan is needed.** **New action for 2017 Plan within Stormwater Task :** **Implementation of Flow Restoration Plans for Sunderland Brook and Morehouse Brook**
Director of Public Works	Infrastructure Assessment for Fluvial Erosion/Landslide Vulnerability	Assess the vulnerability and operational capability of municipal roads, culverts, bridges and other infrastructure to fluvial erosion.	Town has recently investigated development of a stormwater utility. Consultant is working on billing software. No formal startup date announced but goal is to start for FY18. **Continue but as new "Stormwater Utility action in 2017 Plan.**

#3 Continue and improve highway, culvert and bridge maintenance programs			
	Culvert Upgrades	Upgrade culverts and ditching along roads to mitigate against repeated damages from stormwater or spring snowmelt.	Morehouse Brook -Repair of collapsed culvert under Mallets Bay avenue taking was completed in summer 2016. **Some small projects may be undertaken in future but no discrete action for new plan needed.** **REMOVE FROM 2017 PLAN.**
Director of Public Works	Continued Monitoring of Vulnerable Infrastructure	Monitor bridges and culverts with erosion and scouring concerns.	FEMA says maintenance and monitoring is not Mitigation. **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
Director of Public Works	Road Improvement	Consider paving certain road sections to lower overall maintenance costs, improve snow plowing speeds and improve overall capability of roads to handle current and projected traffic volumes.	No formal process in place. Not really mitigation. **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
Director of Public Works	Erosion/Landslide Mitigation	Undertake erosion or landslide mitigation projects where roads regularly incur damage from adjacent rivers/streams and hillsides: Middle Rd at Pond Brook crossing East Rd at Pond Brook crossing	Middle Road: 30' culvert replaced East Road: 48-inch culvert is in place and is considered undersized. However, town has no plans to replace as cost not worth it relative to benefits. **NO FURTHER ACTION NEEDED.** **REMOVE FROM 2017 PLAN.**
#4 Evaluate capabilities of existing and potential public shelters			
Colchester Emergency Management Director	Investigate Alternate Shelters	Investigate capabilities of other buildings sufficient to serve as smaller shelters.	CHS is main shelter and has generator. Looking into St. Mike's **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
#5 Complete landslide hazard assessments, and develop strategies in response to identified risk.			
Vermont Geological Survey	Landslide Hazard Assessment Protocol	Develop a landslide hazard protocol to evaluate county slopes and waterways.	Completed by Vermont Geological Survey with CCRPC as partner. Protocol development testing included the towns of Essex, South Burlington, Colchester, Bolton and Shelburne. **REMOVE FROM 2017 PLAN.**
Vermont Geological Survey, other appropriate entities TBD.	Landslide Hazard Assessment and Mapping	Funding available, landslide hazards should be assessed and mapped in participating municipalities.	Other than the testing mapping described in the previous row, no funding has been secured to prepare additional maps. No funding identified for future research and not considered as significant hazard. **REMOVE FROM 2017 PLAN**

Director of Planning and Zoning, Director of Public Works	Landslide Hazard Mitigation Implementation	Develop strategies to mitigate losses from identified landslide hazards.	Homes along Orchard Shore Road were impacted by slumping of a bank associated with the 2011 lakeshore flooding. At Clay Point, two, 24-inch culverts were repaired. -After 2011 lakeshore flooding near Camp Kiniya, several structures were moved back from the edge of a bank where lateral movement was occurring. 2014: installed dry wells to address flooding/drainage problems near South Bay Circle. Also to address overflow from Smith Hollow a 36-inch culvert was replaced. **Some small projects may be undertaken in future but no discrete action for new plan needed.** **REMOVE FROM 2017 PLAN.**
#6 Seek means to mitigate identified deficiencies in the capacity and safety of the transportation system.			
Director of Public Works	Traffic Issues in High-Growth Areas	Seek funding to implement plans to alleviate traffic capacity and road safety problems in Severance Corners, Exit 16 area, Exit 17 area, Route 2A / Route 7 intersection, and Route 15 Corridor.	Yes, Circ Alternatives project. Exit 16, moving towards construction Exit 17, under Study HAWK (High-intensity-Activated-crossWalK) pedestrian crossing light installed near Fanny Allen installed and also on Lakeshore Drive. 6 more HAWK installations planned. **NOT A MITIGATION ACTION.** **REMOVE FROM 2017 PLAN.**
Director of Public Works	Limited Road Access Areas	Seek funding to implement strategies to mitigate against public safety hazards posed by areas accessible by only a single or few roads.	**NO LONGER CONSIDERED A SIGNIFICANT ISSUE.** **REMOVE FROM 2017 PLAN.**
#7 Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident			
Emergency Management Director	Evacuation and Sheltering Exercises	Conduct evacuation drills or exercises and evaluate performance.	Just started up again. At least one was held in Spring 2015. March tabletop EOC drill in May. St. Mike's active shooter drill **NOT A MITIGATION ACTION.** **REMOVE FROM 2017 PLAN.**
Emergency Management Director	Evacuation and Sheltering Plans	Review evacuation, sheltering, and relocation plans based on results of drills, exercises, and actual incidents.	Yes, see above. **NOT A MITIGATION ACTION.** **REMOVE FROM 2017 PLAN.**
#8 Ensure town and school emergency plans are fully coordinated			
Emergency Management Director, Schools Superintendent	Maintain Communications	Maintain good communication between school and town officials regarding plans and safety issues, so that any changes are known to all parties.	Yes, school safety plans in place. Two officers assigned to schools. **NOT A MITIGATION ACTION.** **REMOVE FROM 2017 PLAN.**
Emergency Management	Monitor Exercises	When evacuation drills and	Have carried out 3-4 evacuation

Director, Schools Superintendent		other exercises are carried out, monitor coordination between school and town officials.	and/or "shelter-in-place" drills **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
#9 Raise public awareness of hazards, hazard mitigation and disaster preparedness.			
Police Department Chief; Colchester VFD Chief, Mallets Bay FD Chief	School Programs	Continue school programs to raise student awareness of hazards, safety, preparedness and prevention.	Yes, programs implemented such as "Rescue Night" and CPR training. **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
Police Department Chief; Colchester VFD Chief, Mallets Bay FD Chief	Family Programs	Continue family programs, such as car safety seat and bike safety programs, to raise family awareness of hazards, safety, preparedness and prevention.	Yes, programs implemented such as car seat inspections and bike safety trainings. **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
Police Department Chief; Colchester VFD Chief, Mallets Bay FD Chief	Fire Prevention Programs	Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention.	Yes, programs implemented **NOT A MITIGATION ACTION. REMOVE FROM 2017 PLAN.**
Police Department Chief; Colchester VFD Chief, Mallets Bay FD Chief	Other hazard awareness programs	Develop public awareness programs, based on all-hazards needs. Programs to address pandemic hazards, preparedness and mitigation may be appropriate.	Outreach on flooding will continue as part of recently obtained Community Rating System status. The following communication methods will also be used to raise awareness of potential hazardous events: -Colchester PD Facebook page -Promotion to encourage sign-up for VT-Alert -Promotion on Town website to sign-up for Notify Me ® emails on various topics including "emergency news" -Use of Reverse 911 dialing -Postings by town to Front Porch Forum, an online "neighborhood forum" to which town officials can post items. **The Town considers Participation in CRS as a "maintenance-type" activity and therefore does not wish to have it listed in this Mitigation Plan as a discrete action.**

5.4.1 Current Capabilities and Need for Mitigation Actions

The Colchester 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. As detailed in the table below, generally, the Town considers its existing capabilities, regulatory structure and programs as adequate to address its vulnerabilities however continuation of existing mitigation actions or the implementation of new actions are warranted from 2017-2021. However, the Town Selectboard notes that municipal mitigation actions may be constrained by the actions of other entities; for example municipal efforts to address transportation, water or sewage concerns may be contingent on obtaining state-level permits.

Table 5-4 Town of Colchester: Capabilities to address vulnerabilities from natural hazards

Hazard	Adequacy of Municipal Capabilities to address associated vulnerabilities (Excellent, Good, Average, Below Average)	Additional expansion or improvement in policies & programs needed to address hazard given long-term vulnerability
Severe Winter Storm	Excellent	No
Flooding	Excellent	No.
Fluvial Erosion	Good	**Yes, see actions below**
Severe Rainstorm	Good	**Yes, see actions below.**
Extreme Temperatures	Good	No, rare occurrence and extent, impact & vulnerabilities are limited.
Wildfire	Excellent	No, rare occurrence and extent, impact & vulnerabilities are limited.

Table 5-5 Town of Colchester: Capabilities to address vulnerabilities from technological hazards

Hazard	Adequacy of Municipal Capabilities to address vulnerabilities (Excellent, Average, Below Average)	Additional expansion or improvement needed to address hazard given long-term vulnerability
Major Transportation Incident	Good + State agencies provide support	No, rare occurrence and extent, impact & vulnerabilities are limited. The Town has several high accident locations where a major transportation incident might occur. The Town has a Capital Plan that includes maintaining and improving transportation infrastructure. Of particular concern to the Town is the possibility that any incident on West Lakeshore Drive could close this road and block access to portions of town, including access by emergency responders. Additionally, heavy truck traffic on this route includes hazardous commodities; a hazardous materials accident on this route would threaten nearby Lake Champlain.
Power Loss	Average. Private utilities are primarily responsible	No given that events are limited in duration and vulnerabilities are short-lived.
Hazardous Materials Incident	Good + State agencies provide	No, rare occurrence and extent, impact & vulnerabilities are limited.

	support	
Water Service Loss	Excellent.	No, rare occurrence and extent, impact & vulnerabilities are limited. Water service loss affects both water customers and the fire departments. Municipal water service is the responsibility of the water supplier (Champlain Water District or Burlington Dept. of Public Works) and the water distribution systems (Colchester Town, Colchester Fire Districts #1 - #3, Town of Essex or City of South Burlington). The Town regards the mitigation capabilities of these entities to be adequate.
Gas Service Loss	Average. Private utility is primarily responsible.	No, rare occurrence and extent, impact & vulnerabilities are limited.
Telecommunications Failure	Private utilities are primarily responsible	No, rare occurrence and extent, impact & vulnerabilities are limited.
Other Fuel Service Loss	Private businesses are primarily responsible	No, rare occurrence and extent, impact & vulnerabilities are limited.
Sewer Service Loss	No service provided by municipality.	No, rare occurrence and extent, impact & vulnerabilities are limited.
Water Pollution	Good	**Yes, see actions below**
Invasive Species	Average	No, rare occurrence and extent, impact & vulnerabilities are limited.

Table 5-6 Town of Colchester: Capabilities to address vulnerabilities from societal hazards

Hazard	**Adequacy of Municipal Capabilities to address vulnerabilities (Excellent, Average, Below Average)**	**Additional expansion or improvement in policies & programs needed to address hazard given long-term vulnerability**
Crime	Good +State agencies provide support.	No. Municipality participates in programs lead by regional and state entities.
Economic Recession	Good +State Agencies provide support	No Diversity of county economy mitigates vulnerabilities. The Town considers its municipal plan as also supportive of the goal of economic diversification.
Terrorism	Good +State & Federal agencies provide support	No, rare occurrence.

Civil Disturbance	Good + State agencies provide support.	No, rare occurrence
Epidemic	Average +State & Federal agencies provide support	No, rare occurrence. 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.
Key Employer Loss	Good +State agencies provide support	No. Diversity of employers in municipality mitigates vulnerabilities.

Note that this Plan does not recommend a discrete mitigation action regarding "future development." Our justification for this is as follows:

- The municipality's regulations, programming and staffing have prevented and will prevent new buildings and infrastructure being constructed in areas vulnerable to hazards. As documented in detail in section 4.6.2, despite active residential and commercial development, no structures and infrastructure subject to municipal regulation, have been constructed in either the Special Flood Hazard Areas or mapped River Corridor Protection Areas.
- For the next five years, there are NO known or anticipated plans for the construction of municipal infrastructure in areas vulnerable to hazards.
- There is no evidence that unwise or poorly regulated development in the municipality has been a significant contributor to putting people or property in harm's way.

Therefore, the reader will note that the proposed Mitigation Actions for the next five years represent a much more focused and achievable list of actions focused on those hazards (e.g. Fluvial Erosion, Severe Rainstorm, Water Pollution, etc.) that cause more frequent if less dramatic damages. It is these more mundane damages of erosion along road beds, damaged small culverts and the ongoing struggle to maintain and improve water quality (which cost the municipality and its taxpayers both time and money) that deserve the most attention rather than hazards that could hypothetically cause damage but which are rare and wherein the benefit-to-cost ratio for potential mitigation actions is weak (e.g. Major Transportation Incident, Hazardous Material Incident, Terrorism). **It is also worthwhile to note that in comparison to the 2011 Plan the priorities for this 2017 Plan have not changed. The hazards and vulnerabilities remain the same as well. Indeed, the only real change is that there is a more heightened awareness due to the severity of recent disasters starting in 2011 to the present.**

5.4.2 Specific Mitigation Actions

CATEGORY A: Operate a Stormwater Utility
Hazards Addressed: Severe Rainstorm, Water Pollution, Fluvial Erosion
Vulnerabilities Addressed: Damage to new/existing public infrastructure and buildings; Temporary road and bridge closure and Budgetary impacts;
Primary Responsible Entity: Town Managers Office, Town Public Works Department and Town Planning Department
Timeframe: Month 2017 through March 5, 2022 (update after FEMA approval date)
Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VTrans grants; Stormwater System user fees; Municipal Operating and Capital budgets only if sufficient

Specific Identified Actions

Action A-1: Establish municipal stormwater utility
Anticipated to begin in FY18 the Town will establish a stormwater utility funded by town property owners. This will ensure a dedicated funding stream as well as tie funding more directly to the impacts of impervious surfaces. The utility will conduct various operations on an annual basis especially Action A-2 and A-4 below.

Action A-2: Street sweeping and catch basin cleaning
Catch basin cleaning & street sweeping removes materials and pollutants which would otherwise cause damages to the ecosystem, to municipal infrastructure and result in the municipality not achieving compliance with its MS-4 permit which in turn would force the municipality to spend more money on personnel, equipment and projects to meet compliance. This is an effective, albeit low-profile, mitigation action.

Action A-3: Review of land development proposals
Review of such proposals by municipal utility staff, municipal Planning & Zoning staff and the municipality's Development Review Board which issues permits assures that land development is sited appropriately and that adequate stormwater controls are required to reduce the amount of runoff from private residential and commercial properties into the municipal road and stormwater infrastructure and in to local streams and Lake Champlain. While broad zoning measures set limits on such measures as units per acre, lot coverage, etc, the attention to detail given at the permit review and application phase is key to mitigating against the vulnerabilities from Severe Rainstorms and Water Pollution which can be exacerbated by poorly sited land development.

Action A-4: Annual upgrades to stormwater infrastructure;
On an annual basis, the Town utility will upgrade stormwater infrastructure (catch basins, pipes, swales, culverts, detention areas, etc.) to mitigate the effects of stormwater. These improvements will be implemented system wide over the coming years.

Rationale / Cost-Benefit Review:

Development and operation of a Town stormwater utility will assure that the Town remains in compliance with its MS4 permit. The utility will enable long-term planning and implementation of various programs and projects which will serve to better detain, infiltrate and treat runoff during flood, fluvial erosion and severe rainstorm events. This will act to reduce overall water levels and velocity. The project will also reduce pollutant and phosphorus loads into local streams and Lake Champlain.

CATEGORY B: Implement Flow Restoration Plans & Phosphorus Control Plan
Hazards Addressed: Fluvial Erosion, Severe Rainstorm, Water Pollution

Vulnerabilities Addressed: damage to public infrastructure especially roads and culverts; temporary closures of roads and bridges including from debris; temporary loss of power and/or telecommunications and temporary isolation of vulnerable individuals such as the elderly or those in poverty.

Status: Ongoing

Primary Responsible Entities: Town of Colchester Department of Public Works

Timeframe: Month 2017 through March 5, 2022 (update after FEMA approval date)

Funding Requirements and Sources: City capital funds and operating funds; grants

Specific Identified Actions:

Action B-1: Implement Flow Restoration Plans for Morehouse & Sunderland Brooks
Begin implementation of Flow Restoration Plans for the following impaired streams: Morehouse Brook and Sunderland Brook. These plans are part of the town's obligations under its National Pollutant Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer Systems (MS4) permit. In keeping with the details of the Plan, the Town will seek to implement the Best Management Practices that are the responsibility of the Town.
In the case of Morehouse Brook, most of this drainage is located upstream in the City of Winooski. Opportunities for disconnecting stormwater runoff in the Town are limited and therefore, the Town will likely make a financial contribution to the City to help implement projects in Winooski.
In the case of Sunderland Brook, its "high flow" targets are currently being met and therefore no new projects are required. However, it is possible that in the future, controls related to phosphorus reduction may be required and therefore it is appropriate to maintain this reference to Sunderland Brook.

Action B-2: Begin Implementation of Phosphorus Control Plan
Develop and begin to implement a plan to reduce overall loading of phosphorus from within municipal boundaries that is eventually discharged into Lake Champlain. The exact nature and scope of these plans are not known at this time but MS4 permitted municipalities will be required to develop these plans as part of forthcoming requirements in an amended MS4 permit to meet the phosphorus targets in the Lake Champlain Total Maximum Daily Loads (LCTMDLs).

Rationale / Cost-Benefit Review:

Implementation of these Flow Restoration Plans and a Phosphorus Control Plan will assure that the Town remains in compliance with its MS4 permit. Projects undertaken to achieve these plans will serve to better detain, infiltrate and treat runoff during flood, fluvial erosion and severe rainstorm events. This will act to reduce overall water levels and velocity. The project will also reduce pollutant and phosphorus loads into these streams and Lake Champlain.

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 5-7 Town of Colchester action evaluation and prioritization matrix

Mitigation Category & Actions	Responds to significant (likely or high risk) hazard	Likelihood of funding	Protect threatened infra-structure	Implemented quickly	Socially / Politically acceptable	Technically Feasible	Administra-tively Realistic	Reasonable cost to benefit	Environmen-tally sound	TOTAL SCORE
CATEGORY A: Operate a Stormwater Utility										
Action 1: Establish municipal stormwater utility	5	4	5	4	4	5	5	5	5	**42**
Action A-2: Catch basin cleaning & street sweeping	4	4	5	4	5	5	5	4	5	**41**
Action A-3: Review of land development proposals	4	4	4	4	5	5	5	4	5	**40**
Action A-4: Upgrades to infrastructure	4	4	4	4	4	5	4	3	5	**37**
CATEGORY B: Implement Flow Restoration Plans & Phosphorus Control Plan										
Action B-1: Begin implementation of Flow Restoration Plans for Morehouse & Sunderland Brooks	4	3	5	3	3	4	4	3	5	**34**
Action B-2: Begin implementation of Phosphorus Control Plan	5	3	4	3	3	4	3	3	5	**33**
5 = Excellent; 4=Good; 3=Average; 2=Below Average or Uknown; 1=Poor										

5.5 Implementation and Monitoring of Mitigation Strategies

The following table is intended to aid municipal officials in implementing the mitigation actions for Colchester and to facilitate the annual monitoring of the plan as outlined in the Multi-Jurisdictional All-Hazards Mitigation Plan. The first table records the strategies from the 2011 Plan and progress that has been made towards them. The second table outlines the mitigation strategies that have been developed for implementation from 2016-2021.

Table 5-8 Town of Colchester Mitigation Actions: Implementation Monitoring Worksheet

CATEGORY A: Operate a Stormwater Utility to mitigate Severe Rainstorm, Water Pollution and Fluvial Erosion and their associated vulnerabilities of: • Damage to new/existing public infrastructure and buildings • Temporary road and bridge closure • Temporary isolation of vulnerable individuals • Budgetary impacts	
Action **(Primary Responsible Entity)**	**Report on Progress since Plan adoption**
Action A-1: Establish municipal stormwater utility (Town of Colchester: various departments)	-note year and month established -note annual number of utility customers -note total funds raised
Action A-2: Street sweeping and catch basin cleaning (Colchester Public Works Director)	-annual # basins cleaned -annual # street miles swept
Action A-3: Review of land development proposals (Colchester Public Works Director and Colchester Planning and Zoning Director)	-note major projects reviewed or inspected with regards to stormwater management and/or number of land development project applications
Action A-4: Annual upgrades to stormwater infrastructure (Colchester Public Works Director)	-note significant upgrades made on an annual basis by location and year

CATEGORY B: Implement Flow Restoration Plans and Phosphorus Control Plan to mitigate Severe Rainstorm, Water Pollution and Fluvial Erosion and their associated vulnerabilities of: • Damage to new/existing public infrastructure and buildings • Temporary road and bridge closure • Budgetary impacts	
Action **(Primary Responsible Entity)**	**Report on Progress since Plan adoption** *See Section 5.4 for details on locations identified during Plan development.*
Action B-1: Implement Flow Restoration Plans for Morehouse & Sunderland Brooks (Colchester Public Works Director)	Morehouse Brook: note any projects in Town or any financial contributions to City of Winooski to support implementation of projects in their portion of the brook Sunderland Brook, its "high flow" targets are currently being met and therefore no new projects are required. However, note any projects implemented within Town or those supported outside of the Town.
Action B-2: Begin implementation of Phosphorus Control Plan (Colchester Public Works Director)	-progress on development of plan and filing to State - progress on any discrete phosphorus reduction projects

Saint Michael's College
2017 All-Hazards Mitigation Plan

Appendix

to the
2017 Town of Colchester
All-Hazards Mitigation Plan

Prepared by:

The Chittenden County Regional Planning Commission
the
Town of Colchester, Vermont
and
Saint Michael's College

Adopted May 9, 2017 by Town of Colchester Selectboard

Table of Contents

List of Tables

SECTION 1: INTRODUCTION AND PURPOSE

1.1 Purpose and Scope of this Plan

The purpose of this appendix to the Colchester All-Hazards Mitigation Plan is to assist the Town of Colchester in identifying the specific hazards facing Saint Michael's College and in identifying strategies to begin to reduce the impacts of those hazards. This plan also seeks to better integrate and consolidate efforts of the College with those outlined in the Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan and the Colchester Annex, as well as efforts of quasi-governmental organizations such as Local Emergency Planning Committee, District #1 and the Chittenden County Regional Planning Commission.

1.2 All-Hazards Mitigation Plan Goals

The 2017 Chittenden County Multi-Jurisdictional All-Hazards Mitigation Plan sets forth general goals for the county as a whole and its municipalities. Of these, the following goals are relevant to the Saint Michael's College community:

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 local plans and the capacity of municipalities and other entities to implement them.
5. Encourage municipalities and other entities to formally incorporate elements of their Local All-Hazards Mitigation Plan, particularly their recommended mitigation strategies, into their operating and capital plans & 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 the regional land use and transportation planning program conducted by the Chittenden County Regional Planning Commission.
7. Maintain existing mechanisms or develop additional processes to foster regional cooperation in hazard mitigation, specifically and emergency management planning, generally.

1.3 Saint Michael's College: Demographics and Development Characteristics

Saint Michael's College is a private Catholic liberal arts college located in the Route 15 corridor in the Ft. Ethan Allen neighborhood of the Town of Colchester, Vermont. The college campus

covers 440 acres, abutting the town of Winooski to the west, and the town of Essex to the east. The college provides undergraduate programs in a variety of liberal arts disciplines, and has a smaller number of graduate programs.

Roughly 2,000 students attend Saint Michael's College, almost all of whom live on campus in residence halls, apartments, or town houses. This concentration of students makes up the majority of the 9.6% of Colchester's population housed in group quarters, as assessed in the 2000 US Census.The college employs over 500 people, including 150 faculty making it a major employer in the Town of Colchester.

The campus is accessible from the rest of Colchester by passing through Winooski or Essex, and is accessible from South Burlington by the Lime Kiln Bridge. A connector road was recently completed; from Barnes Ave travel south on Winchester Place to Vermont National Guard Road, continue south on Johnson Ave and west on Gate 5 Road entering South Campus. The main campus is located on the northern side of US Route 15, near the interchange with Interstate 89 Exit 15. A few buildings are located on the southern side Route 15. A smaller satellite campus, containing residence halls, apartments, trade and support facilities, and some rented office space, is located in Fort Ethan Allen, slightly east from the main campus along Route 15.

In terms of growth, the college cannot expand westward, as it abuts the interstate and a residential neighborhood in Winooski. As noted above, some expansion into the historic Fort Ethan Allen area to the east has taken place. At the moment, there is no connector between the two campuses except the highway, which has a high volume of traffic. A Campus Connector road has been proposed to link the main campus with Fort Ethan Allen.

1.4 Summary of Planning Process

In both June 2016 and January 2017, CCRPC staff asked St. Michael's College Public Safety staff to review the old 2011 draft and update text as necessary. Sgt. Stephen Cushing provided several updates to the data in the plan and also noted the need to add an additional new dorm in the list of locations storing petroleum and/or hazardous substances.

Data pertaining directly to Saint Michael's College was identified for this appendix. Additional data regarding the college was gathered at this time. Specific sources, plans, and reports reviewed include:

- Saint Michael's College Department of Public Safety Annual Report, 2008
- Saint Michael's College Hostile Intruder Community Guideline
- Saint Michael's College website (for general information)
- Saint Michael's College Department of Public Safety website
- 2014 Colchester Town Plan

A draft was submitted on March 17, 2017 to VDEMHS for review and forwarding to FEMA which was subsequently approved for adoption by FEMA on April 17, 2017.

The appendix, along with the 2017 Town of Colchester All-Hazards Mitigation Plan and the Multi-Jurisdictional AHMP, were adopted by the Colchester Selectboard on May 9, 2017.

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. A few of the hazards identified in the Multi-Jurisdictional AHMP are presented in more detail for this appendix. College campuses have unique characteristics not shared by municipalities as a whole, and are thus susceptible to different kinds of hazards.

2.1 Utilities

2.1.1 Loss of Electrical Power and Heat

Power loss, while generally not an immediate threat to human health, has the potential to cause large-scale disruption on a college campus.

Green Mountain Power supplies electrical power to Saint Michael's College. On campus, the College is responsible for the electrical infrastructure and electrical problems that occur. To prevent power loss, all major buildings have generators, and the College has enough portable generators to power most other buildings.

Central buildings are also dual-fuelled, using both natural gas and heating oil for heating systems. These buildings also have redundant boiler systems, to assure continued functioning if the main boiler fails.

2.1.2 Telecommunications Failure

As a college campus, Saint Michael's College relies heavily on electronic communications. Students, faculty, and staff all use electronic means for day-to-day communications. The communication center for the campus is the Telephone and Dispatch Services. Dispatchers field emergency and non-emergency calls. Saint Michael's College has an extensive emergency notification system, which sends alerts through text messaging, email, web page updates, radio, and television. A large-scale telecommunications failure could affect these alert mechanisms, but the IT department is creating an off-site backup to prevent outages from disrupting the emergency notifications systems.

2.2 Hazardous Substances

Hazardous material release or petroleum products release is discussed as a possible hazard in the Multi-Jurisdictional All-Hazards Mitigation Plan. College personnel report that multiple campus locations store fuel oil in excess of 10,000 lbs. as well as various chemicals used in research and instruction. A listing of these sites is contained in Section 3.2.5 of the Town AHMP.

As the campus is densely populated, especially during the daytime hours, a significant hazardous material incident could possibly affect a significant number of people. The school has a chemical hygiene plan that applies to all science labs. This outlines training, spill response, and

resources regarding hazardous materials. Hazardous waste storage facilities are located on both the Main and North campuses.

2.3 Transportation Incident

2.3.1 High Accident Locations

Saint Michael's College is situated along Vermont Route 15, also known as College Parkway. This arterial roadway is heavily travelled, and a segment of it near the campus is designated a High Crash Location by the Vermont Agency of Transportation. Over time, the number of accidents has stayed fairly constant.

From 2001 through 2005, 115 crashes occurred on this segment of Route 15 with one fatality and 33 injuries recorded.

From 2010 through 2014, 100 crashes occurred on this segment of Route 15 with no fatalities and 12 injuries recorded.

College officials have some concerns over the safety of pedestrians crossing College Parkway, although few campus buildings are located south of Route 15.

2.4 Crime

The overwhelming majority of crimes reported by the Saint Michael's College Department of Public Safety are minor offenses, most commonly drug and liquor law violations. College officials have expressed concern over an increase in property crimes, although levels are considered normal for a college campus. Crime prevention efforts are in place, including awareness and education. As with any community, more serious crimes are a possibility. Violent crime at the College is rare. Mass shootings have occurred in other educational institutions in recent years, although their occurrence is difficult, if not impossible, to predict. The College's Department of Public Safety has issued hostile intruder guidelines for the college community, instructing community members how to respond to an active shooter or other hostile intruder.

2.5 Civil Disturbance

Historically, colleges have been vulnerable to civil disturbance. However, Saint Michael's College does not have a history of civil disturbance. The College has a policy regarding student demonstrations. The College plans and prepares for events. College officials do not consider a significant civil disturbance to be likely on campus.

2.6 Epidemic

Colleges and other residential institutions have challenges not shared by municipalities and governments when it comes to epidemics. At a residential college, large numbers of students live in fairly close quarters, often with shared dining facilities. Over the course of a day, each student is exposed to several different groups of people in classes, campus activities, and leisure activities. Similarly, faculty members may teach several completely different groups of students each day.

As a result of these factors, infectious disease has the potential to spread rapidly through the entire campus community. Mindful of this, officials at many colleges have engaged in pandemic planning in recent years, mostly focused on a flu pandemic. If a disease is circulating in the community, officials at a college must decide whether to send students home or keep them on campus. Evacuating the campus could potentially result in students being sent home to areas where the epidemic is more widespread, while keeping them at school runs the risk of disease sweeping through the campus population. College officials must reconcile the different kinds of risk, and also make plans for continuity of operations should the campus be shut down due to an epidemic.

Other than the measures noted above, the College's ability to mitigate an fast-spreading epidemic are limited. For additional response and recovery, the College relies on the Vermont Department of Health and the federal Centers for Disease Control and Preventions related to epidemic preparedness, prevention and mitigation, and medical facilities and services in neighboring communities such as the University of Vermont Medical Center.

SECTION 3: RISK ASSESSMENT

3.1 Mapped Hazard Areas

The developed portion of the Saint Michael's College campus does not fall within either the 100-year floodplain or a designated fluvial erosion hazard area. However, the school owns land south of Route 15 adjacent to the Winooski River, some of which falls in the 100-year floodplain. This land is used partially for agriculture, and no structures lie within the floodplain.

3.2 Other Information

College officials did not identify any other areas that are prone to hazards.

3.3 Future Events

College officials expressed concern about several hazards that, while unlikely to occur, would have significant impact on the school. The college is located near a military facility, Camp Johnson, and college officials believe that a large-scale incident there—a military ordnance explosion or terrorist event—could affect Saint Michael's College as well. Similarly, the college is located about a mile from the runway of Burlington International Airport, and officials expressed concern that an airplane crash or other air travel incident could affect the campus. The college participates in airport drills and the airport's emergency plan. Although unlikely, an active shooter or other hostile intruder is a concern for College officials. The College has implemented awareness training and intervention procedures to help prevent a student from becoming a shooter. The College has also developed and provided training on hostile intruder guidelines to mitigate this hazard.

SECTION 4. VULNERABILITY ASSESSMENT

4.1 Critical Facilities

The Saint Michael's College campus contains the following critical facilities. This list does not contain critical facilities designated as hazardous materials storage sites, as those are listed in Tables 2-1 and 2-2.

Table 4-1 Critical Facilities located at Saint Michael's College

Category	Facility Type	Facility Name
Education	College / University	Saint Michael's College
Emergency Medical Operation and Emergency Operation	EMS Station Locations, Fire Stations	Saint Michael's Fire and Rescue Station
Information and Communications	Radio Station	WWPV
Public Attractions and Landmark Buildings	Sports Arena / Stadium/ Public Gathering Place	Ross and Tarrant Centers, McCarthy Arts Center

Sources: VCGI, Saint Michael's College

SECTION 5: MITIGATION STRATEGY

5.1 Existing *2014 Colchester Town Plan* Excerpts Pertaining to Saint Michael's College That Support Hazard Mitigation

Chapter 2, Land Use

…….Saint Michael's College is a private, Catholic, liberal arts school that confers bachelor's degrees as well as graduate degrees. The majority of its approximately 2,000 students live on campus which makes the campus a rather self-contained facility along the northern edge of Route 15. Recent expansions have moved some of the College functions east into the historic Fort Ethan Allen Area. The Campus Connector Road Project will assist the College in providing a safe means of connecting its functions at the historic Fort with the main campus. The College also maintains a volunteer fire and rescue squad as well as other facilities on the south side of Route 15. These emergency services are coordinated with the Town with the St. Michael's Fire Department acting as a subsidiary of the Colchester Center Volunteer Fire Company. As mentioned throughout this plan, the College significantly contributes to the community and its continued expansion and redevelopment plans should continue to be supported by the Town.…..…

Policies
5. *Improvements to Route 15 are needed to better facilitate current volumes of traffic; however, these improvements should not be done at the expense of local traffic and circulation. The Town should continue to work with Route 15 communities to complete bicycle and pedestrian facilities for safe access along the Route 15 corridor.*
6. *A full interchange at Exit 15 and connection road between Exit 16 and Route 15 should be pursued by the Town.*
7. *The Campus Connector Road should be incorporated into the Official Map.*
8. *The Town should continue to work with the Regional Planning Commission to mitigate the possible impacts of increased truck traffic on Route 15 and Lime Kiln Road.*

Chapter 11: Utilities, Facilities & Services

Saint Michael's College (SMC) operates a Fire Department that is a brigade to the Colchester Center Volunteer Fire Company. While this Department is primarily responsible for calls within the vicinity of the college campus on Route 15, the Company and the Department operate within a contiguous area. Saint Michael's also has a Rescue Department that operates in conjunction with the Colchester Rescue Squad for operations within Colchester. SMC Rescue also serves the greater Burlington area and is one of the busiest volunteer rescue services in Vermont, answering over 2000 calls per year.

5.2 Existing Saint Michael's College Actions That Support Hazard Mitigation

5.2.1 Saint Michael's College Emergency Response Plan

Saint Michael's College has a comprehensive Emergency Response Plan that is reviewed annually by the College's Risk Management & Safety Committee. The potential hazards it addresses include: fire emergency, hazardous materials emergency, oil or petroleum spill, natural gas related emergency, extreme weather, personal injury, bomb threat, civil disturbance, pandemic flu outbreak and hostile intruder guidelines.

5.2.2 Excerpts from the *2008 Saint Michael's College Department of Public Safety Annual Report* That are Relevant to Hazard Mitigation

5.2.2.1 General

Campus Security at Saint Michael's College is the responsibility of the Department of Public Safety, which reports to the Vice President of Student Affairs. ….
Editors Note: [The department is comprised of thirteen full time employees: director, ten non-sworn officers, investigator/liaison officer, emergency coordinator and administrative assistant plus four part time officers]
Each officer has received extensive orientation and on the job training. Several officers have previous law enforcement experience and/or are certified in mountain bike patrol. The department provides annual and ongoing in-service training for its officers that includes, but is not limited to legal update, crime prevention, fire safety, human relations, stress management, CPR and first aid.
The Saint Michael's Campus is patrolled 24 hours a day, 7 days a week by foot, mobile and bicycle officers who handle routine locking schedules, security, facility and fire safety checks, and respond to incidents or reported problems…
…In addition, the campus is equipped with 68 emergency/courtesy telephones connected directly to the dispatcher which identify the location of the caller. The Public Safety office is located on College Parkway across from the South entrance to the college in the Fire & Rescue Station…
…Saint Michael's College is in the town of Colchester and thus falls primarily within the jurisdiction of the Colchester Police Department (CPD). All incidents on campus which are serious crimes are reported or referred to the Colchester Police. While there is no formal written agreement in place, SMC Public Safety and CPD routinely exchange information relative to the security and protection of the campus and surrounding neighborhoods. The campus borders the City of Winooski, and the Public Safety department maintains a cooperative arrangement with its police department as well.

5.2.2.2 Crime Prevention and Awareness

Incidents or trends of incidents on campus which represent a potential threat to the safety and security of the members of the campus community are reported to the community through Public Safety Alert Bulletins. These bulletins are transmitted over the campus e-mail system and are intended to inform the community in a timely manner so people may be aware and take steps to prevent themselves from falling victim to campus crime

5.2.2.3 Emergency Preparedness and Response; Fire and Rescue

Saint Michael's College has a comprehensive Emergency Response Plan in place which covers a wide range of situations, including fires, bomb threat, leaks and spills, disturbances and weather. Emergency Response Charts are posted around campus for reference. The college has also developed a Hostile Intruder Community Guideline and a multi-mode emergency notification plan utilizing Rave Wireless to provide timely communications and instructions in the event of a serious campus emergency. This system is tested each semester.

Editors Note: [Notifications are also transmitted over e-mail, LiveSafe and campus portal.]
Saint Michael's Fire & Rescue, a student organization, operates under the supervision of the Director of Public Safety. Public Safety officers respond to all requests for Fire & Rescue on campus, assisting wherever possible. At the beginning of each academic year, representatives from Public Safety and Fire & Rescue are available to address residents of the halls on fire safety education. These sessions focus on hazards unique to campus residential living as well as alarm and evacuation procedures.

5.2.3 Pandemic Planning

In response to rising concerns about pandemic flu in recent years, Saint Michael's College officials are in the process of creating a Pandemic Flu Plan, which will be part of the Emergency Response Plan. The plan is expected to contain an evacuation plan for the campus to be implemented in the case of an outbreak and a continuity of operations plan in the event of a long-term campus closure. Currently, each incoming freshman student is required to identify locations to evacuate to in case of a campus closure. The Pandemic Flu Plan is scheduled to be completed by the end of August 2009.

5.2.4 Emergency Management Capabilities

Table 5-1 below summarizes other actions and plans that pertain to emergency management at Saint Michael's College.

Table 5-1 Existing Emergency Management capabilities Saint Michael's College

Type of Existing Protection	Description /Details/Comments	Issues, or Concerns
Emergency Response		
Police Services	Department of Public Safety, Town of Colchester, also maintains a cooperative agreement with Winooski Police Department.	
Public Safety Personnel	Thirteen full time employees: director, ten non-sworn officers, investigator/liaison officer, emergency coordinator and administrative assistant plus four part time officers.	
Fire Services	Saint Michael's College Fire & Rescue. Fire unit serves not only the campus, but other areas of Colchester as well.	
Fire Department Personnel	Approximately 25-30 Volunteers	
Fire Department Mutual Aid Agreements	MOU with Colchester Center FD	
EMS Services	Saint Michael's College Fire & Rescue. EMS also serves the communities of Colchester, Hinesburg, St. George, Williston, and Winooski.	
EMS Personnel	Approximately 35-40 Volunteers	
EMS Mutual Aid Agreements	various through VT EMS District #3	
Hazardous Materials Response	2 staff with 40-hour HAZWOPER training	
Other Campus Services		
Facility Maintenance Services	Saint Michael's College Facilities Maintenance	

Facilities Maintenance Personnel	Approximately 72 FTE, includes custodians.	
Building Code / Inspection	Saint Michael's College has many inspections and inspectors depending on the type of building or system. The college falls under the Vermont Dept. of Labor and Industry standards, Town of Colchester planning/zoning requirements (during permit process) and the Vermont OSHA regulations. Many inspections are performed by certified outside vendors. Systems inspected annually include elevators, fire suppression within hoods, fire extinguishers, fire alarms, sprinklers, generators, bleachers, fume hoods etc.	
Emergency Plans		
Emergency Response Plan (ERP)	Yes, updated annually	
School Evacuation Plan(s)	Will be part of Pandemic Plan.	
HAZMAT Plan	Part of Emergency Response Plan	
Shelter, Primary	Ross and Tarrant Centers	College has agreements with Winooski and Colchester to be a short term shelter for the public schools.
Replacement Power, backup generator	Generator present.	
College Plans		
College Comprehensive Plan	Under development	