Town of Braintree, Vermont

Local Hazard Mitigation Plan

Adopted May 19, 2020

Approved June 1, 2020

Prepared by the Town of Braintree

with technical assistance from Two Rivers-Ottauquechee Regional Commission

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

FEMA

Stephanie A. Smith, State Hazard Mitigation Officer
Vermont Emergency Management
45 State Drive
Waterbury, Vermont 05671-1300

Dear Ms. Smith:

As outlined in the FEMA-State Agreement for FEMA-DR-4474, your office has been delegated the authority to review and approve local mitigation plans under the Program Administration by States Pilot Program. Our Agency has been notified that your office completed its review of the Town of Braintree, Vermont Local Hazard Mitigation Plan and approved it effective **June 1, 2020** through **May 31, 2025** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

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

The plan must be updated and resubmitted to the FEMA Region I Mitigation Division for approval every five years to remain eligible for FEMA mitigation grant funding.

Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Melissa Surette at (617) 956-7559 or Melissa.Surette@fema.dhs.gov.

Sincerely,

Captain W. Russ Webster, USCG (Ret.), CEM
Regional Administrator
FEMA Region I

WRW:ms

cc: Ben Rose, Recovery and Mitigation Section Chief, VEM

Certificate of Adoption

The Town of Braintree
Select Board
A Resolution Adopting the Local Hazard Mitigation Plan
May 19, 2020

WHEREAS, the Town of Braintree has worked with the Two Rivers-Ottauquechee Regional Commission to identify hazards, analyze past and potential future losses due to natural and manmade-caused disasters, and identify strategies for mitigating future losses; and

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

WHEREAS, a duly-noticed public meeting was held by the Town of Braintree Select Board on May 19, 2020 to formally adopt the Braintree Local Hazard Mitigation Plan;

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

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

ATTEST

Chair of Select Board

Member of Select Board

Town of Braintree, Vermont
Local Hazard Mitigation Plan

Prepared by the Two Rivers-Ottauquechee Regional Commission and the Town of Braintree

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I. Introduction

Natural and human-caused hazards may affect a community at any time. They are not usually avoidable; however, their impact on human life and property can be reduced through community planning. Accordingly, this Local Hazard Mitigation Plan (hereafter referred to simply as the Plan) seeks to provide an all-hazards mitigation strategy that will make the community of Braintree more disaster-resistant.

"Mitigation" is defined as any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Previous Federal Emergency Management Agency (FEMA), State and Regional Project Impact efforts have demonstrated that it is less expensive to anticipate disasters than to repeatedly ignore a threat until the damage has already been done. While hazards cannot be eliminated entirely, it is possible to identify prospective hazards, anticipate which might be the most severe, and recognize local actions that can be taken ahead-of-time to reduce the damage. These actions, also known as 'hazard mitigation strategies' can (1) avert the hazards through redirecting impacts by means of a structure or land treatment, (2) adapt to the hazard by modifying structures or standards or, (3) avoid the hazard through improved public education, relocation/removal of buildings in the flood zone, or ensuring development is disaster resistant.

II. Purpose of the Plan

The purpose of this Plan is to assist Braintree in identifying all hazards facing the town, ranking them, and identifying strategies to reduce long-term vulnerabilities from known priority hazards.

The Town of Braintree seeks to be in accordance with the strategies, goals, and objectives of the State Hazard Mitigation Plan.

The 2014 Braintree Local Hazard Mitigation Plan was the first stand-alone mitigation plan drafted for the Town. Previously, the Town had a town-specific 2009 Annex in the Regional Pre-Disaster Mitigation Plan. This new plan updates the 2014 plan, adding new information to make the plan stronger and more useful for the Braintree town officials and residents who will implement the hazard mitigation strategies in the future.

III. Community Profile

The Town of Braintree, Vermont is situated in the northwest corner of Orange County and comprises a total land area of approximately 22,700 acres or 35.5 square miles. Braintree is bounded by six towns (Randolph, Rochester, Granville, Roxbury, Brookfield, and Bethel), and is located in the northern part of the Two Rivers-Ottauquechee Regional Commission's planning area. Although Braintree is predominantly a rural-residential town, it abuts the Town of Randolph, which serves as the commercial hub for the area.

Braintree's population is growing. In 2010, the population of Braintree was 1,246, an increase from 1,194 residents in the year 2000 (U.S. Census). The increase in population is reflected in housing unit growth. According to the U.S. Census, there were 645 housing units in Braintree in 2010, compared to 567 in 2000. This amounted to an increase of 78 units (or 13.7%) over the ten-year period, at an average rate of almost eight units per year. According to the 2013-2017 American Community Survey 5-Year Estimates, the majority of Braintree's homes are owner-occupied with less than 16% being rented. As is the case in most Vermont towns, the bulk of Braintree's housing units are comprised of single-family homes. Braintree also has a fairly high percentage of mobile homes (22.9%), most of which are located in the Mobile Acres mobile home park, which is located just outside of the 500-year floodplain. The increase in housing units is likely due in part to the neighboring commercial center, Randolph, which lies along Interstate 89 and is home to several large employers. Braintree will probably continue to experience pressure to grow in the future.

With regard to services, the Town of Braintree lies within the service area of Green Mountain Power, which supplies electrical power to all sections of the town. Internet access can be obtained in various ways throughout the town, including landline/dial-up, cable, DSL, satellite, cellular internet, and most recently, fiber. For many years, most users relied on dial-up or satellite. In 2016 East Central Fiber (ECFiber), through a grant from the State of Vermont, built a business loop through the center of Braintree, bringing true high-speed internet to many, but not all, residents. In 2019, ECFiber installed line optical fiber internet service throughout the town of Braintree. Braintree does not have a cellular tower that services the residents of the town, and, as a result, cell reception is quite poor and in some areas, non-existent. The advent of town-wide ECFiber service does create the option for virtually all home owners to have a localized cell phone hot-spot around their homes. This means the cell-phone-only families can use their cell phones when at home, alleviating much of the issue of not having a cell tower that services Braintree homes.

Braintree has sufficient fire protection services that are available to all residents thanks to a contractual agreement, paid annually, with the Town of Randolph. Randolph has three satellite fire stations that are staffed by volunteer firefighters, with the Randolph Village Fire Department being the closest to Braintree, and the first to respond to an emergency in that area. When necessary, the Randolph Village Fire Department can call up additional firefighters from its other satellite stations, and there are approximately 40 more volunteers available at other area departments.

With respect to law enforcement, a Constable is elected each year at the Braintree Town Meeting. The Constable and Town residents may call upon the Vermont State Police (Troop D) for assistance, which has its station in Royalton. At the time of the writing of this Plan, the Town is considering contracting with Orange County Sheriff's Office for part-time police patrol services.

Emergency medical services are provided under an annual contract with the Town by the White River Valley Ambulance, Inc., which is located in nearby Bethel. This non-profit ambulance/rescue service is jointly owned by Braintree and nine other towns, and currently has a fleet of three ambulances. The Randolph Fire Department has a rescue truck with extrication equipment used for assisting injured people. The closest hospital is Gifford Medical Center, which is located in Randolph Village, and medivac

services are available either by ambulance or through the Dartmouth Hitchcock Advanced Response Team (DHART) helicopter, which is based at Dartmouth Hitchcock Medical Center in Lebanon, New Hampshire.

IV. The Planning Process

A. Plan Developers

Two Rivers-Ottauquechee Regional Commission (TRORC) assisted the Town of Braintree with updating its Hazard Mitigation Plan.

This section of the Plan satisfies 44 CFR 201.6(b)(1) and 201.6(c)(1) (or, A3.a and A3.b of FEMA's Local Mitigation Plan Review Guide, 2011).

The following stakeholders participated in the planning process:

Name	Role/Organization	How Participation Was Solicited
Timothy Caulfield	Braintree Emergency Management Director	On 4/25/2019, TRORC staff sent an introductory email to the Emergency Management Director, Selectboard Chair, and Planning Commission Chair. The letter provided an introduction to the planning process and invited their participation. This core group helped identify additional stakeholders to engage through community meetings (described below). TRORC also worked with the Town's Administrative Assistant and the participating stakeholders to publicize the aforementioned meetings broadly in the community.
Joan Richmond-Hall	Braintree Planning Commission, Development Review Board, Conservation Commission	
Charlie McMeekin	Braintree Selectboard	
Megan O'Toole	Braintree Selectboard	
Jeff Masterson	Braintree Road Foreman	
Michael Hildenbrand	Fire Chief of Randolph Village Fire Department	
Evelyn Harris	White River Valley Ambulance	
Jacob Markwood	White River Valley Ambulance	

Additional Participants in the Process:

The draft plan was submitted on Jan 23, 2020 to the Braintree Planning Commission and the Braintree Selectboard for their review. The Braintree Selectboard reviewed the draft and did not request any edits. The Planning Commission did not submit comments as a body. An individual member of the Planning Commission (Malcom Fitzpatrick) requested edits, some of which were incorporated into the draft in consultation with the Emergency Management Director.

B. Plan Development Process

Braintree's first hazard mitigation plan was an annex to a multi-jurisdictional Regional Hazard Mitigation Plan, drafted by Two Rivers-Ottauquechee Regional Commission and approved by FEMA on September 30, 2008. The annex was later reconstructed as a single jurisdiction, standalone Braintree Local Hazard Mitigation Plan to be submitted to FEMA for individual approval, which it received on June 13, 2014. The Plan expired on June 13, 2019.

This section of the Plan satisfies the Element A: Planning Process requirements set out in 44 CFR 201.6.

This Plan update includes the following changes:

- **General**
  - Data updates: New hazard incidents, emergency declarations, census data, structure and property vulnerability, and the Town's existing hazard mitigation efforts and resources;
  - Hazards have been reevaluated to reflect changes in the hazard ranking system used by the Vermont Division of Emergency Management in the 2018 Vermont State Hazard Mitigation Plan.
  - Status updates on mitigation strategies/actions identified in the 2014 Plan
  - Updates to the discussion of plan development process
  - New hazard mitigation strategies
  - Expanded discussion of the Town's Capabilities, including supporting resources and the Town's ability to expand or improve upon each capability
- **Hazards Analysis**
  - Reassessment of "top hazards" list to better align with community concerns:
    - Ice Storm / Heavy Snow is now on the list of "top hazards," and a new section has been added to the plan narrative to discuss this hazard. This change reflects stakeholders' concern about the impacts of extended power outages on vulnerable residents.
    - Stakeholders decided to remove Structure Fire from the list of "top hazards" due to the spatially limited nature of its potential impacts and the Randolph Village Fire Department's strong response capacity.
- **Maps**
  - The map of the Town of Braintree depicting critical facilities, town infrastructure, and the NFIP designated floodway and 100-year floodplain has been updated.

The following represent the avenues taken to draft the Braintree Hazard Mitigation Plan:

- **Activities**
  - May 30, 2019: A kick-off meeting, during which TRORC staff explained the planning process and timeline and guided stakeholders through an evaluation of the 2014 plan's hazard ranking and mitigation strategies/actions. Stakeholders also discussed changes in the Town's assets and capabilities since the adoption of the 2014 Plan. The following

stakeholders were represented at the meeting: Braintree Selectboard, Braintree Emergency Management Director, Braintree Planning Commission, Braintree Road Foreman, and Randolph Village Fire Department.

- July 22, 2019: Stakeholders met with TRORC staff to discuss data needs and draft new hazard mitigation strategies/actions. The following stakeholders were represented at the meeting: Braintree Selectboard, Braintree Emergency Management Director, and White River Valley Ambulance.
- August 26, 2019: Stakeholders met to review a draft of the plan and discuss mitigation strategies/actions. The following stakeholders were represented at the meeting: Braintree Emergency Management Director, Braintree Planning Commission, Braintree Road Foreman, Braintree Selectboard, Randolph Village Fire Department.

- **Public participation and involvement** (*44 CFR 201.6(b)(1)*)
  - Three planning meetings were held (5/30/19, 7/22/19, 8/26/19) at the Town Office. All of these meetings were open to the public. No members of the public attended. For more details about these meetings, see "Activities," above.
  - The planning meetings were publicized as follows:
    - Notices were published in The Herald of Randolph (a local paper) preceding each meeting. Contact information was provided in the notice to allow interested community members to learn more about and participate in the planning process. No comments were received. Publication dates:
      - 5/23/19, 7/11/19, 8/22/19
    - Preceding each meeting, digital meeting announcements were posted to the Randolph Front Porch Forum and the Town website. A hardcopy flier was also posted at the Town Office. Contact information was provided in the Front Porch Forum notice to allow interested community members to learn more about and participate in the planning process. No comments were received.
- **Governmental participation and involvement** *(44 CFR 201.6(b)(2)*)
  - TRORC staff consulted with Michael Hildenbrand (Fire Chief of Randolph Village Fire Department) on 8/6/19 regarding wildfire-related plan content. Michael provided incident data to TRORC on 8/19/19.
  - TRORC staff consulted with Jeff Masterson (Braintree's Road Foreman) on 8/20/19 and 1/14/20 regarding culvert and bridge conditions and strategies for mitigating risk from ice storms or heavy snow.
  - The following government stakeholders attended planning meetings and helped review the draft plan: Timothy Caulfield (Braintree Emergency Management Director), Joan Richmond-Hall (Braintree Planning Commission Chair), Charlie McMeekin (Braintree Selectboard), Megan O'Toole (Braintree Selectboard), Jeff Masterson (Braintree Road Foreman), and Michael Hildenbrand (Randolph Village Fire Department Chief).
  - The draft plan was provided to all members of the Planning Commission and Selectboard for their review (1/23/20). Contact information was provided for receiving comments by email.

- Sent revised draft to Vermont Emergency Management (3/26/20).

- **Neighboring community participation and involvement** *(44 CFR 201.6(b)(2)*)
  - Preceding each meeting, a notice was published in The Herald of Randolph (a local paper) alerting the public to the hazard mitigation planning process that was taking place. Contact information was provided in the notice to allow interested community members to learn more about and participate in the planning process. No comments were received. Publication dates: 5/23/19, 7/11/19, 8/22/19
  - Preceding each meeting, a digital meeting announcement was posted to the Randolph Front Porch Forum. Contact information was provided in the Front Porch Forum notice to allow interested community members to learn more about and participate in the planning process. No comments were received.
  - Sent revised draft to neighboring towns' Selectboards and provided contact information for receiving comments (3/11/20).
    - Towns of: Granville, Hancock, Rochester, Bethel, Randolph, Brookfield, Roxbury
    - No comments were received.
- **Review of existing plans, studies, reports, and technical information** (*44 CFR 201.6(b)(3)*)
  - **Vermont State Hazard Mitigation Plan, 2018**
    - This Plan was referenced for knowledge of the state's hazard mitigation planning processes and description of top hazards for the State of Vermont.
  - Braintree Hazard Mitigation Plan (Adopted 4/15/14, Approved 6/13/14)
    - This Plan was referenced extensively during the plan development process, especially in regard to the worst threats and mitigation action strategies identified in 2014.
  - Braintree Town Plan (Adopted 12/5/17)
    - The Town Plan provided TRORC's staff with background information on the community, as well as more detail on their emergency services.
  - Braintree Vermont Unified Bylaw (Adopted 3/4/10)
    - The bylaw provided TRORC staff with information about existing regulations within the Town's Floodplain Overlay District.

This section of the Plan satisfies 44 CFR 201.6(b)(3) (or, A4.a and A4.b of FEMA's Local Mitigation Plan Review Guide, 2011).

C. Status Update on Mitigation Actions Identified in 2014

The following table outlines the mitigation actions that were proposed in Braintree's 2014 Local Hazard Mitigation Plan. Participants in the plan update process reviewed these actions and reported on the status of each in the table below. Actions related to long-term mitigation of natural hazards are so noted.

This section of the Plan satisfies the requirements of 44 CFR 201.6(d)(3).

2014 Mitigation Action	Local Leadership	Priority	Resources	Projected Time-frame	2020 – Status of Mitigation Actions
All Hazards					
1. Ensure that Basic Emergency Operations Plan (BEOP) is up-to-date.	Selectboard	High	With TRORC assistance	Yearly	☑ Completed. The new iteration of BEOP is the Local Emergency Management Plan (LEMP). Braintree updates this document annually. Their most recent LEMP was updated and then adopted on 5/2/2019 by the Braintree Selectboard.
2. Determine location and seek funding to install (solar-powered?) repeater in the Town of Braintree.	Selectboard	Medium-High	Grant funding from Homeland Security	Years 1-3 of planning period	☑ Completed. The solar-powered repeater was installed at the top of Braintree Hill in 2014.
3. Formally delineate radio zones and seek funding for radio equipment.	Emergency Response Committee and Emergency Manage-ment Director	High	Grant funding, local resources	Years 1-2 of planning period	☑ Completed. There are now radios installed in 7 different zones within the Town. Use of radio equipment is practiced monthly.
Hazardous Material Spill					
4. Maintain Railroad Emergency Pre-Plan and ensure that it is kept up-to-date.	Emergency Manage-ment Director	Medium-High	Local resources	**Yearly**	☑ Completed. This plan was last updated July 7, 2019.
5. Identify / develop additional access routes to Mobile Acres, a 100 unit mobile home park and campground.	Selectboard, Emergency Managemen t Director	High	Local resources	Years 1-3 of planning period	☑ Completed. The Town was not able to construct a new access route, but has identified two alternative evacuation / access options.

2014 Mitigation Action	Local Leadership	Prior-ity	Resources	Projected Time-frame	2020 – Status of Mitigation Actions
Wildfire / Structure Fire					
6. Develop additional dry hydrant sites in rural locations, including in East and West Braintree.	Braintree Rep to Randolph Fire Advisory Committee	Medium	Local resources, George Aiken Resource Conservation & Development grants	Years 3-4 of planning period	Not completed. No additional hydrants have been installed because there are no available sites (given the present criteria for dry hydrant site development).
7. Assess and map community's overall vulnerability to wildfire. Determine means of accessing areas vulnerable to wildfire.	Planning Commission	Medium	Local resources, Vermont Rural Fire Protection Task Force	Years 2-4 of planning period	Not completed.
8. Begin initiative to clean up debris along rivers left over from flooding.	Selectboard, Road Foreman	High	Local resources	Years 1-2 of planning period	Not completed. The state Agency of Natural Resources has prohibited the Town from removing debris on riverbanks.
Flood; Severe Weather; Hurricane/ Tropical Storm					
9. Maintain with neighboring communities mutual aid agreements for road crews.	Selectboard, Road Foreman	Low-Medium	Local resources	Yearly/on-going	Not completed.
10. Upgrade bridge on Bent Hill Road (undersized, narrow and has safety issues).	Selectboard, Road Foreman	High	Local resources, Better Back Roads grants, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (Competitive) grants (PDM-C)	Years 1-3 of planning period	☑ Completed in 2015. This upgrade resulted in long-term mitigation of flood and fluvial erosion risk to the community.

2014 Mitigation Action	Local Leadership	Prior-ity	Resources	Projected Time-frame	2020 – Status of Mitigation Actions
11. Upgrade culvert on Duclos Road.	Selectboard, Road Foreman	High	Local resources, Better Back Roads grants, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (Competitive) grants (PDM-C)	Years 1-3 of planning period	Not completed.
12. Upgrade the four multiplate culverts on Riford Brook Road.	Selectboard, Road Foreman	High	Local resources, Better Back Roads grants, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (Competitive) grants(PDM-C)	Years 1-3 of planning period	Not completed.
13. Upgrade Culverts 17 and 18 on Thayer Brook Road (close together and washed out during Tropical Storm Irene).	Selectboard, Road Foreman	High	Local resources, Better Back Roads grants, Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (Competitive) grants (PDM-C)	Years 1-3 of planning period	Not completed.

Changes in Town Priorities and Vulnerabilities Since the 2014 Plan

This 2020 Local Hazard Mitigation Plan reflects the evolution of the Town's priorities since 2014. The "top hazards" identified in this Plan and in the 2014 Plan are largely the same, but two significant changes should be noted. Firstly, the stakeholders who participated in the 2020 planning process decided to remove Structure Fire from the list of "top hazards" because its potential impacts are spatially limited (in other words, relatively few people are impacted), and because the existing resources and practices of the Randolph Village Fire Department are currently adequate to mitigate the risk. The hazard retains a high hazard ranking (see section V(A) of this Plan), but the stakeholders did not feel it

was necessary to analyze structural fire in depth, or to develop mitigation strategies specific to structural fire. The second significant change to the "top hazards" list is the addition of Ice Storm / Heavy Snow. The decision to undertake a deeper analysis of this hazard in the 2020 Plan reflects community concerns about the impacts of extended power outages on vulnerable residents.

This 2020 Plan update also includes some changes to mitigation strategies. One of the 2014 strategies that was not completed, namely cleaning up flood debris along rivers, was omitted from this Plan because it conflicted with state regulations. In accordance with its 2014 Plan, the Town completed Mobile Acres emergency access planning work, which led to the development of a new strategy to construct an all-wheel drive evacuation route between School Street Extension and the Mobile Acres Bridge. The 2020 Plan also includes new strategies for protecting populations that are most vulnerable during winter storms and for restricting development in flood-prone areas and near the railroad tracks.

Overall there are not large-scale development plans in the Town of Braintree. Since the last Plan was adopted in April 2014, 19 permits have been issued for new construction, all of which was residential in character. Braintree's Unified Bylaw, which was adopted in 2010, prohibits all new development, including all non-residential and residential structures, in the special flood hazard area and in the fluvial erosion hazard area (i.e., river corridor). In accordance with this bylaw, no new structures have been built within the special flood hazard area or river corridor in Braintree since the adoption of the 2014 Local Hazard Mitigation Plan. Moreover, none of the development permitted since 2014 has encroached upon the 500-year floodplain. This suggests that the vulnerability of Braintree to flooding and fluvial erosion has not significantly increased since 2014. However, it should be noted that structures outside of the mapped special flood hazard area and river corridors could still be vulnerable to fluvial erosion if they are located near a steep, upland stream.

At the time of this Plan's drafting, there are no plans for commercial or industrial development within the Town of Braintree. Only one residential development is currently proposed; it would be located outside of the special flood hazard area, river corridor, and 500-year floodplain. The Town therefore does not anticipate heightened risk resulting from that development project. Climate change impacts may change floodplain boundaries and increase flooding/erosion vulnerability within the Town. The strong focus on flooding and fluvial erosion in this 2020 Plan is consistent with the Town's understanding of its future vulnerability to these hazards. Since 2014, Braintree has completed mitigation actions that have reduced its vulnerability to flooding and fluvial erosion; specifically, about 25 culverts throughout Town were upsized, and improvements were made to one of the Lemery Road bridges, Bent Hill Road Bridge, and Tannenburg Bridge.

Additional development along the major transportation corridors that run through Town (Rte 12, Rte 12A, and the railroad) would increase the Town's vulnerability to hazardous material spills. Of the 19 permits issued for new construction since April 2014, only 3 were located along a major road (Rte 12A), and 2 of them were replacements of existing structures. As only 1 structure has been added to the hazardous material spill risk zone, the Town's vulnerability to this hazard has increased only slightly.

D. Town Capabilities for Implementing Mitigation Strategies

The Town of Braintree is currently engaged in the following hazard mitigation programs, projects and activities:

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(3).

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand/Improve on
Community Preparedness Activities	Program: Annual update of Braintree's Local Emergency Management Plan (LEMP) Current version was updated and formally approved on 5/2/2019.	Updated by the Emergency Management Director with support from the Selectboard and TRORC.	This document is reviewed and updated each year to ensure that the contact information of emergency response personnel is up-to-date. This information is then sent to Vermont Emergency Management for their records. The current program works well, no need to expand or improve on.
	Program: Emergency Management Team This group coordinates emergency response and communications as well as some preparedness efforts. Over the past 3 years, the Town has established and equipped an Emergency Operations Center at the Town Office. The Center has been exercised once during a projected possible flood event, and once as a practice/training session.	The Town budget includes an annual allotment for emergency management efforts. Team is currently composed of 10 local volunteers and meets quarterly.	Town effort exceeds efforts in similar sized towns in Vermont for participation within the local emergency planning committee (LEPC 12). The program is working well. No need to expand or improve on.
	Completed Action: Emergency Generators Generators have been installed at the Town Complex (Town Office and Town Garage) and Town Hall. The elementary school has had a generator for over 10 years.	The installation at the Town Complex was funded by a FEMA grant. The Town funded the installation at Town Hall. Maintenance is funded by local Town resources.	No further improvements are needed.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand/Improve on
Community Preparedness Activities (continued)	Completed Action: Communications Network Upgrades The municipal telephone system has been enhanced to avoid communication disruptions during emergencies. Also, a repeater has been installed on Braintree Hill and radios have been installed throughout the Town to facilitate radio communication. Operators have been designated for all but one of the cached radios.	A FEMA grant paid for the telephone system enhancements and the repeater. The Town funded the upgrades to the radio systems.	The Town is working to establish redundancy in its internet service. The Town is still seeking an operator for the radio at the Mobile Acres mobile home park.
	Program: Shelter Coordination The Town is organizing a community team to oversee preparation, maintenance, and operation of emergency shelter the elementary school.[1] The School District has approved the use of the elementary school as a shelter.	Staffing will come from a limited pool of Town volunteers.	Town volunteers should be provided with training specific to evacuation center operations, and the Town should coordinate with the Randolph Fire Departments for staffing assistance.
	Program: Animal Shelter Coordination The Upper Valley Disaster Animal Response Team works with local communities on pre-disaster planning for emergency animal care. The Team will operate emergency animal shelters during hazard events.	The Town will need to house pets during the first 72 hours of an event. Using local resources, the Town will purchase pet transport boxes and food in advance. After the first 72 hours, UVDAR will contribute resources.	The Town plans to accommodate animals at the elementary school emergency shelter. Doing so would require planning.
	Program: VT EM Trailer A Vermont emergency management trailer was sited at the Randolph Village Fire Station in 2019. During emergencies, this trailer will serve as a mobile hospital for residents of Braintree and surrounding communities.	The trailer is owned and staffed by the state.	The Town should coordinate with the Fire Department to see if the Town can tow the trailer in the event of an emergency.

[1] Braintree residents also have access to Randolph Union High School, which is a certified Red Cross Shelter.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand/Improve on
Community Preparedness Activities (continued)	Completed Action: Mobile Acres Preparedness The Town has identified 2 alternative evacuation / access routes for Mobile Acres mobile home park and Abel Mountain campground. This plan will facilitate evacuation of residents if railroad tracks are closed by a train accident.	RVFD, the Town Road Crew, and Town Emergency Management Team are capable of executing the Plan.	The Town needs to develop the all-wheel drive between the School Street extension and the Mobile Acres Bridge.
Insurance Programs	Authority / Program: Participation in National Flood Insurance Program (NFIP) The Unified Bylaw adopted on 3/4/2010 includes: • Floodplain Overlay District, and limitations/requirements for new development within the Special Flood Hazard Areas. • Fluvial Erosion Hazard Regulations were adopted in Braintree's latest Unified Bylaw (adopted 3/4/ 2010). • Most current FIRM maps dated 9/27/1985	The Town of Braintree's Zoning Administrator, Holly Jarvis, enforces the Floodplain Overlay District provisions of the Bylaw. Holly Jarvis also serves as the NFIP administrator. Assistance is provided by TRORC and Vermont ANR. Funding comes from local resources, i.e., the annual budget.	The Town's current Flood Insurance Rate Map (FIRM) is dated 9/27/1985. The Bylaw is kept up to date and regulates development in Fluvial Erosion Hazard Areas and Special Flood Hazard Areas.
Land Use Planning	Policy / Program: Braintree Town Plan Revised and adopted on 12/5/2017. The Plan update was informed by the Town's 2014 Local Hazard Mitigation Plan.	Volunteer time from the Planning Commission, and assistance from TRORC and state agencies on specific subject matter. Funding comes from Municipal Planning Grants.	The Town Plan is reviewed/updated every five years, as required by statute. The Town is currently revising the Town Plan; the Town is looking to strengthen language around resilience and mitigation of stormwater and flooding.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand / Improve on
Land Use Planning (continued)	Policy / Program: Capital Plan and Budget Information The Town of Braintree tracks and forecasts capital budgets. This information is published in the Town's Annual Report.	Town Selectboard and Town staff develop the Town Capital Budget.	The Town Selectboard has shown the ability to improve the capital budgets over the past 10 years, and will continue to do so. Existing resources are adequate.
	Authority: Unified Bylaw Adopted on 3/4/2010 • Includes Floodplain Overlay District, and limitations / requirements for development within the Special Flood Hazard Areas • Fluvial Erosion Hazard Regulations were adopted in Braintree's Unified Bylaw (adopted March 4, 2010).	Volunteer time from the Planning Commission, and assistance from the Selectboard, TRORC, and state agencies on specific subject matter as needed. Funding comes from Municipal Planning Grants. VLTC also provides guidance.	In 2021, the Town will completely revise the Bylaw. A larger Flood Overlay District will be proposed.
Hazard Control & Protection of Critical Infrastructure & Facilities	Policy / Program: Town of Braintree Local Hazard Mitigation Plan Adopted 4/15/14	Updated with volunteer time from local officials and assistance from TRORC and Vermont DEMHS. Funding from Vermont Emergency Management/FEMA.	The 2020 Braintree Local Hazard Mitigation Plan will replace the 2014 Plan. This 2020 LHMP has evolved from the 2014 Plan and has greatly expanded and improved upon it. Future iterations of the LHMP will be updated by the Town at least every 5 years.
	Authority— Town Road and Bridge Standards (Adopted 03/7/2013) New template adopted 07/16/2019.	Adopted by the Selectboard, implemented by the Road Foreman, assistance from TRORC. Funding from VTrans and the local budget to implement.	Specifies minimum construction standards for roadway, ditches, culverts and bridges and guardrails. VTrans updates the Town Road and Bridge Standards on a fairly regular basis. The Town has the authority to require above-and-beyond what is written in the policy.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand / Improve on
Hazard Control & Protection of Critical Infra-structure & Facilities (continued)	Program: Culvert inventory The last Town-wide culvert inventory was completed in 2014.	TRORC staff time and local Town staff time.	At the time of the writing of this plan, the Town is working with TRORC to update its inventory.
	Ongoing Action: Culvert Upsizing Since the adoption of the 2014 Local Hazard Mitigation Plan, about 25 of the Town's culverts have been upsized.	Town staff time, VTrans Structures and Class II Road Grants, TRORC staff time, Grants and Aid Program funding through TRORC	These efforts continue as resources allow. Large culverts are in need of replacing throughout the Town (See Appendix C).
	Program: Railroad Emergency Pre-Plan—Braintree, Vermont Braintree's Emergency Management Director developed a Railroad Emergency Pre-Plan that lists all crossings, mile markers, and other pertinent information in the event of an emergency. This list is kept up-to-date (last version dated 7/9/2019). A copy of this Pre-Plan is also sent to the Randolph Fire Department Chief.	Town EMD and Administrative Assistant staff time	Most data in the plan is static, and the annual review of the plan is adequate.
	Completed Action: Bridge Improvements The Town upgraded the bridge on Bent Hill Road in 2015. A bridge on Lemery Road was re-decked in 2014. Tannenburg bridge was improved in 2019. Previous completed projects include: West Street bridge (2013) and Gravel Pit bridge (2012).	VTrans Structures grants	The class 3 bridge on Lemery Road that was redecked in 2014 is still undersized and will need new abutments. A class 4 bridge (TH bridge 15) on Lemery Road also needs to be replaced. Work will proceed as resources allow.

	Type of Existing Authority / Policy / Program / Action	Resources: Staffing & Funding	Ability to Expand / Improve on
Education / Public Outreach	Ongoing Action: Distribution of educational materials to the public The following resources are being distributed: • Braintree Emergency Preparation Brochure (Prepared by Richard Bowen) • Preparedness flier (Prepared by Braintree Emergency Management Team)	Braintree Emergency Management Team	The Braintree Emergency Preparation Brochure should be updated. Emergency Management Team is capable of updating and improving the existing brochures. New opportunities will always be sought to distribute brochures.

E. Plan Maintenance

This section of the Plan satisfies 44 CFR and 201.6(c)(4)(i), 201.6(c)(4)(ii), and 201.6(c)(4)(iii).

This Plan (the Braintree Local Hazard Mitigation Plan) will be regularly monitored, updated, and evaluated by discussing its effectiveness and incorporating any necessary revisions. An effective plan advances its goals and leads to successful implementation of the strategies identified by the Town. Monitoring and evaluation of the Local Hazard Mitigation Plan will consist of thorough analysis of whether the Plan's vulnerabilities analyses are still valid, the status of mitigation and preparedness strategies, whether strategies are being implemented according to the time frames included in tables in this Plan, and whether previously identified strategies are still appropriate for the Town (considering effectiveness of implemented projects or actions, as well as changes in Town priorities, capabilities, and vulnerabilities). Updating the Plan will entail incorporating new data and analyses of challenges, opportunities, and progress; making the Plan consistent with changes to the Town Plan or Bylaw; revising strategies or developing new strategies as needed; and identifying the next steps required to implement the Plan's strategies. The plan can be amended in between 5-year updates without formal re-adoption during regularly scheduled Selectboard meetings.

Braintree's Emergency Management Director will be the principal point of contact and will take primary responsibility for the monitoring, evaluation, and update process described here. He or she will bring the Plan's maintenance activities to the Selectboard's agenda and discussions. The Two Rivers-Ottauquechee Regional Commission (TRORC) will help with Plan updates if assistance is requested by the Town of Braintree and if funding is available. If TRORC is unable to assist the Town, then Braintree's Town Clerk, Administrative Assistant, or Selectboard will update the Plan, or the Selectboard may

appoint a committee of interested citizens (including the current local Emergency Management Director) to draft changes.

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, notice within the Town Office, notice in *The Herald of Randolph* and the TRORC newsletter and blog, and inviting the public to the scheduled Selectboard (or specially scheduled) meeting. Additional stakeholders shall be invited to the meeting, such as White River Valley Ambulance, Inc. and Braintree Elementary School. These efforts will be coordinated by the Town Administrative Assistant. Comments from local officials and the public will be incorporated into the plan when relevant.

Monitoring, evaluation, and updates will take place as follows:

- **Annually**: The Plan will be monitored and evaluated annually at the May Selectboard meeting, along with the review of the Town's Local Emergency Management Plan (LEMP). This meeting will constitute an opportunity for the public and other town officials to hear about the town's progress in implementing mitigation strategies and to give input on future activities and any revisions that should be incorporated into the Plan. Updates may be made annually as needed, or reserved for the 5-year update process (see below).
- **Within 3 months of every federal disaster declaration**: The Selectboard and the Town's Emergency Management Director will be responsible for undertaking the plan maintenance process following a disaster declaration.
- **Every 5 years when the plan expires**: The plan maintenance process will begin at least one year before the Plan expires, and shall be informed by the Town's annual and post-disaster monitoring, evaluation, and update efforts.

Braintree will also work to integrate mitigation planning with the Town's long-term land use and development planning documents. The Town will reference and draw from the Local Hazard Mitigation Plan when working on Town Plan amendments or changes to the Town's bylaw. The 2013 Vermont Legislature passed a law requiring all towns to incorporate flood resiliency elements into their town plans as of July 2014. To do so, flood hazard and fluvial erosion hazards will be identified, and strategies and recommendations will be provided to mitigate risks to public safety, critical infrastructure, historic structures and public investments. This Local Hazard Mitigation Plan will help the town to comply with the new community flood resiliency requirement for town plans adopted after July 2014. The Town shall also consider reviewing any future TRORC planning documents for ideas on future mitigation projects and hazard areas.

V. Community Vulnerability by Hazard

A. Hazard Identification

Mitigation efforts must be grounded in the rational evaluation of hazards to the area and the risks these hazards pose. This is done through a process, which in essence asks and answers three basic questions:

- What bad things can happen?
- How likely are they to occur?
- How bad could they be?

This process, which is laid out in the table below, is an attempt to inventory the known hazards, establish the likelihood of them occurring in the future, and then assess the community's potential vulnerability to each. In performing this analysis, we are then able to prioritize actions that are designed to mitigate the effects of each of these disaster types and ultimately make Braintree a safer place.

It is important that we learn from the past in order to avoid the same disasters and their outcomes. Disasters that have occurred within the Town of Braintree, the larger region, and the State of Vermont can give us good information about what types of disasters we can expect in the future and what kinds of damage they might cause. However, while this historical data can inform our perspective of what might happen in the future, it is by no means a prophecy. While Braintree might not have been impacted by a specific hazard in the past, this does not necessarily mean it will never be affected in the future. Indeed, the advance of climate change means that old weather patterns may not hold. For instance, in recent years, Vermonters have seen an increase in the number and severity of storms, especially rainfall events. Armed with historical data and a healthy respect for climate change and the unknown, we have tried our best to identify hazards and prepare for the future.

The following table reflects the hazards that we believe can be expected, or are at least possible, in the central Vermont area. We have considered factors such as frequency of occurrence, warning time and potential community impact to rank each and determine which hazards pose the greatest threats to life and property in Braintree.[2] Community stakeholders selected a subset that they consider to be "top hazards" (bolded in the table, below) and wished to spotlight with discussion and mitigation strategies throughout the rest of this Plan. It should be noted that hazards assigned with the same "Hazard Score" are not in order and their placement in the table should not be assumed to reflect their potential to create hazards for the town.

[2] The ranking methodology used in this Plan (see Appendix A) is similar to that which is used by Vermont Emergency Management in the state hazard mitigation plan, though changes were made to reflect the more limited geographical scope of this analysis, which is focused on a small, rural town rather than the entire State of Vermont.

Hazard	Frequency of Occurrence	Warning Time	Potential Impact	Hazard Score
Wildfire	**Highly Likely**	**None-Minimal**	**Major**	**12**
Flash Flood/Flood/Fluvial Erosion	**Highly Likely**	**3-6 Hours**	**Major**	**11**
Severe Weather (Thunderstorm, Lightning, High Winds, Hail, and Flooding) ***Note: We have defined 'Severe Weather' to include two or more of the above listed hazards.**	**Highly Likely**	**3-6 Hours**	**Major**	**11**
Hazardous Material Spill	**Likely**	**None-Minimal**	**Major**	**11**
Structure Fire	Highly Likely	None-Minimal	Minor/Moderate	10.5
Tornado	Unlikely	None-Minimal	Major	9
Lightning	Likely	None-Minimal	Minor	9
Hail Storm	Likely	None-Minimal	Minor	9
High Wind	Highly Likely	3-6 Hours	Minor	9
Hurricane/Tropical Storm	**Likely**	**12+ Hours**	**Major**	**8**
Ice Storm / Heavy Snow	**Highly Likely**	**12+ hours**	**Moderate**	**8**
Drought	Likely	12+ Hours	Major	8
Water Supply Contamination	Likely	3-6 Hours	Minor	8
Earthquake	Likely	None-Minimal	Negligible	8
Ice Jams	Occasionally	3-6 Hours	Moderate	8
Landslides/Mudslides	Occasionally	None-Minimal	Minor	8
Avalanche	Unlikely	None-Minimal	Moderate	8
Extreme Heat	Likely	12+ Hours	Negligible	5
Invasive Species/Infestation	Likely	12+ Hours	Negligible	5

Hazard	Frequency of Occurrence	Warning Time	Potential Impact	Hazard Score
Agricultural Slurry Tank/Pond Breach	Unlikely	3-6 Hours	Minor	6
Dam Failure (Note: There are no high hazard dams in the Town of Braintree or upstream.)	Unlikely/Occasionally	3-6 Hours	Minor	6.5
Tsunami (Vermont is landlocked.)	N/A	N/A	N/A	N/A
Volcano (Vermont has no active volcanoes.)	N/A	N/A	N/A	N/A

After engaging in discussions using their best available knowledge, the Town of Braintree identified the following "top hazards" which they believe their community is most vulnerable to, based on high frequency of occurrence and significant potential impacts: [3]

- Wildfire
- Flash Flood/Flood/Fluvial Erosion
- Severe Weather
- Hazardous Material Spill
- Hurricane/Tropical Storm
- Ice Storm / Heavy Snow

Each of these "top hazards" will be discussed in the following sections. Within each section, previous occurrences of each hazard will be listed, including the County-wide FEMA Disaster Declarations (DR-#), where applicable. Hazards information was gathered from:

- Local sources (e.g., town history book)
- The National Centers for Environmental Information (NCEI) Storm Events Database (1950-2019)
- The Spatial Hazard Events and Losses Database for the United States (SHELDUS) 1960-2012
- Special Reports produced by the National Weather Service in Burlington, Vermont
- FEMA's listings of Disaster Declarations by year
- Vermont Department of Environmental Conservation's Spill List
- National Fire Incident Reporting System data

[3] It's important to note that those hazards which were not found to pose the greatest threats may still occur in Braintree's future; however, they are not the focus of this Plan. As previously noted in this Plan, Structure Fire was analyzed as a "top hazard" in the 2014 Plan, but is not examined in depth here because its impacts are spatially limited and because adequate resources are already dedicated to mitigating structural fire risk. Other hazards were excluded from the "top hazards" list in this Plan because they had relatively low hazard scores (i.e. low likelihood of occurrence, long warning times, and/or low impacts), or because they are indirectly addressed through the "Severe Weather" hazard analysis included in this Plan.

Each section also includes a description of the hazard and a summary matrix with the following information (please see each hazard profile for a hazard-specific matrix):

Hazard	Location	Vulnerability	Extent	Observed Impact	Likelihood/Probability
Type of hazard	General areas in community that may be vulnerable to the hazard.	Community structures affected by hazard.	General details about the strength or magnitude of the most notable event(s).	Dollar value or percentage of damages.	Likely: >10% but <75% probability per year, at least 1 chance in next 10 years Highly Likely: >75% probability in a year

B. Hazard Profiles For "Top Hazards"

1. Wildfire

Wildfire may be sparked by natural or human activities. Lightning is one of two main natural causes of wildfire. However, across the United States, approximately 90 percent of wildfires are started by humans. According to FEMA, there are three types of wildfire that can consume natural landscapes and man-made structures and features: surface fire, ground fire, and crown fire. Surface fires are slow moving across the forest floor, and, as a result, kill and damage trees. Ground fires are usually caused by lightning strikes, and burn on or below the forest floor. Crown fires, so called for their location in the crown of trees, effortlessly spread through tree tops, often aided by wind.

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Wildfire**.

The Vermont landscape is especially vulnerable to wildfire during the period of time in early spring when all the snow has melted, vegetation has not begun to develop leaves, and the land and vegetation are very dry and/or dead. During mud season, many of the roads in Braintree are impassable to heavy vehicles, complicating emergency services' access to the scene of a wildfire. Delayed access increases the risk and level of damage to structures. As climate change progresses, the risk of wildfire and length of mud season are likely to increase.

The following occurrences were drawn from local knowledge and from the National Fire Incident Reporting System. These reports were supported with research of news stories, where possible (indicated with an asterisk*).

History of Occurrences:

Date	Event	Location	Extent
5/20/2017	Brush Fire	Thresher Road	Extent data unavailable
10/1/2013	Brush Fire	Bent Hill Road	Extent data unavailable
05/04/2013	Wildfire	Route 12A, West Braintree	2-3 acres scorched
04/28/2013	Wildfire	2.5 miles up Braintree Mountain Road (nearby Braintree/Granville town line)	Approximately 5 acres
4/27/2013	Grass Fire	Route 12A	Extent data unavailable
7/12/2012	Brush Fire	Route 12A	Extent data unavailable
4/04/2010	Brush Fire	Farnsworth Brook	Extent data unavailable
07/28/2007*	Wildfire	Several miles up Braintree Mountain Road	Approximately 10-15 acres
8/24/2003	Wildfire	Route 12A	Extent data unavailable
6/29/2003	Wildfire	Duclos Road	Extent data unavailable
4/22/2002	Grass Fire	Route 12A / Duclos Road	Extent data unavailable
1/25/2002	Brush Fire	Battles Brook	Extent data unavailable

Dry hydrant sites have increased from 1 to 4 since the adoption of the 2009 Hazard Mitigation Plan. Dry hydrants are located on Brainstorm Road, VT Route 12A, Thresher Road, and Allen Bent Road. No additional sites are available at this point in time. Some forest areas exist where ground-based firefighting efforts would be very difficult, due to their remoteness. This creates the potential for wildfire to impact private land and property and any logging operations occurring at the time of the wildfire. A wildfire would likely impact or result in the damage of wildlife habitat and recreational lands used for hunting, hiking, mountain biking, back country skiing, and ATV and snowmobiling trails (maintained by VAST, Vermont Association of Snow Travelers).

Much of Braintree is vulnerable to wildfire, as land is mostly rural and is mainly or partially forested. The Town of Braintree does not include any state- or federally-owned forest land; all forested land is held privately. Notably, the railroad corridor is prone to brush fires in the summer, as sparks from the tracks can set dry grasses alight. Also of concern is the large amount of dead trees left over from the January 1998 ice storm that devastated and felled millions of trees over much of northern New England, northern New York and Canada. Dead wood deposits can fuel wildfire in the Town.

Hazard	Location	Vulnerability	Extent	Observed Impact	Likelihood/ Probability
Wildfire	Most of Braintree, especially areas surrounding the New England Central Railroad, powerlines, and Braintree Mountain Road.	Private property, town buildings, utility infrastructure	Up to this point, the extent of damage has been minimal but all that is needed are the right conditions to experience a more damaging wildfire, especially because most of the Town is forested.	Unknown—data gap.	Highly likely

2. Flash Flood/Flood/Fluvial Erosion

Flooding is one of the worst threats to Braintree's residents and infrastructure. Past instances of flooding in Braintree have included rain and/or snowmelt events that cause flooding in the major rivers' floodplains and intense rainstorms over a small area that cause localized flash-flooding. Both kinds of events can be worsened by the build-up of ice or debris, which can contribute to the failure of important infrastructure (such as culverts, bridges, and dams).

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Flash Flood/Flood/Fluvial Erosion**.

The worst flood disaster to hit the Town of Braintree, as well as the overarching region and the State of Vermont, occurred on November 3, 1927. This event was caused by nearly 10 inches of heavy rain from the remnants of a tropical storm that fell on frozen ground. Eighty-four Vermonters, including the Lieutenant Governor, were killed. The flooding in the White River valley was particularly violent, with an estimated 120,000 to 140,000 cubic feet/second (cfs) flowing out of the White River at West Hartford, Vermont. Like many towns in the region, the Town of Braintree received heavy precipitation; Riford Brook took out all eight bridges along its course and the small hamlet of Peth was essentially wiped out.

A more recent flood that devastated the region and the state was the result of Tropical Storm Irene, which occurred on August 28, 2011. Record flooding was reported across the state and was responsible for several deaths, and hundreds of millions of dollars of home, road, and infrastructure damage. Due to the strong winds, 50,000 Vermont residents were initially without power, and many did not have electricity restored to their homes and businesses for over one week. The flooding caused by Tropical Storm Irene is considered to be the second greatest natural disaster in 20th and 21st century Vermont, second only to the Flood of 1927.

The Town of Braintree suffered major damage to property and infrastructure during Tropical Storm Irene, although no lives were lost. It is estimated that Tropical Storm Irene dropped 6-7 inches of rain over the Town of Braintree in a very short span of time, and 5-7 inches across the county. It is thought that the flooding that occurred as a result of the storm was close to being or was a full-fledged 500-year flood. Many of Braintree's roads and culverts were damaged by the storm, including parts of: VT Route 12A, Riford Brook Road, Thresher Road, Thayer Brook Road, Rochester Hollow Road, Bear Hill Road and West Street. The damage for the Town of Braintree totaled $2.2 million, while the county-wide damage for Orange County totaled over $5 million. Following the flood damage, the State of Vermont and FEMA have been coordinating on the home buy-out process across the state. There were two houses washed away by flood waters during Irene, but only one home buy-out occurred in Braintree, located on Thayer Brook Road. At the time of this plan update, there were no repetitive loss properties in Braintree on FEMA's NFIP list.

Fluvial erosion is also a significant concern in Braintree, especially along Riford Brook, Thayer Brook, and the Third Branch of the White River. Channelization and other development within the river corridor have exacerbated the challenges posed by this hazard. The migration of river channels may necessitate revision of floodplain maps.

Unfortunately, flooding is very common across the region, with many events impacting the Town of Braintree specifically. Flooding is one of the worst threats to Braintree's residents and infrastructure. The following list indicates the history of occurrence with regard to this hazard in Orange County (given the small population of Braintree, town-specific data is limited); an asterisk "*" denotes the few instances in which town-specific data is available, and federal disaster numbers are listed where appropriate.

History of Occurrences:

Date	Event	Location	Extent
04/15/2019 (DR-4445)*	Flooding	County-wide	Minimal damage in Braintree, damages scattered throughout Town. Many roads were washed out and reduced to one lane. Roughly $30,000 to $40,000 total damages.
06/25/2013 - 07/11/2013 (DR-4140)	Flash flooding & flooding	County-wide	Route 12A in nearby Randolph Village was closed. In Braintree, Lemery Road and West Street sustained severe damage.. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
08/28/2011* (DR 4022 VT for period of 8/26/2011 – 9/2/2011)	Severe Flash Flooding	Braintree, County-wide	5-7" of rain across region, significant damage to roads/culverts. $2,228,085.22 in damage total for Braintree according to FEMA's Public Assistance database (captures at least 70% of total damage). There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
5/26/2011 – 5/27/2011 (DR 4001 VT)	Flash & riverine flooding	County-wide	3-5+" of rain county-wide. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
7/21/2008 - 8/12/2008 (DR 1790 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
7/9/2007 - 7/11/2007 (DR 1715 VT)	Flooding	County-wide	Over 6 inches of rainfall in nearby Randolph Center. Many Randolph roads were flooded, including Routes 12 and 14. Braintree-specific data could not be found. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
4/15/2007 - 4/21/2007 (DR 1698 VT)	Flooding	County-wide	Snowfall in valleys 4-7" throughout the county; 13" fell in nearby Randolph. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
1/18/2006 – 1/19/2006	Flooding	County-wide	1.5 to 2.5" of rain, augmenting snowmelt. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
7/21/2003 - 8/18/2003 (DR 1488 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
4/14/2002*	Flooding	County-wide	Snowmelt was compounded by 1-3" of rain across the area. Gravel road washouts were reported in Braintree. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
7/14/2000 - 7/18/2000 (DR 1336 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.

Date	Event	Location	Extent
9/16/1999 - 9/21/1999 (DR 1307 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
6/27/1998*	Flash flood	Braintree, County-wide	4-8" of rain; 75% of roads damaged in town. Available data are insufficient to determine the exact size of the land area that was impacted by flooding or fluvial erosion.
6/17/1998 - 7/13/1998 (DR 1228 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
1/19/1996 – 1/20/1996	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
6/6/1984 – 6/8/1984 (DR 712 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
8/5/1976 (DR 518 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
7/6/1973 (DR-397 VT)	Flooding	County-wide	There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
6/28/1973 - 6/30/1973	Flooding	Braintree, County-wide	8.53" reported in nearby Rochester, Vermont. Braintree-specific data could not be found. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.
11/2/1927 – 11/4/1927* ("The 1927 Flood")	Flash flooding	Braintree, County-wide	4-9" of rain, Riford Brook took out all 8 bridges along its course; roads severely damaged. There are no available data on the size of the land area that was impacted by flooding or fluvial erosion.

Given its history, the Town of Braintree has become very proactive. The Floodplain Overlay District prohibits new structures in the federally-mapped 100-year floodplain and in the state-mapped fluvial erosion hazard zone (i.e., river corridor), and it places restrictions on other types of activities within those areas. The Floodplain Overlay District also specifies land, area, and structural requirements for development. In all districts, the town bylaw has set a 50-foot stream buffer for structure development and a 35-foot buffer for ground disturbance, except for bridge or culvert construction or permitted bank stabilization. These buffers seek to protect the fragile riparian habitat, improve or maintain water quality, and prevent soil erosion.

There are 4 residential and 3 non-residential buildings, 1 railway crossing, 1 communication tower, and a 130-unit campground located in the 500-year floodplain.[4] Excluding the railroad crossing, communication tower, and temporary structures in the campground, damages would amount to $1,418,900 if all properties were destroyed in a severe flooding event. There are no critical facilities located in the 100-year or 500-year floodplain areas, and no development projects are currently planned in those areas.

[4] The 500-year floodplain was chosen as a basis for this analysis to demonstrate the number of Braintree properties that are or may be vulnerable to flooding. In addition, the flooding that occurred as a result of Tropical Storm Irene is considered to be greater than a 100-year flood. Therefore, in order to be more forward-looking, the potential damage to structures in the 500-year floodplain is documented in this plan.

A railway crossing, a communication tower, 25 residential structures, 1 commercial structure with a residence, 14 non-residential structures, and a 130-unit campground are located in the river corridor where there is heightened risk from fluvial erosion. No critical facilities are located in the river corridor. Additional work to reinforce riverbanks is necessary, but the town believes bank stabilization on state roads is the responsibility of the state.

It is important to consider the exposure of vulnerable populations, especially children, the elderly, and low-income households, to flood risk. Across Vermont, most child and elder care facilities are not registered with the State. Most child day care is private in-home care in Braintree, but there are two registered family child care homes in Town, and the Orange Southwest School District serves as a licensed provider of early education and afterschool programming at the Elementary School. None of the registered or licensed childcare facilities are located within the river corridor or 500-year floodplain. There are no registered elder care facilities in the Town of Braintree. Finally, most low-income housing is not registered with the State, but the state does maintain a list of mobile home parks. There is one mobile home park in Braintree, Mobile Acres Mobile Home Park. It is not located in the 500-year floodplain. One of the homes is located within the river corridor, where there is heightened risk of fluvial erosion.

It should be noted that the state's river corridor maps and FEMA's floodplain maps may not identify all properties that are at risk of flooding or erosive damage. FEMA has only mapped floodplains in some areas of the Town, and in those areas, FEMA focused exclusively on the Third Branch mainstem and Ayers Brook. The state's river corridor maps include more areas but, like FEMA's maps, they do not include all the land lying within the 500-year floodplain. Moreover, recent studies have shown that the majority of flooding in Vermont is occurring along upland streams, as well as along road drainage systems that fail to convey the amount of water they are receiving. Because they are not identified on FEMA's maps, these areas are often not recognized as being flood prone and property owners in these areas are not typically required to have flood insurance (DHCA, 1998). While small, mountainous streams may not be mapped by FEMA in NFIP FIRMs (Flood Insurance Rate Maps), flooding along these streams is possible, and should be expected and planned for. Flash flooding in these reaches can be very erosive, causing damage to road infrastructure and to topographic features including stream beds and the sides of hills and mountains. The presence of undersized or blocked culverts can lead to further erosion and stream bank/mountainside undercutting. Furthermore, precipitation trend analysis suggests that climate change is increasing the intensity and frequency of local storms, making it all the more important to plan for potential flood and fluvial erosion impacts in areas not accounted for by the state's river corridor maps and FEMA's floodplain maps.

There are many structures in Braintree that are located along smaller streams that are prone to flooding. As these streams do not have federally-mapped floodplains or state-mapped river corridor boundaries, they are not subject to the development regulations of Braintree's Floodplain Overlay District.

Hazard	Location	Vulnerability	Extent	Observed Impact	Likelihood/ Probability
Flash Flood/Flood/ Fluvial Erosion	VT Route 12A (including West Braintree village), Riford Brook Road, Thresher Road, Thayer Brook Road, Rochester Hollow Road, Bear Hill Road, West Street, Farnsworth Brook Road, East Braintree village in the vicinity of Ayers Brook, and other small, steep streams throughout the Town.	Culverts, bridges, road infrastructure. There are 4 residential and 3 non-residential buildings in the 500-year floodplain. 25 residential structures, 1 commercial structure with a residence, 14 non-residential structures, and a 130-unit campground are located in the fluvial erosion hazard area.	Tropical Storm Irene- 5-7" across county (6-7" in Braintree)	From TS Irene: $2,228,085.22 for Braintree from FEMA's Public Assistance database.	Highly likely

3. Severe Weather (Thunderstorm, Lightning, High Winds, Hail, Flooding)

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Severe Weather (Thunderstorm, Lightning, High Winds, Hail, Flooding)**.

More common than hurricanes or tropical storms are severe thunderstorms (usually in the summer), which can cause flooding as noted above, and are associated with lightning, high winds, hail and tornadoes. Hailstorms have occurred in Vermont, usually during the summer months. While local in nature, these storms are especially significant to area farmers, who can lose entire fields of crops in a single hailstorm. Large hail is also capable of property damage. 382 hail events were recorded between 1950 and 2008 in the state, making hail a regular annual occurrence in at least some part of the state. Most of these events had hail measuring 0.75 inches, but many had hail at least 1.5 inches in size. The largest hail during the period was 3-inch hail that fell in Chittenden County in 1968. Tennis ball-sized hail was reported in the town of Chittenden during a storm in the summer of 2001. Thunderstorms can generate high winds, such as that which hit the region on July 6, 1999, downing hundreds of large trees in a few minutes.

In Braintree, severe weather is quite common, typically in the late spring and summer months when the region experiences high temperatures. Severe thunderstorms tend to bring other hazards such as high

winds, hail, and lightning, and flooding, and these hazards are often experienced in combinations that create many unique weather and emergency management situations. Over the years, Braintree has been hit with high winds that have downed and uprooted numerous trees, and knocked out electricity to residents in the Town. Town-specific wind damage data could not be found, but the "Remarks" section of NCEI Database helps to illuminate the impact strong winds can have on Braintree. Sizeable hail has also accompanied storms moving through the Town and region.

The following list indicates the history of occurrence with regard to this hazard in Orange County (given the small population of Braintree, town-specific data is limited); an asterisk "*" denotes the instances in which town-specific data is available, and federal disaster numbers are listed when appropriate. In an attempt to capture the individual hazards that may arise, and the different circumstances caused by the hazards in concert, the separate hazards are documented in the table below.

History of Occurrences:

Severe Weather Date	Event					Location	Extent
	Thunderstorm/ severe storm	Flooding	Hail	High Winds	Lightning		
9/5/2017*	✓			✓		East Braintree	Downed trees. Estimated wind gust of 50 mph in E. Braintree. No available data on the size of the land area that was impacted.
6/29/2017 - 7/1/2017 (DR-4330)*	✓	✓		✓		Braintree Hill, County-wide	Flash flooding, road damage, downed trees, No available data on the size of the land area that was impacted.
7/23/2016*	✓			✓		Braintree Hill, County-wide	Numerous downed trees and power lines. Estimated wind gust of 55 mph at Braintree Hill. No available data on the size of the land area that was impacted.
9/11/2013*	✓			✓		Braintree Hill, County-wide	Downed trees and power lines on Flint Rd. Estimated wind gust of 50 mph at Braintree Hill. No available data on the size of the land area that was impacted.
06/25/2013—07/11/2013 (DR 4140)	✓	✓				County-wide	No available data on the size of the land area that was impacted.

Severe Weather Date	Event					Location	Extent
	Thunderstorm/ severe storm	Flooding	Hail	High Winds	Lightning		
5/26/2011 - 5/27/2011 (DR 4001 VT)	✓	✓	✓	✓		County-wide	No available data on the size of the land area that was impacted.
07/21/2010*	✓		✓	✓		Braintree Hill, County-wide	Quarter-sized hail. No available data on the size of the land area that was impacted.
7/10/2010*			✓			Braintree, County-wide	0.5-1" hail. No available data on the size of the land area that was impacted.
7/21/2008 - 8/12/2008 (DR 1790 VT)	✓	✓	✓			County-wide	No available data on the size of the land area that was impacted.
7/9/2007 - 7/11/2007* (DR 1715 VT)		✓	✓	✓		Braintree, County wide	Downed trees/wind damage. Estimated wind gust of 50 mph. No available data on the size of the land area that was impacted.
4/15/2007 – 4/21/2007 (DR 1698 VT)		✓		✓		County-wide	No available data on the size of the land area that was impacted.
7/21/2003 – 8/18/2003 (DR 1488 VT)		✓				County-wide	No available data on the size of the land area that was impacted.
6/29/2003*	✓				✓	Braintree, County-wide	Numerous lightning strikes, a few tree fires resulted. No available data on the size of the land area that was impacted.
7/4/2002*	✓			✓		Braintree, County-wide	Downed trees, wind damage. No available data on the size of the land area that was impacted.
7/10/2001*	✓			✓		Braintree, County-wide	Multiple downed trees. No available data on the size of the land area that was impacted.

Severe Weather Date	Event					Location	Extent
	Thunderstorm/ severe storm	Flooding	Hail	High Winds	Lightning		
7/14/2000 – 7/18/2000 (DR 1336)	✓	✓				County-wide, especially west portion	Locally heavy rain. No available data on the size of the land area that was impacted.
6/17/1998	✓	✓				County-wide	Flash flooding. No available data on the size of the land area that was impacted.
1/19/1996 – 2/2/1996 (DR 1101 VT)		✓		✓		County wide	No available data on the size of the land area that was impacted.
6/27/1994*	✓		✓	✓		East Braintree, Braintree	Numerous downed, snapped, uprooted trees. Up to golf-ball sized hail in nearby Randolph. No available data on the size of the land area that was impacted.
8/6/1989	✓			✓		County-wide	No available data on the size of the land area that was impacted.
6/6/1984 – 6/8/1984 (DR 712 VT)	✓	✓				County-wide	No available data on the size of the land area that was impacted.
8/5/1976 (DR 518 VT)	✓	✓		✓		County-wide	No available data on the size of the land area that was impacted.
7/6/1973 (DR 397 VT)		✓				County-wide	Severe storms; landslides. No available data on the size of the land area that was impacted.

The main hazard caused by severe weather throughout the Town is flooding and rampaging waters in the narrow hollows coming off the hills. Prior to the flooding from Tropical Storm Irene, the spring of 2011 was particularly wet, and a pre-Memorial Day storm caused widespread flooding throughout Orange County. The roads and other infrastructure damaged during this flood event included the following locations: VT Route 12A, Riford Brook Road, Thresher Road, Thayer Brook Road, Bear Hill Road and Rochester Hollow Road.

Braintree maintains a list of culverts and culvert conditions, and has been working to upgrade culverts since 2009. A number of the steel culverts have been replaced with plastic culverts.

Hazard	Location	Vulnerability	Extent	Observed Impact	Likelihood/ Probability
Severe Weather	Town-wide for wind, hail, high winds, lightning and thunderstorm impacts; for flooding: VT Route 12A, Riford Brook Road, Thresher Road, Thayer Brook Road, Bear Hill Road and Rochester Hollow Road	Town and private buildings, and utilities; culverts, bridges, road infrastructure	Most recent, Tropical Storm Irene- 5-7" across county (6-7" in Braintree).	From TS Irene: $2,228,085.22 for Braintree from FEMA's Public Assistance database.	Highly likely

***Note*: The main hazard caused by severe weather is typically (though not always) flooding, accompanied by rushing water washing away infrastructure. In addition, flooding is often the most expensive hazard caused by severe weather. Therefore, the Extent and Impact categories for Severe Weather will reflect the data reported in the Flash Flood/Flood/Fluvial Erosion, as it represents the higher limits of damage caused by severe weather.

4. Hazardous Materials Spill

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Hazardous**

Based on available 2018 Tier II data, there are 3 sites in town (Sprint, Comcast, and the Braintree Highway Garage) that have sufficient types and/or quantities of hazardous materials that require reporting. More significantly, several transportation corridors cross the Town, leaving a large area vulnerable to spills of hazardous materials during transit. The New England Central Railroad runs through Braintree, usually daily, right along Route 12A. The railroad cuts through the middle part of the Braintree for roughly 7 miles, entering the town from East Granville in the northwest and exiting Braintree to Randolph in the southeast corner of the town. West Braintree village is located on Vermont Route 12A and sees a small amount of truck traffic, while East Braintree village is located on VT RT 12 and sees a moderate amount of truck traffic by Vermont standards.

Within 1,000 feet of the railroad tracks and Routes 12 and 12A, there are 6 communication facility structures, 7 railroad crossings, 243 residential structures, 1 commercial structure with a residence, and 28 non-residential buildings. In the event that 5% of these structures (excluding the communications facility structures and railroad crossings) were involved in a HAZMAT incident, the estimated damage would be $1,548,225. Critical facilities in close proximity to these transportation corridors include the school, Town Hall, Town Garage, and Town Office. The vulnerability of Mobile Acres Mobile Home Park is of particular note, as it has only one access road that could potentially be cut off by a hazardous materials spill on the railroad or Route 12A. There's also potential for an incident on the access road itself, as it crosses railroad tracks at a hard turn with limited visibility. In the event of such an emergency, evacuation of Mobile Acres will be achieved by directing vehicles over unpaved ground north along the railroad tracks to Riford Brook Road, or by directing pedestrians across the bridge that

leads south across the river. On the other side of the river, evacuees would need to walk 2 miles of trail to reach the nearest road, or they could be shuttled by an all-terrain vehicle.

Further to the north, emergency access to homes on Riford Brook Road could be significantly delayed by a railroad or Route 12A incident, as the only alternative access is via Thayer Brook Road. Additionally, the fuel storage tank at the Town Garage is unprotected and could be damaged in the event of a vehicular collision.

The following occurrences were reported in the Vermont Department of Environmental Conservation's Spill List (marked with a double asterisk **), news stories (indicated with an asterisk*), or were reported by the Committee, to the best of their ability.

History of Occurrences:

Date	Event	Location	Extent
6/25/2018**	Mineral oil dielectric fluid spill	Bent Hill Road	7 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
2/10/2017**	Kerosene spill	Riford Brook Road	120 gallons spilled, absorbed into ground beneath a residence. No available data on the size of the land area that was impacted.
12/1/2015**	Fuel oil spill	Haupt Road	275 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
11/4/2014**	Kerosene spill	Sesame Street	140 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
Late fall/early winter 2011	Fuel oil truck drove/lost control and went into a ditch	Bent Hill Road	Some fuel oil leaked into ditch. No available data on the size of the land area that was impacted.
9/23/2011**	Hydraulic oil spill	Riford Brook Road	4 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
9/14/2011**	Transformer fluid spill	Mobile Acres Road	10 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
9/2/2011**	Fuel oil spill	VT-12A	Unknown quantity. Spill cleaned up and project closed. No available data on the size of the land area that was impacted.
8/31/2011**	Heating oil spill	VT-12A	Unknown quantity. Spill cleaned up and project closed. No available data on the size of the land area that was impacted.
12/2/2010**	Transformer fluid spill	Riford Brook Road	10 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
7/26/2010**	Truck hydraulic fluid spill	Blanchard Road	0.5 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.

Date	Event	Location	Extent
10/12/2009**	Battery cabinet leakage of lead	VT-12A	2 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
8/9/2008*	New England Central Railroad train derailment	South of VT 12A crossing	Last rail car dragged 4 miles, damaging rails (tore up a few miles of rail ties) and spilled limestone along rail bed. Train service suspended a few days for repairs. No available data on the size of the land area that was impacted.
3/8/2008**	Kerosene spill	Fogey Street / Mobile Acres	100 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
12/20/2007**	Truck accident	Bent Hill Road	4 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
1/3/2006**	Kerosene spill	Sesame Street	150 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.
6/1/1994**	Kerosene spill	Mobile Acres Park	250 gallons spilled, spill cleaned up and project closed. No available data on the size of the land area that was impacted.

It should be noted that the State of Vermont currently has one fully trained HAZMAT response team, with vehicles located in Essex Junction, Brandon, and Windsor. The HAZMAT crew chief is available within minutes of a call for the team but on-scene response would be a matter of hours. In the event of a serious accident in town, there would be little time for evacuation and response would be difficult. Braintree maintains a Railroad Emergency Pre-Plan, which lists the railroad crossings and their mile mark. In the event of a hazardous material spill on the railroad tracks, this information could help responders and the Town of Braintree react more quickly.

Hazard	Location	Vulnerability	Extent	Estimated/Potential Impact	Likelihood/ Probability
Hazardous Materials Spill	VT 12, VT 12A, areas adjacent to rail beds.	Road and rail infrastructure, nearby structures (ex. Town Garage if fuel tank struck), 100 unit trailer park/130 unit campground.	Initially, local impacts only; but depending on material spilled, extent of damage may spread (ex. into groundwater)	Within 1,000 feet of the railroad tracks and Routes 12 and 12A, there are 243 residential structures, 1 commercial structure with a residence, and 28 non-residential buildings. In the event that 5% of these structures were involved in a HAZMAT incident, the estimated damage would be $1,548,225.	Likely

5. Hurricane/Tropical Storm

Hurricanes (storms with sustained winds greater than 74 mph) rarely reach as far inland as Vermont; more often, they have weakened to tropical storms. In either case, the high winds, heavy rains, and large affected areas from hurricane or tropical storms can make these rare events major disasters. The most infamous example of an actual hurricane hitting the state was the disastrous "Long Island Express" Hurricane of 1938. On September 21, 1938 a very fast-moving hurricane hit Vermont in the early evening, but was moving so fast that wind damage was more severe than damage from rain in places. However, there was severe flooding, as over 4 inches of rain accompanied the storm and followed upon the heels of preceding storms that had saturated the ground and raised river levels. Buildings were lost, power lines downed, and millions of trees were felled. Much more recently, Tropical Storm Floyd in September 1999 caused flooding and wind damage in parts of Vermont, as well as one fatality, and resulted in a federal disaster declaration.

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Hurricane/Tropical Storm**.

Another flood that devastated Vermont, Orange County, and Braintree was the result of Tropical Storm Irene, which occurred on August 28, 2011. Record flooding was reported across the state and was responsible for several deaths, and millions of dollars of home, road and infrastructure damage. Due to the strong winds, there were 117,000 power outages across the state, and many did not have power restored for over a week. The damage and flooding caused by Tropical Storm Irene is considered to be the second greatest natural disaster in 20th and 21st century Vermont, second only to the Flood of 1927.

The following list indicates the history of occurrence with regard to this hazard in Orange County (given that small population of Braintree, town-specific data is limited); an asterisk "*" denotes the few instances in which town-specific data is available, and federal disaster numbers are listed where appropriate.

History of Occurrences:

Date	Event	Location	Extent
08/28/2011* (DR 4022 VT for period of 8/26/2011 – 9/2/2011) (Tropical Storm Irene)	Severe Flash Flooding	Braintree, County-wide	5-7" of rain across region; significant damage to roads/bridges. Over $2.2 million of damages in Braintree. No available data on the size of the land area that was impacted.
9/16/1999 – 9/21/1999 (DR 1307 VT) (Tropical Storm Floyd)	High winds, flooding	County and state-wide	3-6" statewide, with higher totals reported locally. Widespread downed trees/power outages due to wind. No available data on the size of the land area that was impacted.
9/21/1938 ("The Great New England Hurricane")	High winds	State-wide	Hit Vermont as a Category 1 storm. High winds severely damaged trees, buildings, power lines. No available data on the size of the land area that was impacted.

In the wake of Tropical Storm Irene, Braintree formed an Irene Disaster Recovery Committee, which created a report assessing the Town's emergency response during and following the storm. It outlined the mechanisms that failed, considered actions to be taken to improve the Town's emergency response, and proposed zones to be designated in order to better coordinate response efforts. Emergency management zones have since been created. In the event of an emergency, response efforts in each zone will be overseen by the Town's Emergency Operations Center.

Hazard	Location	Vulner-ability	Extent	Observed Impact	Likelihood/ Probability
Hurricane / Tropical Storm	Riford Brook Road, VT Route 12 (including East Braintree village), VT Route 12A (including West Braintree village), Thayer Brook Road, Thresher Road, Bear Hill Road and Rochester Hollow Road	Culverts, bridges, road infrastructure, structures in floodplain	TS Irene: 5-7" of rain across region; significant damage to roads/bridges	TS Irene: Over $2.2 million in damages in Braintree, over $5 million in Orange Co.	Likely

6. Ice Storm / Heavy Snow

Winter storms are a regular occurrence in Vermont. However, severe winter storms can cause serious damage, including collapse of buildings due to overloading with snow or ice, downed trees and power lines, road closings, car accidents, and stranded vehicles. People can be at risk of freezing in extended power outages if they lack wood heat or backup power, and individuals shoveling large accumulations of snow can also be at risk from frostbite, hypothermia and heart attacks due to cold and overexertion. While snow removal from the transportation system is standard fare in Vermont winters, extreme snow or ice can close rail and road systems, further jeopardizing any stranded persons that are in danger of freezing or needing medical assistance.

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(2)(i), 201.6(c)(2)(ii), and 201.6(c)(2)(iii) for **Ice Storm/Heavy Snow**.

Severe winter storms include a blizzard on February 15-17 in 1958, which dumped over 30 inches and resulted in 26 deaths in New England. On December 26-27 in 1969, another blizzard left 18-36 inches of snow in northwestern Vermont and a whopping 45 inches in Waitsfield. A string of storms in March 2001 hit the state, beginning with 15-30 inches on March 5-6th (later declared a federal disaster), 10-30 inches on the 22nd, and 10-20 inches on the 30th. Recent years have seen wet snowstorms that have leveled trees and caused widespread power outages.

The worst winter storm in terms of damage to hit the state recently was not a snowstorm, but an ice storm. In January of 1998, just the right combination of precipitation and temperature led to more than

three inches of ice in spots, closing roads, downing power lines, and snapping thousands of trees. This storm was estimated as a 200-500 year event. Power was out up to 10 days in some areas and 700,000 acres in of forest were damaged in Vermont. Amazingly, there were no fatalities in Vermont, unlike Quebec where 3 million people lost power and 28 were killed. The Town of Braintree was impacted by this ice storm.

Over the past few winters, Braintree has received numerous snowstorms that have dropped significant amounts of snow over a day or two-day period. As a result of climate change, Vermont is expected to receive less snow, but the snow that does fall will be denser, increasing the risk of power outages. Moreover, the frequency and intensity of winter storms will increase. The following table documents the occurrence of ice storms / heavy snow (more than 6 inches of accumulation) in the Town of Braintree and in Orange County. Given the small population of Braintree, town-specific extent data is generally not available. In a few instances, an asterisk "*" denotes the instances in which town-specific extent data is available. Federal disaster numbers are listed when appropriate.

Date	Event	Location	Extent
3/21/19 – 3/23/19	Winter Storm	County-wide	7 to 14 inches of heavy, wet snow across the County. Widespread power outages.
2/12/19 – 2/13/19	Winter Storm	County-wide	6 to 15 inches of accumulation, mixed with freezing rain, across the region.
1/19/19 – 1/20/19*	Winter Storm	County-wide	16 inches reported in Braintree
1/8/19 – 1/10/19	Winter Storm	County-wide	6 to 10 inches of heavy, wet snow across the County. 6 inches reported in nearby Brookfield. Scattered power outages.
11/26/18 – 11/27/18	Winter Storm	County-wide	6 to 12 inches of heavy, wet snow across the County. 9 inches reported in nearby Brookfield. Power outages reported across the region.
3/13/18 – 3/14/18	Winter Storm	County-wide	10 to 27 inches of accumulation across the County. 18 inches reported in nearby Chelsea.
3/7/18 – 3/9/18	Winter Storm	County-wide	9 to 15 inches of accumulation across the County.
2/7/18	Winter Storm	County-wide	6 to 10 inches of accumulation across the County.
12/22/17	Winter Storm	County-wide	6 to 10 inches of accumulation across the County.
12/12/17	Winter Storm	County-wide	6 to 12 inches of accumulation across the County.
3/31/17 – 4/1/17*	Winter Storm	County-wide	12 inches of heavy, wet snow reported in Braintree. Scattered power outages across the region.
3/14/17 – 3/15/17	Winter Storm	County-wide	12 to 18 inches of accumulation across the County.
2/12/17 – 2/13/17	Winter Storm	County-wide	6 to 12 inches of accumulation reported across the County. 11 inches reported in nearby Chelsea.
12/29/16	Winter Storm	County-wide	6 to 12 inches of accumulation reported across the County.
2/2/15*	Winter Storm	County-wide	8 inches reported in Braintree.
12/9/2014-12/12/2014 (DR-4207)*	Severe Winter Storm	County-wide	18 inches of heavy, wet snow reported in Braintree. Widespread power outages throughout the County.
11/26/14 – 11/27/14*	Winter Storm	County-wide	12 inches reported in Braintree
3/12/14 – 3/13/14*	Winter Storm	County-wide	16 inches reported in Braintree.
2/13/14 – 2/14/14	Heavy Snow	County-wide	12 to 18 inches reported across Orange County.

Date	Event	Location	Extent
2/5/14	Heavy Snow	County-wide	8 to 12 inches reported across Orange County.
12/29/13 – 12/30/13	Winter Storm	County-wide	5 to 10 inches of wet, heavy snow across the County.
12/14/13 – 12/15/13	Winter Storm	County-wide	10 to 15 inches of accumulation across the County.
3/19/13 – 3/20/13	Winter Storm	County-wide	6 to 12 inches reported across the County
2/8/13 – 2/9/13	Winter Storm	County-wide	6 to 15 inches reported across the County
11/23/11 – 11/24/11	Winter Storm	County-wide	5 to 10 inches of heavy, wet snow mixed with rain and sleet, across the County. 9 inches reported in nearby Chelsea.
3/6/11-3/7/11	Winter Storm	County-wide	6 to 12 inches of accumulation and ¼ inch of ice across the County.
2/25/11	Winter Storm	County-wide	6 to 10 inches of accumulation across the County
2/5/11	Winter Storm	County-wide	8 inches reported in nearby Brookfield. Heavy snow mixed with sleet and freezing rain.
2/2/11	Winter Storm	County-wide	10 to 15 inches of accumulation across the County.
1/12/11	Winter Storm	County-wide	10 inches reported in nearby Brookfield
12/26/10-12/27/10	Winter Storm	County-wide	8 inches reported in nearby Brookfield. Some power outages reported in the region.
2/23/10– 2/24/10	Winter Storm	County-wide	26 inches reported in nearby Brookfield. Heavy, wet snow caused widespread power outages across the region.
2/22/09 – 2/23/09	Winter Storm	County-wide	10 to 18 inches of accumulation across the region.
1/28/09*	Winter Storm	County-wide	17 inches reported in Braintree.
12/21/08	Winter Storm	County-wide	18 inches reported in nearby Randolph Center.
12/19/08 – 12/20/08	Winter Storm	County-wide	10 inches reported in nearby Chelsea.
12/11/08 – 12/18/08 (DR-1816)	Winter Storm	County-wide	From December 11th to 12th, 5 to 9 inches of snow, sleet, and ice fell across the region. Power outages were reported in the region. An additional 3 to 6 inches fell on December 17th.
3/1/08	Winter Storm	County-wide	8 inches reported in nearby Brookfield.
2/26/08 – 2/27/08	Winter Storm	County-wide	13 inches reported in nearby Brookfield.
2/12/08 – 2/13/08	Winter Storm	County-wide	Snow and sleet accumulations of 6 to 10 inches across the region.
12/16/07 – 12/17/07	Winter Storm	County-wide	18 inches reported in nearby Brookfield.
12/2/07 – 12/3/07	Winter Storm	County-wide	14 inches reported in nearby Brookfield.
4/4/07 – 4/5/07	Winter Storm	County-wide	12 inches reported in nearby Brookfield. Some power outages reported in the region.
3/16/07 – 3/17/07	Winter Storm	County-wide	10 inches reported in nearby Brookfield.
3/2/07	Winter Storm	County-wide	11 inches reported in nearby Brookfield.
2/14/07	Heavy Snow	County-wide	19 inches of accumulation in nearby Chelsea.
4/4/06 – 4/5/06	Winter Storm	County-wide	7 inches of heavy, wet snow reported in nearby Brookfield. Power outages reported across the region.
2/25/06	Winter Storm	County-wide	10 inches of accumulation reported in nearby Brookfield.
3/11/05 – 3/12/05	Winter Storm	County-wide	Up to 9 inches in Orange County.
3/1/05 – 3/2/05	Winter Storm	County-wide	Between 8 and 10 inches across the region.
2/10/05	Winter Storm	County-wide	Between 8 and 12 inches of accumulation across the region. Power outages reported.

Date	Event	Location	Extent
12/14/03 – 12/15/03	Winter Storm	County-wide	Between 10 and 20 inches of accumulation across Orange County.
12/6/03 – 12/7/03	Winter Storm	County-wide	Between 12 and 20 inches of accumulation across Orange County.
4/3/03 – 4/5/03	Winter Storm	County-wide	7.2 inches reported in nearby Chelsea. Heavy snow mixed with sleet and freezing rain.
2/17/03 – 2/18/03	Winter Storm	County-wide	6-12 inches of accumulation across the region.
1/4/03	Winter Storm	County-wide	13 inches reported in nearby Brookfield.
12/25/02 – 12/26/02	Winter Storm	County-wide	10 to 20 inches of accumulation across the region.
11/17/02 – 11/18/02	Winter Storm	County-wide	Heavy and wet snow. Accumulations of 6-10 inches across the region. Some power outages in Orange County.
3/20/02	Winter Storm	County-wide	Heavy and wet snow; 10 inches reported in nearby Brookfield.
1/31/02 – 2/1/02	Winter Storm	County-wide	Snowstorm with 1/4" ice on top of the snow. 7 inches of snow reported in nearby Chelsea.
3/30/01	Winter Storm	County-wide	Heavy and wet snow, with power outages. 19 inches reported in nearby Brookfield.
3/22/01 – 3/23/01	Winter Storm	County-wide	Heavy and wet snow, with power outages. 23 inches reported in nearby Brookfield.
3/5/01 – 3/7/01 (EM-3167)	Snowstorm	County-wide	15 inches reported in nearby Chelsea.
2/5/01 – 2/6/01	Winter Storm	County-wide	12 inches reported in nearby Chelsea.
12/30/00 – 12/31/00	Winter Storm	County-wide	7 inches reported in nearby Brookfield.
12/16/00 – 12/18/00 (DR-1358)	Severe Winter Storm	County-wide	Freezing rain and ice accumulation.
1/30/00 – 1/31/00	Winter Storm	County-wide	8 inches reported in nearby Brookfield.
1/25/00 – 1/26/00	Winter Storm	County-wide	10 inches reported in nearby Randolph.
3/6/99	Winter Storm	County-wide	Accumulations of 7 to 17 inches across the region. 20 inches reported in nearby Bethel.
1/27/99 – 1/29/99	Winter Weather	County-wide	7.5 inches reported in nearby Chelsea.
1/8/99 – 1/9/99	Winter Storm	County-wide	9 inches of snow reported in nearby Brookfield.
3/21/98 – 3/22/98	Heavy Snow	County-wide	Heavy snow accumulations of 14 inches reported in nearby Brookfield. Brief power outages.
3/14/98	Heavy Snow	County-wide	Heavy snow accumulations of 10 inches reported in nearby Brookfield.
2/24/98 – 2/25/98	Winter Storm	County-wide	Heavy snow accumulations of 9 inches reported in nearby Brookfield.
1/23/98	Winter Storm	County-wide	Snow and ice accumulations of 13 inches reported in nearby Brookfield.
1/15/98	Winter Storm	County-wide	9 inches of snow reported in nearby Brookfield.
1/6/98 – 1/16/98 (DR-1201)	Ice Storms	County-wide	Ice accumulations of ¾ of an inch or less. Tens of thousands of trees damaged across the region. Widespread power outages.
12/29/97 – 12/30/97	Winter Storm	County-wide	Heavy snow and sleet. 6-8 inches of accumulation reported in nearby Brookfield.

Date	Event	Location	Extent
11/14/97	Winter Storm	County-wide	7.5 inches reported in nearby Chelsea.
3/31/97	Winter Storm	County-wide	8-14 inches of heavy wet snow across the county.
3/5/1997 – 3/6/97	Winter Storm	County-wide	Heavy wet snow downed powerlines across Orange County. 18 inches reported in nearby Brookfield.
1/9/97 – 1/10/97	Winter Storm	County-wide	10 inches reported in nearby Brookfield.
12/7/96 – 12/8/96	Winter Storm	County-wide	Heavy, wet snowfall. 16 inches reported in nearby Chelsea. Large number of power outages across the region.
3/7/96 – 3/8/96	Winter Storm	County-wide	Accumulation of 6-12 inches across the region, with 12 inches reported in nearby Brookfield.
1/12/96 – 1/13/96	Winter Storm	County-wide	9 inches of snow fell in Chelsea.
1/3/96	Winter Storm	County-wide	A foot or more of snow fell across Orange County. Widespread power outages reported in Central and Southern Vermont.

The Town of Braintree is no stranger to winter weather and the hazards that it brings. With heavy/wet snow or ice, electricity may be knocked out for a few hours or days. The utility company currently serving the Town of Braintree, Green Mountain Power, has followed a regular tree-trimming schedule.

Heavy/wet snow or large quantities of snow may also leave structures vulnerable to roof collapse. Roof collapse occurs when the structural components of a roof can no longer hold the weight of snow. Flat roofs are most vulnerable to collapse because they do not drain well and the snow on the roof soaks up water like a sponge, increasing the weight that the roof must bear. More common, it seems, is the collapse of barns commonly used for livestock sheltering and other agricultural purposes. Unfortunately, livestock in the barn are often killed and equipment stored in the barn may be damaged or ruined. It is difficult to determine whether a residential structure or a barn would be rebuilt after a roof collapse, because the decision to rebuild would likely depend on the extent of damage. The collapse of a barn roof is likely to be a total loss, and the collapse of a house roof may be a 50% loss.

In general, winter weather is most hazardous to travelers. Icy and snow-covered roads present multiple examples of dangerous driving conditions and situations. In Braintree, the mountainous terrain, steep slopes, and remoteness of some roads further complicate travel. The Town relies on Travel Advisories issued by the State of Vermont Department of Emergency Management Homeland Security and the National Weather Service to alert residents of dangerous travel weather. Despite this, it is difficult to prohibit people from driving during winter weather events. As a result, emergency services personnel must always be prepared to provide assistance to stranded drivers or to those who have been in an accident.

Hazard	Location	Vulnerability	Extent	Observed Impact	Likelihood/ Probability
Ice Storm / Heavy Snow	Town wide	The entire Town is vulnerable, including road infrastruc-ture, town and privately owned buildings, utility infrastruc-ture.	Snowfall has varied, from a few inches to over a foot or more. Heavy snow and wind downed trees and power lines. Snow/ice contributed to hazardous driving conditions.	For roof collapse: monetary damages will depend on each structure but collapse of barn roof is often a total loss. This does not include the loss of livestock. Collapse of a house roof may be at a 50% loss. For car crashes due to poor driving conditions: minimal damage to vehicle to totaled vehicle. Health impacts could vary significantly.	Highly likely

VI. Mitigation

A. Mitigation Goals

1. To reduce or avoid long-term vulnerabilities to the following priority hazards:
    a. Wildfire
    b. Flash Flood / Flood / Fluvial Erosion
    c. Severe Weather
    d. Hazardous Material Spill
    e. Hurricane / Tropical Storm
    f. Ice Storm / Heavy Snow
2. To reduce or avoid long-term vulnerabilities to all other hazards that could impact the Town of Braintree.

B. Excerpted Town Plan Goals & Objectives Supporting Local Hazard Mitigation

- To protect the rural character of Braintree in order to maintain quality of life for its citizens. (General Planning Goals, p. 8)
- To ensure that the rate of growth does not exceed the ability of Braintree to provide the community with the necessary resources, facilities and services. (General Planning Goals, p. 8)
- To enhance and maintain use of flood hazard areas as open space, greenways, non-commercial recreation and/or agricultural land. (Flood Resilience, p. 104)
- To ensure no net loss of flood storage capacity in an effort to minimize potential negative impacts. These impacts include the loss of life and property, disruption of commerce, and

demand for extraordinary public services and expenditures that result from flood damage. (Flood Resilience, p.104-105)

- To protect the citizens of Braintree by using good planning practices within designated Flood Hazard Areas and Fluvial Erosion Hazard Areas. (Future Land Use: Flood Hazard Area, p. 86)

The Braintree Town Plan was recently updated and adopted on December 5, 2017, and has a 5-year lifespan.

C. Hazard Mitigation Strategies: Programs, Projects & Activities

Vermont's Division of Emergency Management & Homeland Security encourages a collaborative approach to achieving mitigation at the local level through partnerships with Vermont Agency of Natural Resources, VTrans, Vermont Agency of Commerce and Community Development, Regional Planning Commissions, FEMA Region 1 and others. That said, these agencies and organizations can work together to provide assistance and resources to towns interested in pursuing hazard mitigation projects.

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(3)(ii), 201.6(c)(3)(iii) and 201.6(c)(3)(iv).

With each mitigation strategy, general details about the following are provided: local leadership, possible resources, implementation tools, and prioritization. The prioritization category is based upon the economic impact of the action, Braintree's need to address the issue, the cost of implementing the strategy, and the availability of potential funding. The cost of the strategy was evaluated in relation to its benefit as outlined in the STAPLEE guidelines.

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

The Town of Braintree understands that, in order to apply for FEMA funding for mitigation projects, a project must meet more formal FEMA benefit cost criteria. The Town must have a FEMA-approved Hazard Mitigation Plan as well.

The following strategies will be incorporated into the Town of Braintree's long-term land use and development planning documents. In addition, the Town will review and incorporate elements of this Local Hazard Mitigation Plan into updates for the municipal plan, zoning regulations, and flood hazard/ fluvial erosion hazards (FEH) bylaws. The incorporation of the goals and strategies listed in the Local Hazard Mitigation Plan into the municipal plan, zoning regulations and flood hazard/FEH bylaws will also be considered after declared or local disasters. The Town will also consider reviewing any future TRORC planning documents for ideas on future mitigation projects and hazard areas.

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Possible Resources*	Time Frame
All hazards	*Ensure that the Town's LEMP is up-to-date.*	Selectboard	High	With TRORC assistance	Yearly
	Maintain Railroad Emergency Pre-Plan and ensure that it is kept up-to-date.	Emergency Management Director	Low-Medium	Local resources	Year 5 of planning period
	Develop an all-wheel drive emergency evacuation route for Mobile Acres (between School Street Extension and Mobile Acres bridge)	Emergency Management Director and Selectboard.	Medium	Local resources or a grant, and volunteer assistance from the Rochester/Randolph Area Sports Trails Alliance	Years 2-4 of planning period
	Revise the Town Plan and Bylaw to prevent any future development that requires the construction of additional railroad crossings in Town.	Planning Commission	Medium - High	Local resources, state Municipal Planning Grant	Town Plan: Year 1 of the planning period Bylaw: Years 2 to 4 of the planning period
	Enhance preparedness by training a person to coordinate shelters and purchasing animal kennels and food for Town Hall shelter.	Selectboard, Emergency Management Director	High	Local resources	Years 1-2 of planning period
	Continuing public education	Emergency Management Director	High	Local resources	Yearly

Hazards Mitigated	Mitigation Action	Local Leadership	Prioriti-zation	Possible Resources*	Time Frame
Wildfire	*If and when opportunities arise, develop additional dry hydrant sites in rural locations, including in East and West Braintree.*	Braintree Rep to Randolph Fire Advisory Committee	Low	Local resources, George Aiken Resource Conservation & Development grants	Years 1-5 of planning period
	Assess and map community's overall vulnerability to wildfire. Determine water supply of sites and means of accessing areas vulnerable to wildfire.	Planning Commission	Medium	Local resources, Vermont Rural Fire Protection Task Force	Years 2-4 of planning period
Flood / Fluvial Erosion; Severe Weather; Hurricane / Tropical Storm	*The area of West Braintree experienced severe flooding during Irene. The Town intends to prevent increase in development density in West Braintree to reduce exposure to flood risk. Although it is a historic village area, the Town does not plan to pursue village designation, nor does it plan to encourage denser settlement.*	Planning Commission	Medium	State Municipal Planning Grant	Years 2-4 of the planning period.
	Create and maintain with neighboring communities mutual aid agreements for road crews.	Selectboard, Road Foreman	Low-Medium	Local resources	Years 3 to 5 of the planning period
	Educate Town residents about the National Flood Insurance Program's Preferred Risk Policy by including a notice in the Town Report.	Planning Commission	High	TRORC staff to develop case studies of where this policy has benefitted homeowners, Planning Commission members' time	Year 1 of planning period.

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Possible Resources*	Time Frame
Flood /Fluvial Erosion; Severe Weather; Hurricane/ Tropical Storm (cont-inued)	*Upgrade culvert on Duclos Road.*	Selectboard, Road Foreman	High	Local resources, Better Roads grant program, Hazard Mitigation Grant Program (HMGP), or Pre-Disaster Mitigation (Competitive) grant program (PDM-C)	Years 1-2 of planning period
	Upgrade the culverts on Riford Brook Road.	Selectboard, Road Foreman	Medium	Local resources, Better Roads grant program, Hazard Mitigation Grant Program (HMGP), or Pre-Disaster Mitigation (Competitive) grant program (PDM-C)	Years 2-3 of planning period
	Upgrade Culverts 17 and 18 on Thayer Brook Road (close together and washed out during Tropical Storm Irene).	Selectboard, Road Foreman	Medium	Local resources, Better Roads grant program, Hazard Mitigation Grant Program (HMGP), or Pre-Disaster Mitigation (Competitive) grant program (PDM-C)	Years 2-3 of planning period
Hazardous Material Spill	*Develop an all-wheel drive emergency evacuation route for Mobile Acres (between School Street Extension and Mobile Acres bridge)*	Emergency Manage-ment Director and Selectboard.	Medium	Local resources or a grant, and volunteer assistance from the Rochester/Randolph Area Sports Trails Alliance	Years 2-4 of planning period
Ice Storm / Heavy Snow	*Clear and maintain town road rights-of-way, and work with local utilities to ensure that utility corridors are cleared and maintained.*	Road Comm-issioner, Selectboard	High	Local resources	Yearly

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization	Possible Resources*	Time Frame
Ice Storm / Heavy Snow (cont-inued)	*Plan for, budget and maintain roads for safe winter travel.*	Road Comm-issioner, Selectboard	High	Local resources	Yearly, during budget discussions.
	Develop a sustainable plan for communicating shelter information to populations that are vulnerable to extreme temperatures.	Emergency Manage-ment Team	Medium	Local resources	Years 2 to 4 of the Planning period.
	Develop a plan for transporting vulnerable populations to shelters.	Emergency Manage-ment Team	Medium	Local Resources	Years 2 to 4 of the Planning period.

*Depending on the mitigation action, local resources may include the following: town personnel/staff time; volunteer time; town budget, donations, among others.

Appendices

Appendix A: Hazard Ranking Methodology

Frequency of Occurrence Probability	Warning Time Amount of time generally given to alert people to hazard	Potential Impact Severity and extent of damage and disruption
1 = *Unlikely* <1% probability of occurrence per year 2 = *Occasionally* 1–10% probability of occurrence per year, or at least one chance in next 100 years 3 = *Likely* >10% but <75% probability per year, at least 1 chance in next 10 years 4 = *Highly Likely* >75% probable in a year	1 = More than 12 hours 2 = 6–12 hours 3 = 3–6 hours 4 = None–Minimal	1 = *Negligible* Isolated occurrences of minor property and environmental damage, minor disruption of critical facilities and infrastructure, and potential for minor injuries 2 = *Minor* Isolated occurrences of moderate to severe property and environmental damage, brief disruption of critical facilities and infrastructure, and potential for injuries 3 = *Moderate* Severe property and environmental damage on a neighborhood scale, temporary shutdown of critical facilities, and/or injuries or fatalities 4 = *Major* Severe property and environmental damage on a community or regional scale, shutdown of critical facilities, and/or multiple injuries or fatalities

The "Hazard Score" presented in section V.A of this plan is calculated as the sum of scores for "Frequency of Occurrence," "Warning Time," and "Potential Impact."

Appendix B: Critical Stream Crossings

Critical crossings group one includes stream crossing structures on town highways that cross third order streams or larger. Headwater streams generally include first through third order. Third order was included as these headwater streams will have larger drainage areas and may have larger structures that are more difficult to replace and have a larger impact on the road network. Most of these are bridges.

Critical crossings group one

STRUCT_NUM	STRUCTYPE	STRC_LBL	RDFLNAME
400902002009021	TS	B20	TANNENBURG RD
400902000509021	TS	B5	THRESHER RD
400902000709021	TS	B7	WEST ST
400902000909021	TS	B9	VT RT 12A
400902001509021	TS	B15	RIFORD BROOK RD
400902001709021	TS	B17	THAYER BROOK RD
400902001809021	TS	B18	THAYER BROOK RD
400902002309021	TS	B23	RIFORD BROOK RD
400902002709021	TS	B27	CONNECTICUT CORNERS RD
400902002909021	TS	B29	LABOUNTY RD
400902003009021	TS	B30	FARNSWORTH BROOK RD
400902003609021	TS	B36	BENT HILL RD
400902003809021	TS	B38	BEAR HILL RD
400902004009021	TS	B40	RIFORD BROOK RD
100902001309021	TL	B13	LEMERY RD
100902001609021	TL	B16	THRESHER RD
100902001209021	TL	B12	MENARD RD
400006001109021	TS	Local ID 1	PETH RD

Appendix C: Large Structures List of Replacement in Order of Need

The following table represents the priority of structures in Braintree which need replacement, and the reasons why replacement is necessary. This information was obtained through the efforts of the Town of Braintree's Road Foreman to physically access the structures and determine their priority for replacement.

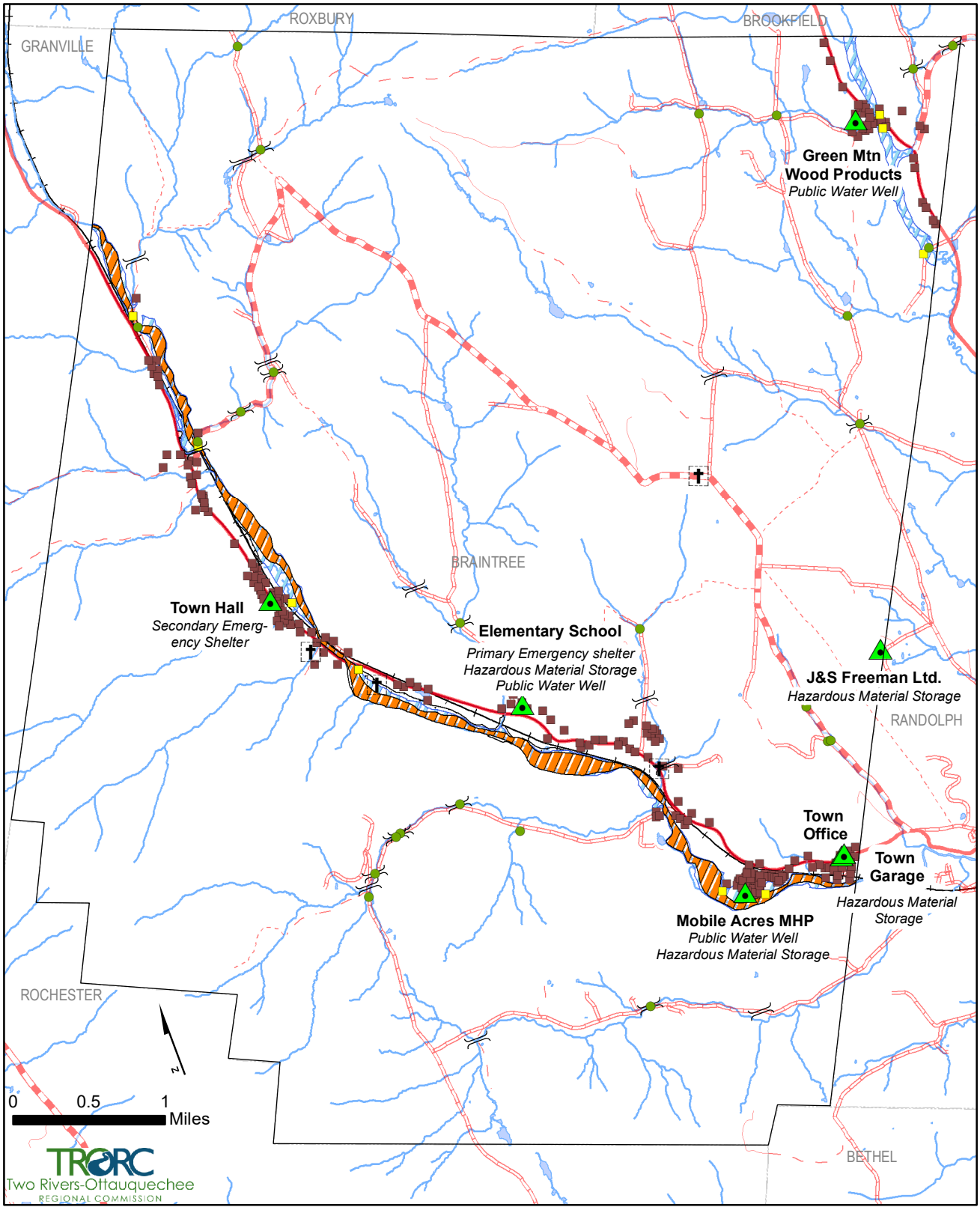
BRAINTREES LARGE STRUCTURES LIST OF REPLACEMENT IN ORDER OF NEED

SUBJECT TO CHANGE AS NEEDED

Culverts:

43.95191	-72.707		DUCLOS RD	OVERWASH IN HIGH WATER, CRITICAL UNDERSIZED A 9 FOOT AND A 4 FOOT UPSTREAM OF THIS
400902004009021	TS	B40	RIFORD BROOK RD	ALL UNDERSIZED AND KEEP WASHING OUT
400902002309021	TS	B23	RIFORD BROOK RD	
400902001509021	TS	B15	RIFORD BROOK RD	
43.9443	-72.7285		RIFORD BROOK RD	REPLACED 3 FOOT CULVERT WITH 5 FOOT IN 2012 MAY NEED HYD STUDY
43.94346	-72.7503		RIFORD BROOK RD	REPLACED 2012 WITH HYD STUDY
400902001709021	TS	B17	THAYER BROOK RD	THESE TWO ARE CLOSE TOGETHER AND WASHED OUT DURING IRENE. SHOULD REPLACE AT SAME TIME.
400902001809021	TS	B18	THAYER BROOK RD	
43.94212	-72.6863		BOWEN HILL RD	CULVERTS UNDERSIZED, SHOULD BE REPLACED WITH 1 CULVERT
43.94208	-72.6859		BRAINTREE HILL RD	
400902002909021	TS	B29	LABOUNTY RD	THESE TWO ARE UNDERSIZED AND SHOULD BE REPLACED.
400902003009021	TS	B30	FARNSWORTH BROOK RD	
100902001309021	TL	B13	LEMERY RD	REDECKED IN 2014. WITHSTOOD IRENE AND JULY 2013 FLOODS BUT IS UNDERSIZED
400006001109021	TS		PETH RD	UNDERSIZED

Attachment A



Hazard Mitigation Plan Map
Braintree, VT

- TH Class 1
- TH Class 2
- TH Class 3
- TH Class 4
- Legal Trail
- Private
- State Highway
- Railroad
- Critical Stream Crossing
- Cemetery
- Bridge
- Critical Facility
- e911 in Floodplain
- e911 within 1000' of major transportation corridor
- 500-Year Floodplain
- 100-Year Floodplain
- Floodway