Brandon, Vermont
Local Hazard Mitigation Plan

January 2019 Flooding on Newton Road

FEMA Approval Pending Adoption Date:
Municipal Adoption Date:
FEMA Formal Approval Date:

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RUTLAND REGIONAL PLANNING COMMISSION

Other Key Partners
Rutland Natural Resources Conservation District
Western Vermont Floodplain Manager
Vermont Department of Health
Vermont Agency of Transportation District 3 Program Manager

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
RIVERS PROGRAM

VERMONT
DEPARTMENT OF HEALTH

VERMONT
AGENCY OF TRANSPORTATION

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1 INTRODUCTION

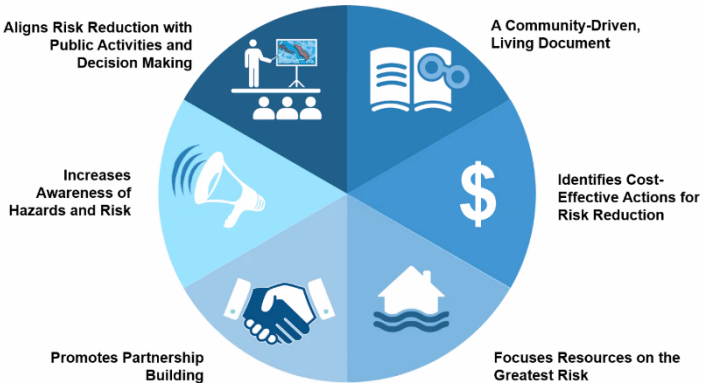
The impact of expected, but unpredictable natural events can be reduced through community planning and action. The goal of this Plan is to provide a natural hazards local mitigation strategy that makes Brandon (the Town) more disaster resistant and more resilient after a disaster.

Hazard Mitigation is any sustained policy or action that reduces or eliminates long-term risk to people and property from natural hazards and their effects. FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This Plan recognizes that communities have opportunities to identify mitigation strategies and measures during all the other phases of Emergency Management – Preparedness, Response and Recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe, and identify local actions and policies that can be implemented to reduce the severity of the hazard.

2 PURPOSE

The purpose of this Plan is to assist the Town in identifying all natural hazards facing the community, ranking them according to local vulnerabilities, and developing strategies to reduce risks from those hazards. Once adopted, this Plan is not legally binding; instead, it outlines goals and actions to prevent future loss of life and property.

The benefits of mitigation planning include:



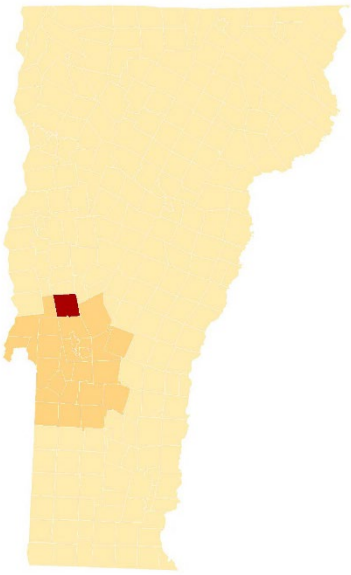
Source: FEMA LHMP Skill Share Workshop 2021

Furthermore, the Town seeks to be in accordance with the strategies, goals, and objectives of the 2018 State Hazard Mitigation Plan.

3 COMMUNITY PROFILE

Land Use and Development Patterns

Brandon is located at the north-central border of Rutland County. It is considered a "sub-regional center" between Middlebury to the north and Rutland City to the south.



Brandon contains a distinct, historic downtown or 'village' area that straddles the Neshobe River. In or adjacent to the Designated Downtown, there are four greens, four churches, municipal buildings, a variety of stores, offices, restaurants, and several inns.

Another long-standing cluster of development exists northeast of downtown in Forest Dale. There, businesses, the town's elementary school, two churches, the Senior Citizen's Center, a golf course, and two general stores are interspersed with residential development, much of which is historic.

Northwest of the downtown is Park Village, a campus of mixed business and residential uses. It is adjacent to the Industrial Park.

These clusters of development are surrounded by generally open, rural, and forested land with residential and non-residential uses.

Land Features

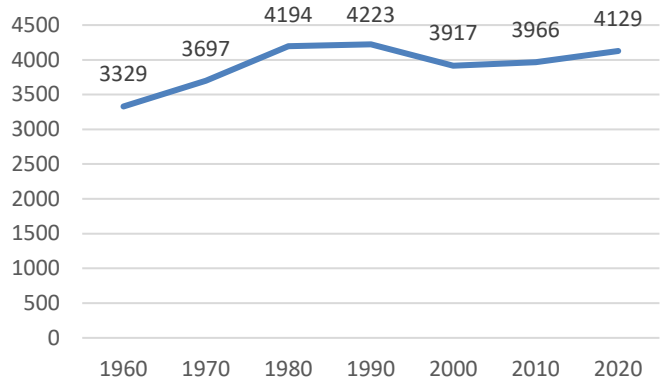
Brandon's landscape is one of extremes. Elevations range from 357 feet at the downstream extent of Otter Creek in the northwest part of town to a 2,345 feet peak in the Green Mountains – the most dominant land feature along the town's eastern border.

The northeast corner of Brandon is characterized by the distinct Brandon Gap along Route 73, which provides the only paved access from Brandon to Goshen and Rochester.

The south-central and western portions of town are within the Champlain Lowland and dominated by the Otter Creek Valley.

Demographics and Growth Potential

The 2020 American Community Survey Five-Year Estimates prepared by the U.S. Census Bureau shows an estimated population of 4,129 and 1,914 housing units. Brandon has had relatively stable population since 1980.



Between 2010 and 2020, the median age of Brandon residents increased from 41.9 to 49.7; higher than the Vermont median age of 42.8. The portion of the population over 65 is 21%, compared to 19% in Vermont and 16% in the country. The population density of the Town is 100 people per square mile compared to an overall state density of 68.

On the heels of significant infrastructure improvements, the Town of Brandon is positioned to experience intentional and sustainable growth.

Improvements to the municipal water supply have helped ensure water quality and capacity for potential residents and businesses. Proactive actions to mitigate climate change impacts related to flooding, such as improvements to stormwater systems and upgrades to the wastewater treatment system, contribute to the Town's potential for growth.

In addition to infrastructure improvements, Brandon's state Downtown Designation, uncomplicated tax stabilization policy, and relatively development-friendly zoning regulations and land use ordinances make it a desirable choice for developers.

As described above (Land Use and Development Patterns), there are four (4) main areas for development – Forest Dale, Park Village, Downtown, and surrounding rural areas.

Forest Dale: The largest potential for housing exists adjacent to the last large development – Forestbrook. The pending merger of Brandon Fire District #2 with Brandon Fire District #1 only serves to strengthen potential for more housing along the Route 53 corridor to the Leicester line.

Park Village: The site of the shuttered Brandon Training School has become a mixed-used area with residential housing, commercial, and municipal spaces. There is opportunity for rehabilitation of existing buildings in this complex as several are currently underutilized. In addition, there is potential for expansion at the Brandon Industrial lots on Robert Wood Drive in the Deneke Park. Existing three-phase power, water and wastewater services could be extended to future expansions.

Downtown: Since Tropical Storm Irene, downtown Brandon has experienced significant change. The Town has aggressively followed the recommendations in the 2015 Vermont Economic Resiliency Initiative report, including FEMA buyouts and development of an overflow structure to divert floodwaters from inundating downtown buildings and US Route 7. Immediate residential housing potential exists in rehabilitation/repurposing of buildings like the former Brandon High School and Brandon Lumber along with a handful of single-family units awaiting landowner investment to bring back online. There are new construction residential opportunities adjacent to the Neshobe House development and on Mill Lane. Expanding out to the greater downtown area (from Nickerson Road to Steinberg) there are a few lots that have potential for residential development.

Downtown commercial space is at a premium. Currently four (4) commercial buildings are for sale. New commercial development would be infill.

Rural: Most development potential in the surrounding rural areas is along US Route 7. There are 72 acres for sale on the east side of Route 7 near Otter Valley Union High School that could be used for either commercial or residential. In addition, there is one (1) existing commercial property for sale and redevelopment on Route 7 north and a few properties are for sale on Route 7 south.

Precipitation and Water Features

Average annual precipitation is 41 inches of rain; with June being the wettest month. Average annual snowfall is 71 inches; with February being the snowiest month.

The Otter Creek, its many tributaries (Arnold Brook, Jones Brook, Breese Mill Brook), and broad floodplain west of US Route 7 is a dominant water feature. As is the Neshobe River and its tributaries (Leicester Hollow Brook), which flows through Brandon's historic downtown. Sugar Hollow Brook lies east of US Route 7.

Several small ponds are sprinkled throughout Brandon – Sugar Hollow Pond, Burnell Pond, Jones Mill Pond, Spring Pond.

Approximately 22% of Brandon's land area (or 5,500 acres) is Class II wetlands, including the 278-acre Brandon Swamp Wildlife Management Area. These play an important function in water absorption and holding capacity that thereby reduces the hazards of flooding and replenishes groundwater supplies.

Drinking Water and Sanitary Sewer

Municipal drinking water service and fire protection is provided by Brandon Fire District #1. Fire District #1 serves approximately 1,180 service connections in the villages of Forest Dale and Brandon. The gravity-fed system has three (3) wells, three (3) storage tanks, approximately 27 miles of distribution piping, and 192 fire hydrants. There are seven (7) water main river crossings in the system and portions are in FEMA-mapped floodplain, including Well #1 on Newton Road.

Brandon Fire District #2 is a loop system serving 59 residents in the Forestbrook housing development. Brandon residents not served by the municipal water systems rely on individual drilled wells, springs, or private water systems.

Sanitary sewer service in Brandon is provided by the Town. This system serves 915 customers in and around the villages of Forest Dale and Brandon. The system has 22 miles of sewer line and 7 pump stations. The main treatment plant is located at 500 Union Street. There are 12 sewer main river crossings in the system and the treatment plant and two of the pump stations (Newton Road and Champlain Street) lie within FEMA-mapped floodplain. Brandon residents not served by the municipal system dispose of sewage in on-site systems.

Transportation

Brandon is 41 square miles in size with primary access via US Route 7, a principal north-south arterial highway, and VT Route 73, a major east-west collector. Average Annual Daily Traffic count on Route 7, especially in the urban compact, is 10,000+ compared to 1,300-4,000 on VT Route 73.

The 2020 VTrans Town Highway data indicates that Brandon has a total of 66.8 municipal road miles: 2.2 miles of Class 1; 16.01 miles of Class 2; 40.24 miles of Class 3; 8.3 miles of Class 4 (or functionally Class 4). Of the total municipal road miles, 10.8 miles are in the urban compact and 82% of these are paved. Fifty-six (56) municipal road miles are outside of the urban compact and only 40% of these are paved.

According to the Town's 2017 road erosion inventory, 89% of Brandon's road mileage is hydrologically connected - meaning it is within 100-feet of a water resource (i.e., stream, wetland, lake, or pond). Proximity to water resources can make these sections of road more vulnerable to flooding and fluvial erosion.

According to the Town's bridge inventory, Brandon has a total of 22 municipal bridges – 9 short structures (6'-20' length) and 13 long structures (>20' length). The town's 13 long structures are inspected every two years by VTrans through the Town Highway Bridge Program.

Brandon has a total of 803 culverts within the municipal road right-of-way, all of which were inventoried in 2017 (an inventory update is being conducted by the Rutland Regional Planning Commission in 2022). Several culverts are listed in critical condition and should be considered for replacement and/or upgrade in accordance with Town Road and Bridge Standards. The local road network is maintained by the municipal highway department, whose garage is located on Champlain Street and lies within FEMA-mapped floodplain.

Electric Utility Distribution System

Electric service to approximately 2,190 accounts is provided by Green Mountain Power via several circuits. Average annual outage statistics between 2017 and 2021 are summarized in **Table 1**.

Table 1: Power Outage Summary

Average Annual (2017-2021)	
Avg # of times a customer was without power in a year	0.76
Avg length of each outage in hours	1.63
# of hours the typical customer was without power	1.24
2021 only	
Avg # of times a customer was without power in a year	1.86
Avg length of each outage in hours	1.60
# of hours the typical customer was without power	2.98

The longest power outage affecting the greatest number of accounts between 2017 and 2021 was 4.3 hours and impacted 652 accounts. An outage lasting 11.8 hours occurred in 2021 that affected only 1 account.

Public Safety

Fire protection is provided by the Brandon Fire Department, an all-volunteer organization. The Fire Department is a member of both Rutland County and Addison County mutual aid programs. Law enforcement is provided by the Brandon municipal police department, with support from Vermont State Police. The nearest hospital is the Rutland Regional Medical Center. Ambulance service is provided by the Brandon Area Rescue Squad.

Emergency Management

Brandon's Town Manager serves as the Emergency Management Director (EMD). They work with others in town to keep the Local Emergency Plan up-to-date as well as to coordinate with nearby towns and regional emergency planning efforts.

4 PLANNING PROCESS

Plan Developers

Steffanie Bourque, an Emergency Management Planner at the Rutland Regional Planning Commission (RRPC), assisted the Town with updating its Local Hazard Mitigation Plan. Pre-Disaster Mitigation Program funds from FEMA supported this process.

The Hazard Mitigation Planning Team members who assisted with the update include the Town Manager/EMD, Road Foreman, Wastewater System Operator, Water Superintendent, and Vermont Department of Health Emergency Preparedness Specialist for the Rutland Region (who happens to be a Brandon resident).

Plan Development Process

The 2022 Brandon Local Hazard Mitigation Plan is an update to the 2017 single jurisdiction mitigation plan. A summary of the process taken to develop the 2022 update is provided in **Table 2**.

Table 2: Plan Development Process

June 28, 2022: Kick-off meeting. Discussed what a LHMP is; benefits of hazard mitigation planning; current plan status; planning process; outreach strategy; and plan sections. Planning Team meetings were not open to the public.

June/July 2022: Notice posted on RRPC and Town websites/social media and bulletin boards at Junction Store in Forest Dale and Town Office in downtown Brandon that Town is updating the LHMP. Emailed notice to officials (Selectboard and Planning Commission chairs, Town Managers and Clerks, Emergency Management Directors) in neighboring towns of Chittenden, Pittsford, Hubbardton, Sudbury, Goshen, Leicester, Whiting and Key Partners (Rutland Natural Resources Conservation District, Western VT Floodplain Manager, Dept of Health Regional Emergency Preparedness Specialist, VTrans District 3 Projects Manager). Notice included RRPC contact for information on planning process and opportunities for public input – see **Appendix D**.

July 12, 2022: Planning Team meeting – confirmed plan purpose and continued work on community profile. Began work on community hazard risk assessment, storm history, and identifying assets vulnerable to highest risk natural hazards.

August 2, 2022: Planning Team meeting – completed work on community profile and hazard identification and risk assessment. This is a critical milestone in the plan development process and draft plan was readied for public meeting.

August 22, 2022: Draft LHMP presented at joint meeting of Brandon Selectboard and Planning Commission to encourage public input from local government and public that could affect plan's conclusions and better integrate with Town initiatives. This meeting was recorded and aired on PEGTV. Draft shared with Key Partners for input on vulnerable locations and assets. Draft posted for public comment period with instructions to email comments to Town Manager, David Atherton. Comments were accepted until September 12, 2022 – see **Appendix D**.

September 12, 2022: Draft LHMP discussed at Brandon Selectboard meeting with opportunity to share public comments. This meeting was recorded and aired on PEGTV.

September 15, 2022: Planning Team meeting – discussed comments received on August draft; completed work on hazard identification and risk assessment. Began work on hazard mitigation strategy – confirmed mitigation goals, discussed community capabilities, and updating status of 2017 actions.

October 4, 2022: Planning Team meeting – continued work on hazard mitigation strategy – completed community capabilities; updated status of 2017 mitigation actions; and evaluated range of possible mitigation actions.

November 1, 2022: Planning Team meeting – completed work on hazard mitigation strategy; plan maintenance; and changes since 2017 plan. Draft LHMP finalized for presentation to local officials and public at joint meeting of Brandon Selectboard and Planning Commission on November 28, 2022.

November 28, 2022: Final draft LHMP presented at joint meeting of Brandon Selectboard and Planning Commission. Meeting was recorded and aired on PEGTV. Plan emailed to neighboring towns and Key Partners. Draft posted for public comment period with instructions to email comments to Town Manager, David Atherton. Comments were accepted until December 12, 2022 – see **Appendix D**.

December 12, 2022: Draft LHMP discussed at Selectboard meeting with an opportunity to share public comments.

December 30, 2022: Final draft LHMP submitted to Vermont Emergency Management for Approval Pending Adoption.

In addition to the local knowledge of Planning Team members and other relevant parties, several existing plans, studies, reports, and technical information were utilized in the preparation of this Plan. A summary of these is provided in **Table 3.**

Table 3: Existing Plans, Studies, Reports & Technical Information

2022 Local Emergency Management Plan

2021 FEMA NFIP Insurance Reports

2020 Land Use Ordinance

2021-2017 Green Mountain Power Outage Data

2020 American Community Survey Five-Year Estimate

2020 Stormwater Infrastructure Mapping Project

2018 State of Vermont Hazard Mitigation Plan

2017 Road Erosion Inventory

2017 Brandon Stormwater Master Plan

2016 Brandon Town Plan

2015 Vermont Economic Resiliency Initiative

2021 Brandon Fire District #1 Source Protection Plan

2021 Brandon Fire District #1 Emergency Response Plan

VTrans Town Highway Bridge Inspection Reports

Vermont Statewide Highway Flood Vulnerability and Risk Map

RRPC Local Liaison Reports of Storm Damage

National Oceanic and Atmospheric (NOAA) National Climatic Data Center's Storm Events Database

FEMA Disaster Declarations for Vermont

OpenFEMA Dataset: Public Assistance Funded Project Summaries for Vermont

Changes Since the 2017 Plan

[placeholder for description of land use/development changes since the 2017 plan – has there been new development? Has development made the community more/less vulnerable to natural hazards?]

[placeholder for description of changes in mitigation priorities since the 2017 plan – have community mitigation priorities changed or stayed the same and explain how/why.]

[placeholder for description of any mitigation actions that have been completed – reference Appendix C. Describe specific ways that implemented actions reduced vulnerabilities – how was asset vulnerability reduced and what is the defined benefit?]

5 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Local Vulnerabilities and Risk Assessment

One of the most significant changes from the 2017 Plan is the way hazards are assessed. To be consistent with the approach to hazard assessment in the 2018 State Hazard Mitigation Plan, the Hazard Mitigation Planning Team conducted an initial analysis of known natural hazard events[1] to determine their probability of occurring in the future (high probability events are **orange** in **Table 4**).

The Planning Team then ranked the hazard impacts associated with the known natural hazard events based on the probability of occurrence and potential impact to life, the economy, infrastructure, and the environment. The ranking results are presented in **Table 4**.

After engaging in discussions, the Town identified the following "highest risk hazards" that they believe their community is most vulnerable to:

- ***High winds associated with thunder, tropical, and winter storms***
- ***Inundation, flash flooding, and fluvial erosion associated with thunder, tropical, and winter storms***
- ***Extreme cold, snow, and ice associated with winter storms***

Each of these "highest risk hazards" (**orange** in **Table 4**) are further discussed in this section and depicted in the Local Natural Hazards and Vulnerabilities Map in **Appendix B**.

The "lower risk hazards" that are considered to have a low probability of occurrence and low potential impact are not discussed. For information on these hazards, consult the State Hazard Mitigation Plan.

Table 4: Community Hazard Risk Assessment

Hazard Event	Hazard Impacts	Probability	Potential Impact					Score
			Life	Economy	Infrastructure	Environment	Average	
Thunderstorm	**Flash Flood/ Fluvial Erosion**	**4**	**1**	**2**	**4**	**4**	**2.75**	**11.00**
Ice Jam								
Tropical Storm /Hurricane	**Inundation Flood**	**4**	**2**	**2**	**4**	**4**	**3.00**	**12.00**
	High Wind	**4**	**2**	**3**	**4**	**4**	**3.25**	**13.00**
Tornado	Hail	3	1	2	3	3	2.25	6.75
Landslide	Landslide	2	1	1	1	2	1.25	2.50
Winter Storm	**Cold/Snow/Ice**	**3**	**3**	**4**	**3**	**4**	**3.50**	**10.50**
Drought	Heat	3	2	1	1	3	1.75	5.25
	Drought	2	1	2	2	3	2.00	4.00
Wildfire	Wildfire	2	3	3	2	2	2.50	5.00
Earthquake	Earthquake	1	3	3	2	2	2.50	2.50

*Score = Probability x Average Potential Impact

	Frequency of Occurrence: Probability of a plausibly significant event	**Potential Impact:** Severity and extent of damage and disruption to population, property, environment, and the economy
1	**Unlikely:** <1% probability of occurrence per year	**Negligible:** isolated occurrences of minor property and environmental damage, potential for minor injuries, no to minimal economic disruption
2	**Occasionally:** 1–10% probability of occurrence per year, or at least one chance in next 100 years	**Minor:** isolated occurrences of moderate to severe property and environmental damage, potential for injuries, minor economic disruption
3	**Likely:** >10% but <75% probability per year, at least 1 chance in next 10 years	**Moderate:** severe property and environmental damage on a community scale, injuries or fatalities, short-term economic impact
4	**Highly Likely:** >75% probability in a year	**Major:** severe property and environmental damage on a community or regional scale, - multiple injuries or fatalities, significant economic impact

[1] This Plan defines natural hazards as atmospheric, hydrologic, geologic, and wildfire phenomena. Hazards not necessarily related to the physical environment, such as infectious disease, were excluded from consideration by the Planning Team.

Invasive Species

The Planning Team did not formally assess the risk associated with invasive species; however, they did discuss the potential hazards and risks associated with the Emerald Ash Borer (EAB) specifically.

Vermont's EAB infestation was first detected in 2018 in northern Orange County. In October 2020, a new detection of EAB in West Rutland was confirmed making Brandon a town in the High Risk Area. This is the first confirmed detection in Rutland County. An inventory of trees within the road right-of-way is needed to determine how many Ash trees are at risk. The potential risk to public and private woodlots and impacts on the local economy have not been quantified.

Highest Risk Hazard Profiles

High Wind

Severe thunderstorms can produce high winds, lightning, flooding, rains, large hail, and even tornadoes. Thunderstorm winds are generally short in duration, involving straight-line winds and/or gusts more than 50 mph. Thunderstorm winds can cause power and communication outages, transportation and economic disruptions, significant property damage, and pose a high risk of injuries and loss of life.

From 2004 to 2010, for thunderstorms that caused more than $200,000 in damage, Rutland County experienced nearly $2 million in property damage. From 2011 to 2020, thunderstorms resulted in just under $2.4 million in property damage in Rutland County, with $525,000 due to a high wind event in May 2017.

Violent windstorms are possible here; Brandon is susceptible to high directional winds town-wide. Many storms with high winds result in downed trees, damaged phone and power lines, buildings, and other property. Brandon is vulnerable to power outages, and they present a potentially significant risk to many residents.

Downed trees within the road right-of-way are the root cause of many power outages. There are many roads that pass through dense wooded areas that are prone to downed trees, which can lead to fallen power lines. Areas of particular concern include Birch Hill Road, North Birch Hill Road, Van Cortland Road, Basin Road, High Pond Road, Lover's Lane, Wheeler Road, Town Farm Road, and the Forestbrook development.

When a power outage occurs, communication systems become compromised. Landline phone service that has been converted from copper wire to fiber rely on an in-home battery back-up. The battery life is typically less than eight hours, whether the phone is used or not. Though most residents use cell phones, service in Brandon is spotty, further complicating the problem of contacting emergency services during power outages.

To mitigate the impacts of power outages, the following public buildings/critical facilities have been equipped with back-up power or generator hook-up: Police Station; Town Garage; Neshobe School (primary local shelter); wastewater treatment plant; two main wastewater pump stations (Champlain Street and Newton Road); Fire District #1 office; Well #2; and Well #3.

The Town Office, which lacks back-up power, serves as the local Emergency Operations Center (EOC). During a disaster, municipal response is managed from the EOC, this would include all communications – from phone calls to internet browsing and 2-way radio.

Connectivity is crucial in times of crisis. Telecommunications are needed for warning systems before disaster, as well as for response during and recover after. Power outages are the main reason for stopping communications, leaving the EOC significantly compromised.

In addition to the Town Office, other critical facilities without back-up power include the alternate local shelter – the American Legion – and the Fire District #1 storage tank controls. The battery back-up for the control system provides power for up to 6 hours. After which operations shift from automated to manual.

High Wind Hazard History

These are the most up to date significant events impacting Brandon. Federal declarations are depicted in **bold**.

6/30/2021: 50 mph wind: $2,000 local damage
3/1/2021: 39 mph wind: $20,000 regional damage
8/4/2020: 45 mph wind: $35,000 regional damage
2/24/2019: 48 mph wind: $25,000 regional damage
4/1/2018: 63 mph wind: $50,000 regional damage
10/30/2017: 40 mph wind: $100,000 regional damage
5/5/2017: 64 mph wind: $500,000 regional damage
7/23/2016: 60 mph wind: $25,000 local damage
5/27/2015: 50 mph wind: $5,000 local damage
7/8/2014: 55 mph wind: $10,000 local damage
5/27/2014: 55 mph wind: $5,000 local damage
12/21/2012: 61 mph wind: $50,000 regional damage
12/1/2010: 52 mph wind: $100,000 regional damage
6/27/2008: 50 mph wind: $10,000 local damage
8/16/2007: 60 mph wind: $75,000 local damage
6/27/2007: 55 mph wind: $10,000 local damage
2/17/2006: 37 mph wind: $75,000 regional damage
9/29/2005: 35 mph wind: $50,000 regional damage

Inundation/Flash Flooding/Fluvial Erosion

Floods can damage or destroy property; disable utilities; destroy or make impassable roads and bridges; destroy crops and agricultural lands; cause disruption to emergency services; and result in fatalities. People may be stranded in their homes for a time without power, heat, or communication or they may be unable to reach their homes. Long-term collateral dangers include the outbreak of disease, loss of livestock, broken sewer lines or wash out of septic systems causing water supply pollution, downed power lines, loss of fuel storage tanks, fires, and release of hazardous materials.

As noted in the State Hazard Mitigation Plan, "Flooding is the most common recurring hazard event in Vermont" (2018: 55). There are two types of flooding that impact Vermont communities: inundation and flash flooding. Inundation is when water rises onto low lying land. Flash flooding is a sudden, violent flood which often entails fluvial erosion (stream bank erosion).

Inundation flooding of land adjoining the normal course of a stream or river is a natural occurrence. If these floodplain areas are in their natural state, floods likely would not cause significant damage.

While inundation-related flood loss can be a significant component of flood disasters, the more common mode of damage in Vermont is associated with fluvial erosion, often associated with physical adjustment of stream channel dimensions and location during flood events. These dynamic and oftentimes catastrophic adjustments are due to bed and bank erosion of naturally occurring unstable stream banks, debris and ice jams, or structural failure of or flow diversion by human-made structures. An ice jam occurs when the ice layer on top of a river breaks into large chunks which float downstream and cause obstructions (State HMP 2018). Brandon is vulnerable to ice jams on Newton Road, Wheeler Road, and downtown.

Several major flooding events have affected the state in recent years, resulting in multiple Presidential Disaster Declarations. From 2003 to 2010, Rutland County experienced roughly $2.6 million in property damages due to flood events.

The worst flooding event in recent years came in August of 2011 from Tropical Storm Irene (DR4022), which dropped up to 10-11 inches of rain in some areas of Rutland County. Irene caused 2 deaths and $55,000,000 in reported property damages and $2.5 million in crop damages in Rutland County.

Although the storm was technically a tropical storm, the effects of the storms are profiled in this flooding section, since the storm brought only large rainfall and flooding to the Town, not the high winds typically associated with tropical storms. This caused most streams and rivers to flood in addition to widespread and severe fluvial erosion. Brandon experienced $1.4 million in local damages during Irene - $116,510 Individual Assistance; $817,430 Public Assistance; $122,000 Hazard Mitigation; and $370,180 National Flood Insurance.

From 2012 to 2020, Rutland County experienced approximately $3.5 million in property damages; with $1.9 million due to a flash flood event in July 2017 (DR4330) and $1 million due to a flash flood event in April 2019 (DR4445).

In Brandon, flooding is a risk. Damages from Tropical Storm Irene were significant, resulting in approximately $1.4 million in impacts. A wide range of assets are vulnerable to flooding.

Sixty-six structures are in the Special Flood Hazard Area (4% of community structures); including residential dwellings, commercial properties, public water supply well, municipal wastewater treatment plant, and municipal garage.

According to FEMA, 14% of these properties have flood insurance. In total, these 13 policies cover $1,867,300 in value.

There are 2 repetitive loss properties.

Like many other Vermont towns, Brandon was built very close to a river. As described in Section 3, the Neshobe River travels west out of Goshen and meanders throughout the Town. It is the biggest contributor to inundation flooding in many parts of Brandon.

As shown on the Local Natural Hazards and Vulnerabilities Map in **Appendix B**, Brandon is vulnerable to inundation flooding on Newton Road, Stone Mill Dam Road, Wheeler Road, Forestdale Road, Pearl Street, Union Street, and lower Carver Street. The Neshobe Golf Club is also vulnerable to inundation flooding.

July 2017 Flood Event on Newton Road

A wide range of assets are at risk from inundation flooding, including roads, culverts, bridges, homes, commercial property, agricultural lands, water mains/service lines/hydrants, sanitary sewer mains/laterals/pump stations, as well as the access roads to Well #1 on Newton Road and the wastewater treatment plant on lower Carver Road.

Flash flooding can occur any time the area has heavy rain. It can impact areas that are located outside of designated floodplains, including along streams confined by narrow valleys. Sections of several roads are periodically washed out – Grove, Old Brandon, North, Wagner, Basin, Van Cortland, North Birch, Richmond, Town Farm, Lover's Lane, Wheeler, Hollow, Short Swamp, Hack Saw Mill, and Marshall Phillips. All these roads, except for Grove and North streets, are gravel. Impacts to municipal roads and driveways can be exacerbated by undersized culverts and inadequate ditching.

Culvert failures and road washouts can have a significant negative impact on the Town. Especially if they occur on roads considered locally important routes for through-traffic, short-cuts, detours, and/or access to critical facilities – such as Forestdale Road (access to the Brandon Police Department), Wheeler Road, and Carver Street.

When roads are impacted by flooding, the Town coordinates with the Fire Department and State Dispatch to close the roads and set up detours. The road closures create longer commute times for residents and longer emergency service response times.

The inventory of hydrologically-connected roads completed in 2017 for the Municipal Road General Stormwater Discharge Permit also identified areas vulnerable to flash flooding and included recommended corrective actions to make these areas more resilient.

Stream Geomorphic Assessments (SGAs) provide information about the physical condition of streams and factors that influence their stability. Phase 1 and 2 SGAs exist for the Neshobe River. SGA data was used to identify and prioritize river corridor protection and restoration projects within the Neshobe River watershed, primarily in the Town of Brandon.

The Neshobe River Corridor Plan was completed in September 2011. A list of 13 potential restoration and conservation projects was developed. Types of projects include river corridor and wetland protection through easements and conservation efforts, improving riparian buffers, reducing farm field runoff, evaluation of berm removal, mass failure remediation, bridge replacement, and dam removal.

Assets vulnerable to fluvial erosion on the Neshobe River include a bridge on North Street (B8), bridge on Town Farm Road (B24), bridge on Wheeler Road (B1), buildings on north side of Park Street in the downtown, Mill Lane, a bridge on Union Street (B5), as well as various water and sanitary sewer main river crossings, and the wastewater treatment plant.

Assets vulnerable to fluvial erosion on the Otter Creek include a bridge on Pearl Street (B12) and water main river crossing.

As weather patterns shift and we see larger storms and more frequent freeze-thaw cycles, the Town will monitor for signs that rivers that have historically been stable becoming less stable, with increased erosion, widening, trees falling in from its banks, etc.

Flooding Hazard History

These are the most up to date significant events impacting Brandon. Federal declarations are depicted in **bold**.

8/24/2020: 2-3" rain: no reported local damage
4/15/2019: DR4445 1-2" rain with significant snow melt: no reported local damage; $1,000,000 regional damage
7/1/2017: DR4330 3-4" rain the previous 3-4 days with flash flooding on 7/1/17: $395,180 local damage; $700,000 regional damage
6/25-7/11/2013: DR4140 heavy rain over multiple days: $13,645 local damage; $420,000 regional damage
8/28/2011: DR4022 Tropical Storm Irene with ±5" rain: $1.4 million local damage ($116,510 Individual / $817,430 Public / $122,000 HMGP / $370,180 NFIP)
8/6/2008: 3-5" rain: $100,000 local damage
7/24/2003: heavy rain: $25,000 local damage
12/16/2000: DR1358 2-4" rain: no reported local damage

Extreme Cold/Snow/Ice

In the Rutland Region, most winter weather events occur between the months of December and March. Throughout the season, winter weather events can include snowstorms, mixed precipitation events of sleet and freezing rain, blizzards, glaze, extreme cold, the occasional ice storm, or a combination of any of the above. Events can also be associated with high winds or flooding, increasing the potential hazard.

The costs of these storms come in the form of power outages due to heavy snow or ice accumulations, damaged trees, school closings and traffic accidents.

From 2001 to 2010, Rutland County experienced $2.7 million in property and crop damages from winter storms. 2011 to 2020 experienced $1.58 million in property damage, with $300,000 due to a 10" - 20" heavy, wet snowfall across the county on December 9, 2014.

There have been four winter storm-related federally declared Disasters in the county (the ice storm of January 1998 – DR 1201; severe winter storms in December 2000 and 2014 – DR 1358 and DR 4207, respectively; and severe storm and flooding in April 2007 – DR 1698).

Typically, towns' vulnerability to snow and ice storms are loss of road accessibility and power outages. The Town is prepared for a power outage during a severe winter storm, except for the local emergency operations center.

Snow accumulation typically has not made the Town vulnerable to loss of road accessibility. The Town's fleet of snowplows ensures all roads are accessible, even in major accumulation events. Roads adjacent to critical facilities are well maintained.

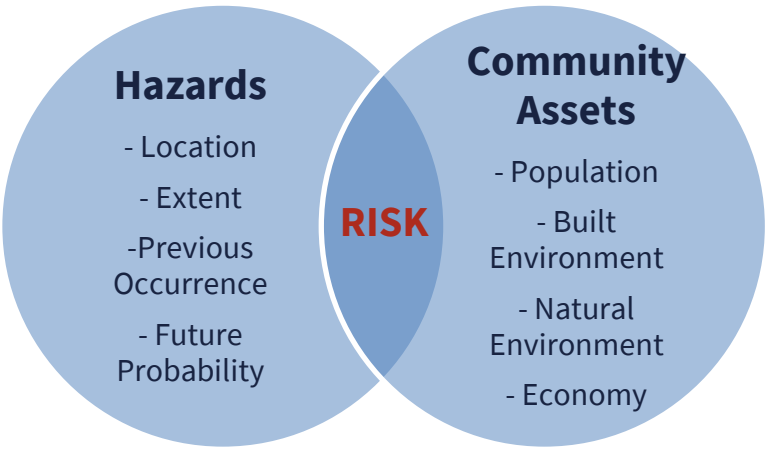
The change of winter storm events from mostly snow to rain and ice has increased the Town's risk with downed trees and resulting power outages, which are previously discussed in the High Wind hazard profile.

During prolonged cold events, Fire Districts #1 and #2 infrastructure is vulnerable to freezing – the above ground storage tank at 1311 New Road; concrete encased utility mains crossing the Neshobe River; and service lines. January and February 2015 were record cold months in the Rutland Region. Brandon reported temperatures of 12 degrees below zero. Forty-seven water service lines froze resulting in significant disruption in water supply and budget impacts. Several residents were without water for four (4) days.

Extreme Cold/Snow/Ice Hazard History

These are the most up to date significant events impacting Brandon. Federal declarations are depicted in **bold**.

2/3/2022: 8-12" snow mixed with freezing rain: $50,000 regional damage
1/16/2021: 3-6" wet snow: $50,000 regional damage
2/7/2020: 8-12" snow; ¼" ice: $15,000 regional damage
1/19/2019: 16" snow: $10,000 regional damage
11/26/2018: 4-8" heavy snow: $25,000 regional damage
2/7/2018: 10" snow: $10,000 regional damage
12/12/2017: 12" snow: $10,000 regional damage
3/14/2017: 12-22" snow: $25,000 regional damage
2/1-2/2015: Record cold month with 15-20+ days below zero and 10" snow: $10,000 regional damage
1/7/2015: 0-10 degrees with wind of 15-30 mph creating wind chills colder than 20-30 below zero: 12 below zero reported in Brandon: $28,585 local damages
12/9/2014: DR4207 10-20" snow: $200,000 regional damage
2/23/2010: 6-30" snow: $100,000 regional damage
12/11/2008: 5-9" snow/glaze ice: $50,000 regional damage
4/15-16/2007: DR1698 "Nor'icane" 3" snow and rain, 60-80 mph wind: $34,040 local / $1 mil regional damage
3/5/2001: EM3167 2-18" snow: $4,800 local damage



Vulnerability Summary

High Wind

Location[1]: Town-wide

Vulnerable Assets[1]: Roads, buildings, trees, power lines, telecommunication systems, signalized traffic lights

Extent: up to 64 mph winds

Impact: $75,000 local damage / $500,000 regional damage

Probability: >75% chance in a year

Inundation/Flash Flooding/Fluvial Erosion

Location[1]: *Inundation Flooding:* Newton Rd, Stone Mill Dam Rd, Wheeler Rd, Forestdale Rd, Pearl St, Union St, lower Carver St, downtown, Neshobe Golf Club

Flash Flooding: Grove St, Old Brandon Rd, North St, Wagner Rd, Basin Rd, Van Cortland Rd, North Birch Hill, Richmond Rd, Town Farm Rd, Lover's Ln, Wheeler Rd, Hollow Rd, Short Swamp Rd, Hack Saw Mill Rd, Marshall Phillips Rd

Fluvial Erosion: Neshobe River – North St, Town Farm Rd, Wheeler Rd, Park St (downtown), Mill Ln, Union St, utility river crossings; Otter Creek – Pearl St, utility river crossings

Vulnerable Assets[1]: Roads, culverts, bridges, homes, driveways, commercial property, agricultural lands, water mains/service lines/hydrants, sanitary sewer mains/laterals/pump stations, access road to Well #1, access road to wastewater treatment plant, wastewater treatment plant

Extent: ±5" rain; extent data for fluvial erosion is unavailable

Impact: $1.4 million local damage

Probability: >75% chance in a year (all flooding types)

Extreme Cold/Snow/Ice

Location[1]: Town-wide

Vulnerable Assets[1]: Roads, culverts, bridges, trees, power lines, telecommunication systems, signalized traffic lights

Extent: up to 30" snow; ¼" ice; 80 mph winds; 15-20+ days below zero

Impact: $28,585 local damage / $1 mil regional damage

Probability: >10% but <75% probability per year

[1] See **Appendix B:** Local Natural Hazards and Vulnerabilities Map

The Hazard Identification and Risk Assessment is the foundation for the mitigation strategy to reduce future losses.

CERTIFICATE OF ADOPTION
TOWN OF Brandon, Vermont Selectboard
A RESOLUTION ADOPTING THE Brandon, Vermont 2022 Local Hazard Mitigation Plan

WHEREAS, the Town of Brandon has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **2022 Brandon, Vermont Local Hazard Mitigation Plan,** which result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Brandon has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its **2022 Brandon, Vermont Local Hazard Mitigation Plan (Plan)** under the requirements of 44 CFR 201.6; and

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

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

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

RESOLVED by Town of Brandon Selectboard:

1. The **2022 Brandon, Vermont Local Hazard Mitigation Plan** is hereby adopted as an official plan of the Town of Brandon;

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

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

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

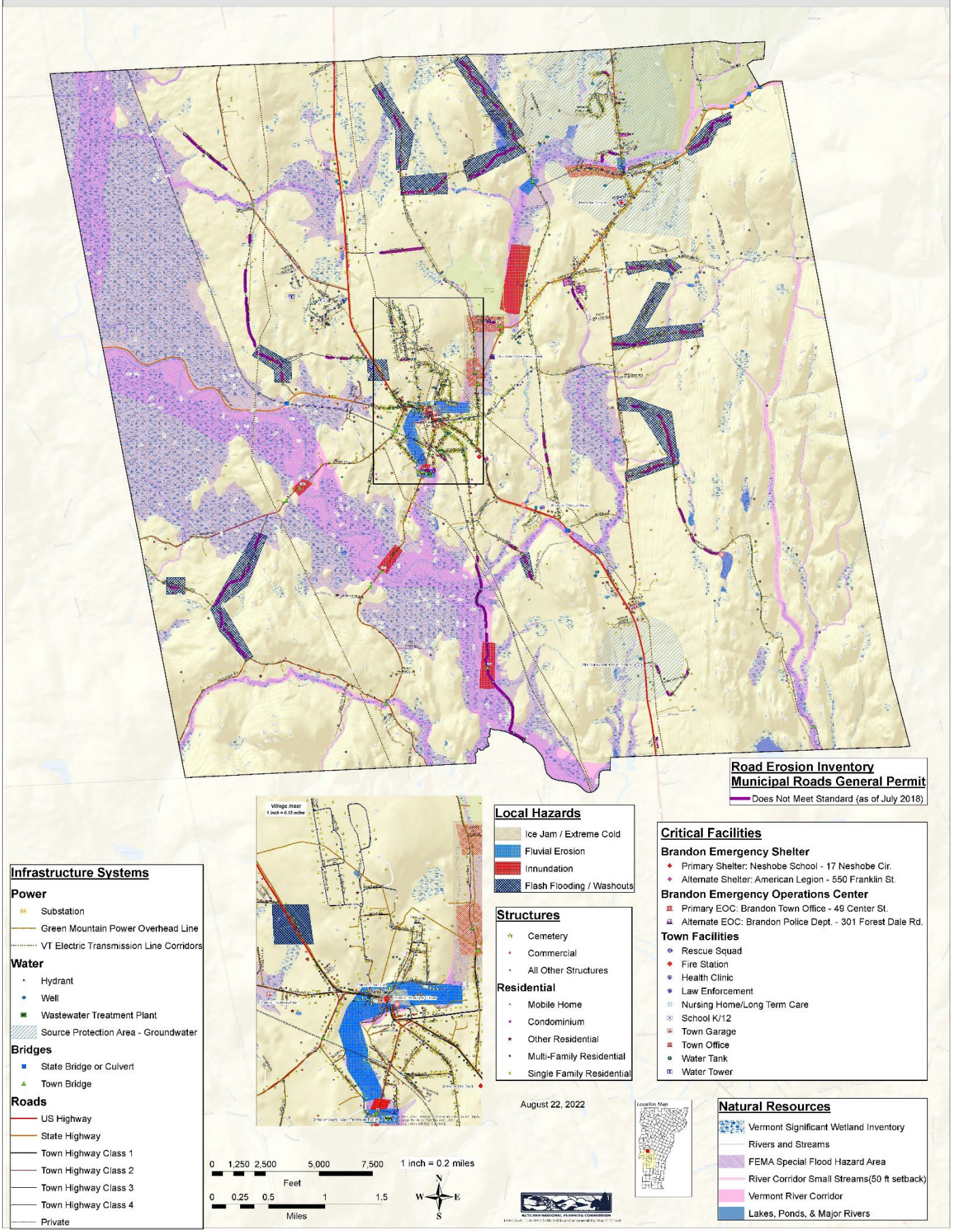
IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Brandon this ____ day of _____ 2022.

_____
Selectboard Chair

ATTEST

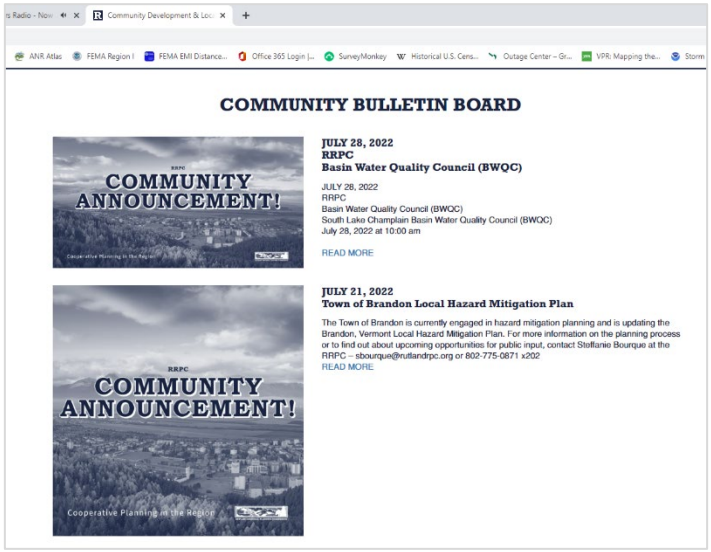
_____
Town Clerk

Brandon, Vermont: Local Natural Hazards and Vulnerabilities Map



MITIGATION ACTIONS FROM 2017 PLAN

SUMMARY OF PUBLIC COMMENTS ON DRAFT PLAN



COMMUNITY BULLETIN BOARD

JULY 28, 2022
RRPC
Basin Water Quality Council (BWQC)

JULY 28, 2022
RRPC
Basin Water Quality Council (BWQC)
South Lake Champlain Basin Water Quality Council (BWQC)
July 28, 2022 at 10:00 am

READ MORE

JULY 21, 2022
Town of Brandon Local Hazard Mitigation Plan

The Town of Brandon is currently engaged in hazard mitigation planning and is updating the Brandon, Vermont Local Hazard Mitigation Plan. For more information on the planning process or to find out about upcoming opportunities for public input, contact Steffanie Bourque at the RRPC – sbourque@rutlandrpc.org or 802-775-0871 x202
READ MORE

Example plan update kick-off public notice from Rutland Regional Planning Commission website.

No inquiries received in response to the kick-off notice.

From: Steffanie Bourque
To: Steffanie Bourque
Bcc: kpratt.selectboard@chittendenvt.org; lisa.purcell@comcast.net; clerk@chittendenvt.org; isotirakis@aol.com; Manager@pittsfordvermont.com; aliciam221b@gmail.com; mark@papillon-ag.com; clerktreasurer@pittsfordvermont.com; idproduction@comcast.net; rgibbbps@shoreham.net; spdubois@peoplepc.com; clrkhubb@shoreham.net; winnerspass@myottmail.com; upyonder@shoreham.net; sudburytownclerk@gmail.com
Subject: PUBLIC NOTICE - Brandon Engaged in Hazard Mitigation Planning
Date: Thursday, June 30, 2022 1:27:00 PM

Local Officials:

As neighboring communities, we are providing you with public notice that the Town of Brandon is currently engaged in hazard mitigation planning and is updating the Brandon, Vermont Local Hazard Mitigation Plan. For more information on the planning process or opportunities for public input, contact Steffanie Bourque at the Rutland Regional Planning Commission – sbourque@rutlandrpc.org or 802-775-0871 x202.

Email to local officials in neighboring communities announcing LHMP update kick-off – dated June 30, 3022. Similar email sent to Key Partners.

No inquiries received from neighboring communities or Key Partners.