

Town of Plainfield, VT
2019 Local Hazard Mitigation Plan
Prepared by the Town of Plainfield and CVRPC

DRAFT

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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 Local Hazard Mitigation Plan (hereafter referred to “the Plan”) is to provide a local mitigation plan that makes the Town of Plainfield more disaster resistant and reduces its risk from natural hazards. In accordance with the Stafford Act, municipalities may perform mitigation planning and be eligible to receive increased federal funding for hazard mitigation measures. (42 U.S.C. 5165).

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. The Federal Emergency Management Agency (FEMA) defines a natural hazard as a source of harm or difficulty created by a meteorological, environmental, or geological event. FEMA, State agencies, and municipalities have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster strikes. This Plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of emergency management – preparedness, response, and recovery.

Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe, and identify local actions that can be taken to reduce the severity of the hazard. These actions and measures, also known as “hazard mitigation strategies,” can alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or land treatment, adapt to the hazard by modifying structures or standards, or avoid the hazard by preventing, limiting, or relocating development, improving public education, or ensuring development is disaster resistant.

2. Purpose

The purpose of this Local Hazard Mitigation Plan is to assist the Town of Plainfield in recognizing hazards facing its community, ranking them according to local vulnerabilities, and identifying strategies to reduce risks from acknowledged hazards of highest concern based on current information.

The 2019 Plainfield Local Hazard Mitigation Plan is an update of the town's 2012 plan, which was adopted by the Selectboard on December 18, 2012, and approved by FEMA on June 7, 2013. The town reviewed, evaluated, and revised the 2012 plan to reflect changes in development, progress in local mitigation efforts and changes in priorities. New information has been incorporated into this Plan making it up-to-date, stronger and more useful for the Plainfield town officials and residents who will implement the actions and measures going forward. This Plan reflects changes in development, progress in local mitigation efforts and changes in priorities. It is anticipated that implementation of this Plan will make Plainfield more resistant to harm and damages in the future, and will help reduce public costs.

Plainfield strives to be in accordance the strategies, goals and objectives of the State Hazard Mitigation Plan, which was last updated in 2018. The current State Plan includes an emphasis on proactive pre-disaster flood mitigation for public infrastructure, good floodplain and river management practices, and fluvial erosion risk assessment initiatives.

The 2019 Plainfield Local Hazard Mitigation Plan includes current information since the last plan update in 2012.

- The Town has updated hazards to reflect the Town's current needs and priorities
- Plan Update Process
- Plan Maintenance
- Identification of worst hazards and recommendations for mitigation efforts
- Identification of non-worst threat hazards
- Updates of Local Areas of Concern Map
- Status update of the mitigation strategies and actions set out in the 2012 HMP
- Identification of new mitigation strategies and goals for the next five years that reflect the current priorities and intended actions of the community over the next five years.
- Updated flood hazard map based on local flood studies and drone flights
- Updated Flood Insurance Rate Maps (2013)
- Marshfield Dam #6 (also known as Molly's Falls Dam) Inundation Area Map
- River Corridor Map
- Updated Hazard Analysis Map
- The Town and Village's inclusion in the Community Rating System (CRS)—October 2016

- Description of several long-term mitigation projects and strategies have been completed from 2012 to 2019
- Public outreach and education is ongoing

Throughout this updated Hazard Mitigation Plan for Plainfield, old assumptions have been challenged, and new information has been added to make the plan stronger and more useful for the Plainfield officials and residents who will implement hazard mitigation strategies for the town in the future.

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3. Community Profile

The Town of Plainfield is located in the eastern section of Washington County, bordered by the towns of Marshfield, East Montpelier, Barre, Orange, and Groton. Plainfield has a total area of 21.0 square miles, of which 0.04 square miles (0.19%) is water. The Plainfield landscape can be divided into three regions: the eastern hills, the western hills, and the Winooski River Valley. The eastern hills include Spruce Mountain (elevation 3030 feet), Maple Hill to the northwest of Spruce Mountain (elevation 1604 feet), and Colby Hill (elevation 2265 feet) southwest of Spruce Mountain. Starting about two miles south of Plainfield village, the western hills rise from the western side of the Great Brook westward to the Winooski River Valley. Significant rivers, streams and brooks run through Plainfield. The Winooski River is one of Vermont's largest. The Winooski, one of Vermont's largest rivers, flows east to west through Plainfield at an elevation of nearly 11 feet. Potter Brook originates in the southeastern portion of L.R. Jones State Forest and flows in a northerly direction, eventually entering Nasmith Brook which flows into the Winooski River in Marshfield. On the Winooski River to the east of Plainfield, Green Mountain Power Marshfield Dam #6 presents an ongoing risk to Plainfield of catastrophic flooding in the event of a lengthy storm event (see below).

An additional source of flooding and alluvial erosion hazards to Plainfield is the Great Brook which bisects the town from south to north. The Great Brook is a tributary of the Winooski River and enters the Winooski River just west of Plainfield Village. Checkerberry Brook originates at Bancroft Pond and flows west for several miles to Great Brook. Mskaskek Brook originates on Spruce Mountain and flows northeast to the Great Brook. In addition, there are five unnamed tributaries to Great Brook and two unnamed tributaries to the Winooski River are shown on the USGS topographic maps for Plainfield.

According to the 2010 US Census, Plainfield had a population of 1,243 people, a three per cent decrease from the 2000 census. However, the 2016 American Community Survey (ACS) 5-year population estimate for Plainfield is 1,466 (an 18% gain since the 2010 census). This change in population has little, if any, impact on Plainfield's priorities or vulnerability. According to the 2010 census, there were a 565 housing units, an increase of 8.6% from the 2000 census. Approximately 28% of Plainfield's workforce is within the town and another 71% working outside the community.

The town's major thoroughfares are US Route 2 and Vermont Route 214 which converge in the northwestern section of the Town. Housing within the Town is widely dispersed in both rural locations and the "village" area of town, with 74% of housing being "owner-occupied" according to the 2010 census. Housing development continues to be primarily scattered, "rural residential" development.

The Town's limited commercial development is primarily in the "village" portion of the Town which is consistent with the Town's zoning regulations. This includes a bookstore, restaurant, bio-diesel Company, food coop, an auto repair business, a clothing design firm, retail professional office space, a used furniture store, and a summer's farmers' market. In addition, a significant number of home-based businesses are scattered throughout the rural areas of the town, ranging from farms, to sugaring operations, to day care, to a tree farm, evidencing a vibrant, creative community. Other non-commercial institutions which enrich community life are Goddard College, The Health Center, the Plainfield Coop's Community Center, the Cutler Memorial Library, and the Plainfield Town Hall/Opera House. Overall, new development since the 2012 Plan has caused no change in the community's vulnerabilities. However, Marshfield Dam #6, operated by Green Mountain Power for electricity generation presents an increased risk of vulnerability to Plainfield resulting from failure to maintain the concrete emergency spillway, reliance on human observations of water level rise during high water events, an aged flood-gate system which can only be opened by humans, and no emergency electric power system operational during grid power outages (making water level readings very difficult). Green Mountain Power is in the process of seeking a Certificate of Public Good for upgrades and changes to the service spillway and emergency spillway, as well as operational changes. Plainfield is participating in this case currently before the Vermont Public Utilities Commission to assure that concerns about safety are addressed and met, and that the risk of harm from dam overflow or failure is reduced.

3.1 Public Infrastructure

Green Mountain Power provides electric service to customers within Plainfield "village" and along US 2 and VT Route 14. Washington Electric Cooperative serves customers in the rest of town. While an increasing number of residents rely on cellular telephone service and VOIP for telephone service, Consolidated Communications (formerly Fairpoint Communications) provides land line telephone service. Internet service is provided by Cloud Alliance, a wireless internet service provider, Consolidated Communications, and Charter Communications, depending on the customer's location in town. At Town Meeting in 2018, voters approved Plainfield joining in a new special municipal entity to explore providing high speed internet services via fiber optic cables for underserved municipalities. That is in its infancy.

The Plainfield Water and Sewer District, with a total of 240 connections, provides water and sewer to the "village" area of Plainfield and a few Marshfield residents. The properties in Plainfield not served by the Water and Sewer District are dependent upon natural springs and on-site wells for water and leach fields for on-site septic disposal. Such septic systems are regulated by the State's wastewater regulations.

3.2 Public Safety

Plainfield Volunteer Fire and Rescue provides fire protection and Fast-Squad medical emergency response services to the Town. According to the 2017 Town Report, Fire and Rescue responded to nearly a call every day, ranging from fire calls, calls for medical assistance, traffic accidents, to occasional hazmat situations. Plainfield Volunteer Fire and Rescue even stepped in to rescue goats and their babies from rapidly rising flood waters in the May 2011 flood. Plainfield is a member of the Capital Mutual Fire Aid System. This agreement allows departments within the system the ability to call in resources from other towns in the event of emergencies. Plainfield also has an automatic response agreement with adjacent East Montpelier and Marshfield. The nearest HAZMAT Response Vehicle is located approximately 47 miles away at the IBM Facility in Essex Junction. The nearest HazMat decontamination, rescue and mass care trailers are located at Barre City and Berlin Fire Departments. For medical emergency services of greater complexity than Plainfield's Fast Squad can handle, Plainfield contracts with the East Montpelier Fire Department ambulance service which responded to seventy-five calls in Plainfield in 2017 (declining each year from a high of 100 calls in 2013). Plainfield Volunteer Fire and Rescue's work is much appreciated and, with the Town's support, a new fire truck was put into service in September 2018. Earlier, in 2013, Plainfield Volunteer Fire and Rescue celebrated its 100th year in operation. Andy Hebert serves as the Plainfield Fire Warden. He regulates open burning in the town by issuing burning permits ("Permits to Kindle Fire"), educating town residents about safe open burning practices, and maintains a relationship with Plainfield Volunteer Fire and Rescue as Second Assistant Chief, and with the Vermont Department of Forest Parks, and Recreation. As the Fire Warden, Andy is responsible for wildland fire suppression in the town and may ask the state for technical assistance and specialized equipment. The Town Forest Fire Warden issues between 100 and 200 permits a year.

Law enforcement is provided by the Vermont State Police. The Town also contracts with the Washington County Sheriff's Department for traffic enforcement. The Plainfield Town Constable does not have formal law enforcement authority, but is a source of assistance when various problems arise. The Town Constable also serves as Plainfield's Animal Control Officer and would be available to assist during a variety of emergencies. The Town Health Officer is also assisted by two Deputy Town Health Officers, one of whom is the Town Constable and the other of whom is Plainfield's former Town Health Officer.

In accordance with 20 V.S.A. §6, regarding local organization for emergency management, the Plainfield Selectboard appoints an Emergency Management Director who has "direct responsibility for the organization, administration, and coordination of the local organization for emergency management, subject to the direction and control of the executive officer or legislative branch." Michael Cerulli Billingsley served as Plainfield's Emergency Management Director from October 10, 2016 to May 15, 2018. On May 14, 2018, Selectboard member Sasha Thayer was appointed Interim Emergency Management Director while review of the position description and seeking a permanent Emergency Management Director is underway.

Plainfield's 2006 Hazard Mitigation Plan called for putting an emergency shelter in place at the Plainfield Fire House. That had not been accomplished by the 2012 update of Plainfield's Hazard Mitigation Plan. Since then, arrangements have been made with Goddard College to provide space for the physical emergency shelter for up to 75 individuals. Beds and supplies for 22 individuals are in place. In addition to having space to provide overnight housing, Goddard College also has emergency generators and cooking facilities. Plainfield is fortunate to have a water-sewer facility operator who is also willing to serve as the shelter director for the period of time until the Red Cross steps in to handle providing shelter. Goddard is in the process of installing a wood chip heating system to serve the entire campus which will also provide resilience in heating not available elsewhere.

This emergency shelter at Goddard College would serve the towns of Plainfield and Marshfield. In addition, an emergency shelter facility at the Barre Auditorium is an alternative in the event that Plainfield's shelter is not available or exceeds its capacity. The Town of Plainfield approved a \$1000 Reserve Fund for Emergency Management for the 2018-2019 fiscal year which can be used to provide food for those using the emergency shelter for the three days until Red Cross would take responsibility for the shelter. In addition, arrangements for an emergency command center at the Plainfield Town Hall/Opera House are now in place. Landline telephone service is in place there as this facility is also a polling place for elections. Both Goddard College and the Plainfield Town Hall/Opera House have generators to provide service for a period of time in the event of an emergency which results in an electric power outage. The town municipal building, fire house and Town Hall/Opera House all have surge protection installed to protect against electrical surges harming electronics and communication devices.

3.3 Public Health

Plainfield is also home to The Health Center, which receives Federal support through the Community Health Center Program as a Federally Qualified Health Center. The Health Center provides Plainfield and surrounding communities with primary care, dental care, mental health care, and physical and occupational health services, all on a sliding scale. The Health Center and its staff are an ongoing resource to area residents and the town is in consultation with staff planning for coordination in responding emergency weather or HAZ-MAT spill events. Plainfield Emergency Management is in the process of collaborating with The Health Center for responses and support in the event of the need for medically assisted emergency shelter or an infectious disease event.

3.4 Municipal Plan

The Town Plan was adopted in February 2014. The existing plan is in the process of being updated in response to State requirements that it be updated in 2019. The Town Plan includes goals and strategies regarding floodplains, transportation, and public services. The 2011 Zoning Regulations include a Forest and Agricultural Lands District, which covers the majority of the Town. Concerns regarding flood plain development are regulated by the Town of Plainfield Inundation Hazard Area Regulations adopted in March 2010. Amendment of Plainfield's Zoning ordinance is underway and incorporates within the zoning ordinance a section on Flood Hazard Overlay, rather than addressing regulation relating to flood hazard as a separate document. These amendments address River Corridors and Special Hazard Flood areas in more detail and with greater specificity than the 2011 Plainfield Inundation Hazard Area Regulations. The Plainfield Planning Commission's proposed amendments to the town Zoning Ordinance incorporate flood hazard planning, including definitions for Special Flood Hazard Area, River Corridor, Start of Construction, all relating to flood plain management, and establishes a Flood Overlay Hazard District (Section 2.8). The updated zoning regulations also incorporate available GIS-mapped river corridors. In addition, the Planning Commission has explored incorporation of FEH maps into the planning and zoning processes. It is anticipated that the amended zoning ordinance will be approved in 2019.

3.5 Local Emergency Management Plan (LEMP)

The Town of Plainfield has an approved Local Emergency Operations Plan (LEOP), (formerly known as the Rapid Response Plan), that is updated and adopted annually, after Town Meeting Day. The 2017 LEOP was adopted on June 24, 2017 and was due for update and renewal in May 2018. The updated 2018 LEOP was adopted by the Plainfield Selectboard on May 14, 2018 and is due for renewal by May 1, 2019. The town coordinates with the Central Vermont Regional Planning Commission which provides technical support and guidance with the LEOP plan update. The town requires the certifying officer to be trained in ICS 402 or ICS 100 at a minimum. In conjunction with the LEOP, on September 24, 2012, the town adopted the use of the National Incident Management System (NIMS) as the standard for management and systematic approach involving all threats and hazards, regardless of cause, size, location, or complexity, in order to reduce loss of life, property, and harm to the environment.

3.6 Flood Resiliency

Over the past eight years, stormwater management has become a focus of the flood resiliency efforts in the community. In response to concerns about flooding, especially from the May 2011 flood event in Plainfield, the Selectboard appointed a Flood Management Advisory Committee in August 2011. That Flood Management Advisory Committee's charge was "to assist the town by gathering information and developing long term recommendations for mitigating the impact of future flood events on public safety and infrastructure." Soon after its initial meeting, in September 2011, Plainfield suffered further damage from Hurricane Irene flooding and fluvial erosion. These events, as well as past history of flooding in Plainfield and further flooding in July 2015, resulted in vibrant Flood Management Advisory Committee which provided thoughtful, well-researched recommendations to the Plainfield Selectboard. In March 2015, the Flood Management Advisory Committee recommended the firm of Milone & MacBroom to provide the town an assessment of the challenges posed by the undersized bridges traversing the Great Brook.

On February 8th 2016, the Selectboard disbanded the Flood Management Advisory Committee and established the Plainfield Hazard Mitigation Committee as its successor. The Hazard Mitigation Committee has a page on the Town's website (www.plainfieldvt.us) which provides information about the committee's work and challenges the town faces. The Hazard Mitigation Committee's charge is to "to provide the Selectboard with information and suggestions to reduce or eliminate the long-term risks to human life and property in Plainfield from fluvial erosion/landslide, flash floods/floods, Marshfield dam releases or failure, winter storms, long-term electric outages, hazardous waste spills, forest fires and other identified hazards" as well as to assist the town by gathering information and developing long term recommendations to mitigate the impact of future flood and other hazard events on public safety and infrastructure. The Hazard Mitigation Committee, and the Flood Mitigation Committee before it, have been an active and involved resource to the Town. These Committees have been evaluating hazards, acting as the Town's evaluator of flood-damage engineering reports and recommendations, have evaluated and reported on dam-related hazards, and made recommendations for improving local flood resilience and all-hazard mitigation measures. Plainfield's Hazard Mitigation Committee carries out these responsibilities currently, including assessing past mitigation projects and compiling information on its current and future hazard mitigation programs, projects and activities. Members of the Committee have also regularly attended state Emergency Management and FEMA Hazard Mitigation trainings and workshops for information about best practices and pending new hazard threats and participated in a tabletop exercises relating to the hazard of flooding posed by dam failure or emergency water release from Green Mountain Power's Molly's Falls/No. 6 dam. These actions keep the town prepared and better able to respond, recover, and reduce risk.

In 2017, Plainfield participated in a Central Vermont Storm Water Master Plan project with CVRPC. The project was funded by a grant from the VT Department of Environmental Conservation's Clean Water Fund. A final report by Watershed Consulting Associates, LLC was released in 2018. Outcomes of the report will be used in the update of this Plan and other town planning efforts including a storm water management and the municipal Town Plan update to take place in 2022.

The Town Emergency Management Director is working to develop a page on the Plainfield website where residents can be informed on emergency preparedness, response, recovery, and mitigation matters and access maps. In 2017, efforts were taken to encourage increased town wide participation in VT Alert.

The town has pursued and found resources to pursue geomorphic assessment and river corridor planning work through a contract with Milone & MacBroom. The town is also seeking Hazard Mitigation grant funding to address chronic, debris jamming/washout concerns with undersized bridges in the village, particularly the Brook Road bridge #2 and has actively sought FEMA Hazard Mitigation funding for that purpose.

The Planning Commission, with the support of CVRPC Senior Planner Clare Rock, CFM will begin the process of updating the municipal plan due to expire in 2022. The goals and objectives of the 2019 Plainfield Local Hazard Mitigation Plan will be incorporated into the Town Plan update and the Town Plan update will also be incorporated into future updates for Plainfield's Hazard Mitigation Plan.

3.7 Emergency Relief & Assistance Funding (ERAF)

Vermont's Emergency Relief & Assistance Fund (ERAF) provides State funding to match FEMA Public Assistance grants following a federally declared disaster. In 2014, the ERAF criteria were revised to incentivize communities to be more proactive prior to disasters. The default rate for State contribution towards non-federal Public Assistance match following a declared disaster dropped to 7.5%, requiring municipalities to cover the other 17.5% for Public Assistance projects. However, municipalities that take the following proactive measures are awarded 12.5% State match:

1. Participate in the National Flood Insurance Program (NFIP)
2. Adopt Town Road and Bridge Standards that meet or exceed the VTrans 2013 template
3. Adopt a Local Emergency Management Plan which is renewed and adopted annually
4. Adopt a Local Hazard Mitigation Plan approved by FEMA every five years

Municipalities that wish to further decrease their cost share to 7.5%, with a 17.5% State match, must also meet one of the following criteria:

5. Adoption of ANR's River Corridor bylaws, or
6. Enrollment in the Community Rating System (CRS), whereby the community must earn credit under Activity 430

At the time of this Plan development, Plainfield has an ERAF rating of 17.5%. Plainfield has taken many specific steps to reduce flood damage. Home buyouts at risk from landslide and fluvial erosion have eliminated risk for specific properties. The update of Plainfield's zoning regulations was completed by the Planning Commission on April 16, 2018 and forwarded to the Central Vermont Regional Planning Commission for review before setting required public hearings, Selectboard approval and presentation for a vote (at the time of March Town Meeting in 2019). The updated zoning regulations include prohibition of new structures in the Flood Hazard Area and adoption of interim River Corridor protection standards.

Plainfield's Inundation Hazard Area Regulations adopted on May 10, 2010 already prohibit new structures, storage and fill in the Special Flood Hazard Area in and on the most current flood insurance studies and maps published by the Department of Homeland Security, Federal Emergency Management Agency, National Flood Insurance Program, as provided by the Secretary of the Agency of Natural Resources pursuant to 10 V.S.A. Chapter 32 § 753, which are therein adopted by reference and declared to be part of the May 2010 Inundation Hazard Area Regulations and in the Floodway. The 2010 Inundation Hazard Area Regulations also prohibit small accessory structures in the Floodway and require conditional use review for a wide range of other development/activities in the Flood Hazard Area and the Floodway, including improvement to existing structures, replacement of an existing water supply or septic system, grading, road improvement, bridges and culverts, and channel management.

In order to retain eligibility under the River Corridor Plan criteria of the ERAF and qualify for the maximum 17.5% rate, Plainfield will need to update their interim river corridor standards to meet the Vermont Agency of Natural Resources (ANR) criteria within two years of ANR publishing a statewide river corridor map updated to include existing Phase 2 Stream Geomorphic Assessment (SGA) data. The data release, expected to occur at the end of 2016, has been delayed and the agency has not announced a new release date. The other option to qualify for the maximum ERAF rate is for Plainfield to enroll in the NFIP Community Rating System (CRS) and adopt a bylaw that prohibits new structures in the Flood Hazard Area. However, lacking a history of no repetitive loss properties in the community, it is likely that Plainfield cannot meet the eligibility criteria to enroll in the NFIP Community Rating System (CRS). The administrative resources necessary for enrollment and ongoing program maintenance are likely to be a significant challenge for Plainfield and a deterrent for participation. The CVRPC is posed to assist the community in drafting a river corridor plan with the release of the Phase II data. Preliminary work began in 2017 with the review of model ordinances.

National Flood Insurance Program (NFIP)

Since 1983 Plainfield has participated in the National Flood Insurance Program. In 2013, official Digital Flood Insurance Rate Maps became available. The Plainfield FIRMS were last updated effective 3/19/2013, Community panel numbers 50023C0289E, 50023C0293E, 50023C0294E, 50023C0315E, 50023C0455E and 50023C0460E and can be found online at www.msc.fema.gov and http://floodready.vermont.gov/assessment/vt_floodready_atlas. Using 2017 E911 data, there are twenty-nine (29) structures in the 100 year flood plain: twenty-five (25) residential, two (2) commercial, one (1) industrial, and one (1) public gathering place. And there are one hundred eighty (180) parcels that touch the flood plain. There are 13 NFIP flood insurance policies in Plainfield with a covered value of \$1,763,000. Plainfield has had only one repetitive loss, to a building which sits directly adjacent to the Great Brook on the western side of Mill Street at its intersection with Recreation Field Road. (This building is an historic building constructed in 1897 which now houses eight apartments.) Over the past five years, other than a permit for the installation of a small information kiosk at the “boat access” onto the Winooski River (located behind the Plainfield Coop), no new permits were issued for development in the Plainfield Special Flood Hazard Area or along its steep sloping terrain. This has helped reduce the town’s vulnerability to hazards.

Vermont Stream Alteration General Permit (SAGP) Revision:

A notable advancement in hazard mitigation initiatives during the past few years has been the revision of Vermont’s Stream Alteration General Permit (SAGP), and FEMA’s subsequent recognition of the new general permit as “codes and standards” for purposes of future Public Assistance repairs. For several disasters following Tropical Storm Irene in 2011, VEM, ANR and VTrans worked with FEMA Region I on a case-by-case basis to have upsized drainage structures deemed fully-eligible for Public Assistance funding under Section 406 hazard mitigation of the Stafford Act. Beginning with DR-4330, which was declared in 2017, structure replacements that fall under the jurisdiction of the SAGP, and are required to meet the standards of the SAGP, are presumed to be PA-eligible and do not require approval by FEMA prior to construction, though certain projects may require environmental planning and historic preservation (EHP) review before breaking ground. This significant improvement allows Vermont to more quickly and appropriately address vulnerable infrastructure in a more sustainable way than has typically been implemented during the immediate response and recovery phase following a disaster.

4. Planning Process and Maintenance

4.1 Planning Process

The Central Vermont Regional Planning Commission (CVRPC) and the Hazard Mitigation Committee coordinated Plainfield's Local Hazard Mitigation Plan update process with the assistance of the Plainfield Selectboard (one of whom is a member of the Hazard Mitigation Committee), Plainfield Emergency Management Director (also a member of the Hazard Mitigation Committee), and Plainfield's Interim Emergency Management Director (Selectboard member and Hazard Mitigation Committee member). Plainfield's Road Commissioner, Bram Towbin, has continued his active involvement with the Hazard Mitigation Committee which started in his prior role as a Selectboard member.

The 2019 Hazard Mitigation Plan incorporates the existing review of the Plainfield Town Plan, Plainfield Rapid Response Plan, 2017 Town Report, Upper Winooski Corridor Plan, and Great Brook Geomorphic Assessment as well as the Town's draft new Zoning Regulations and review of mitigation projects undertaken and underway. (See also, Section 4.2 below.) Information from these documents is incorporated into numerous sections of the plan. The Plainfield Hazard Mitigation Committee has focused on assessing past mitigation projects and compiling information on current and future hazard mitigation programs, projects and activities. Members of the Committee have also regularly attended state Emergency Management and FEMA Hazard Mitigation trainings and workshops for information about best practices and pending new hazard threats.

Development of hazard priorities for consideration for 2019 Plainfield Hazard Mitigation Plan was begun in January 2017 with preliminary Committee and public meetings occurring through that year and into 2018. Hazard Mitigation Committee Meetings are always open to the public. In January 2017, the Hazard Mitigation Committee identified hazards facing the Town of Plainfield, established hazard priorities and ranked them according to the apparent seriousness and likelihood of the hazard.

In addition, early in 2018 those involved in updating the Hazard Mitigation Plan met with Central Vermont Regional Planning Commission staff, including Emergency Management Director and Hazard Mitigation Committee member Michael Billingsley, Selectboard member and Hazard Mitigation Committee member, Sasha Thayer, Plainfield Volunteer Fire and Rescue Chief Patrick Martin, Water/Wastewater Treatment Plant Director Greg Chamberlain, and Road Commissioner and Hazard Mitigation Committee member, Bram Towbin. The inventory of the town's vulnerability to hazards made in January 2017 was followed by identification of current and future mitigation programs projects and activities.

A town-wide Hazard Mitigation Forum was held on March 21, 2018 where members of the community were asked to share their wisdom regarding hazards the town faces and approaches to mitigate those hazards.

Those involved in updating the Hazard Mitigation Plan include:

Michael Cerulli Billingsley, Emergency Management Director and HMC member

Alexandra Thayer, Selectboard, HMC member, Interim EMD

Patrick Martin, Fire Chief

Bram Towbin, Road Commissioner and HMC member

Andy Hebert, Fire Warden

Greg Chamberlin, Water & Wastewater facility manager

Amos Meacham, former Mental Health disaster planner, HMC chair

Theresa Bienz, flood-impacted Town housing owner, HMC member

Dan Gadd, flood-impacted Town resident, HMC member

Susan Grimaldi, flood-impacted Town resident, HMC member

George Springston, geologist, former HMC member

...as well as members of the public who attended various public meetings about flood hazards, wood debris, hazard impact and hazard assessment.

Arrangements were made for public comments on the draft 2019 Plainfield Hazard Mitigation Plan to be sent to the Plainfield Selectboard, by sending comments by email to Interim Emergency Management Director and Selectboard member Alexandra “Sasha” Thayer (at s.thayer@plainfieldvt.us) or by leaving written comments at the Plainfield Town Clerk’s Office (149 Main Street). Once the draft was updated, CVRPC placed a notice for public comments of the draft update on the CVRPC blog and newsletter. The draft update was also available at Plainfield Municipal offices and by request from CVRPC for public review and comments from March 4th, 2019 to April 3rd, 2019. The announcement of the draft update in the CVRPC newsletter reached over 150 people and businesses in the region’s twenty-three towns, including the adjacent towns of Marshfield, East Montpelier, Barre Town and Orange. In addition, the notice for public comments on the draft update was made by the town on the town website, on the Plainfield People Facebook page, and on Front Porch Forum. The draft plan will be made available during the 2019 Town Meeting Day. Public comments submitted will be reviewed by the Plainfield Selectboard (and CVRPC Staff dependent on funding) and attached as an appendix. Once the plan is conditionally approved by FEMA, the plan will go before the Selectboard for adoption.

4.2 Plan Update Process

The 2019 LHMP update will be submitted as a single jurisdiction local mitigation plan. This Plan will guide the town into the next five years and maintain the town’s eligibility as an applicant for mitigation grants. The current plan is not a significant departure from the 2012 plan; however, new analysis was done to best determine where the town should put resources in the future. Town planners updated the significant weather events history, considered changes to risk based off of past events and the likelihood of future events and their impact to infrastructure and lives, and reviewed the historical and expected locations of future events to

make determinations on how best to apply resources. The information gathered indicates that the town is most vulnerable to river and brook flooding including flash flooding, fluvial erosion and landslides, extended power outages or grid failure, high wind, severe winter storm/ice storm or severe cold, Marshfield #6-Molly's Falls dam release or failure. Less likely hazards identified by the Committee include a hazardous materials spill on US Route 2, an active shooter, forest and clustered structure fires, terrorist or organized criminal attack (including cyber-attack), extreme heat wave, and regional earthquake and epidemic or flu pandemic. More remote (but considered) hazards included warfare; and meteorite/space debris impact.

Flood and fluvial erosion engineering studies and mitigation projects are now a priority due to recent storm events and predicted worsening local torrential rainfall. Flooding and fluvial erosion events are also the most common and damaging hazards and can be accompanied by high wind and power outages. Analysis showed that the threats and areas of concern remain the same from the 2012 plan and that continued effort needs to be applied to these threats and areas to mitigate risk. Priorities have not changed from the 2012 plan. Available resources will be applied to mitigate these priority threats.

The implementation of several mitigation actions over the past five years, some not listed because the town considers them to be regular maintenance and program implementation measures, have reduced the town's vulnerability to specific hazards. Despite the fact that solid strides have reduced the risk of identified worst threats and areas, additional work needs to be done. Plainfield has benefitted from the collaborative approach to achieving mitigation on the local level, by partnering with Agency of Natural Resources (ANR), Vermont Agency of Transportation (VTrans), Vermont Emergency Management, Central Vermont Regional Planning Commission (CVRPC), Federal Emergency Management Administration (FEMA) Region 1 and other agencies, all working together to provide assistance and resources to pursuing mitigation projects and planning initiatives in Plainfield.

Background

The Plainfield Local Hazard Mitigation Plan was originally adopted by the Town as an Annex to the Central Vermont Regional Pre-Disaster Mitigation Plan in March 2006 and received FEMA final approval in March 2006. During 2012, the Town updated the plan creating a single-jurisdiction local mitigation plan which was adopted by the Board of Selectmen on December 18, 2012 and received FEMA approval on June 7, 2013. This Plan is an update of the 2012 Town of Plainfield Hazard Mitigation Plan and will guide the town into the next five years and maintain the town's eligibility as an applicant for mitigation grants.

As part of its ongoing engagement to foster community awareness of hazards and mitigation of these hazards, Plainfield sought and received a grant from the Lake Champlain Basin Project (LSBP) to undertake a project designed to increase the town's resiliency awareness and identify and strengthen the intrinsic resources for a resiliency community. Led by a Resiliency Committee consisting of three volunteer community members appointed by the Plainfield Selectboard, the project engaged area residents and partnered with municipal boards and commissions,

Plainfield's volunteer fire and rescue department, the Cutler Memorial Library, Washington County Sheriff's office, and numerous other individuals and organizations, to deliver the shared message of building a more resilient community. The project also received limited professional assistance from the Resiliency Project Coordinator.

Six residents, including members of the Resiliency Committee attended the "Resilient Vermont: 2016 Conference" held in May 2016 at Norwich University. Among the insights shared during this conference were that resilient communities incorporate regulatory protection measures, infrastructure improvements, as well as opportunities for public education and involvement for vulnerable populations. This is because these populations are often found in hazard areas because housing in such areas is often the most affordable. As a result, Plainfield's Hazard Mitigation Committee has been actively engaged in providing ongoing education including involvement in Plainfield's Old Home Day celebrations in 2016, 2017 and 2018, as well as engaging citizens in removal of an aging river-side shelter on the Plainfield recreation field and riparian planting of shrubs and trees to help maintain a riparian buffer. This latter project also involved the Plainfield Conservation Commission and included school youth involved in a mentoring program, as well as elders. In addition, the Hazard Mitigation Committee has been a presence at Plainfield's annual Town Meeting with large maps showing the areas subject to risk of flooding, as well as information about emergency preparedness planning and state-wide programs like Vermont Alert.

Another outcome of the Resilience Awareness and Action Project report completed in May 2017, was the initiation in the summer of 2017 of regular community dinners, monthly during much of the year and less frequently during the summer. In addition to fostering stronger connections among members of the community, these community dinners also have developed a crew of individuals experienced in preparing meals for large numbers of people. This is a tangible resource available in the event of needing to provide shelter for community members in the event of a weather event, or fire, or other disaster and provides a group of skilled and experienced people who can be called upon to support Plainfield's Fire and Rescue Department volunteers in the event that they are out in the field for an extended period of time.

Broad community participation in these community dinners is also fostered by the fact that there is no charge to participate. And these community dinners have been a venue for sharing information related to community concerns, including hazard mitigation and planning.

Updated Priorities

The 2019 Plainfield Local Hazard Mitigation Plan was revised to reflect changes in priorities from the 2012 plan based on an updated analysis of hazards and the town's vulnerabilities. The 2019 Plainfield HMP also reflects how Plainfield addresses these hazards based on these changes in priorities and the effects of the implementation of past mitigation actions and strategies. The implementation of several mitigation actions over the past five years, some not listed in this Plan because the town considers them to be regular maintenance and program implementation measures, have reduced the town's vulnerability to specific hazards. Plainfield has benefited

from the collaborative approach to achieving mitigation on the local level, by partnering with Agency of Natural Resources (ANR), Vermont Agency of Transportation VTrans, Agency of Commerce and Community Development (ACCD), Vermont Emergency Management, Central Vermont Regional Planning Commission (CVRPC), Federal Emergency Management Administration (FEMA) Region 1 and other agencies, all working together to provide assistance and resources to pursuing mitigation projects and planning initiatives in Plainfield.

Review of Existing Plans, Studies, Reports and Technical Information

Preparation for the planning meetings included a review of the following documents and resources as noted below as well as conversations with CVRPC Senior GIS Planner, Pam DeAndrea, CVRPC Transportation Planner Dan Currier, CVRPC Emergency Management Planner, Jonathan DeLaBruere, and VEM Hazard Mitigation Staff.

- 2013 Stormwater Infrastructure Mapping Project
- 2013 Plainfield River Hazard Zone map
- 2014 Great Brook Landslide Hazard Report
- 2014 Great Brook Landslide Hazard Presentation
- 2014 Great Brook River Corridor Plan with Appendices
- 2015 Great Brook July 2015 Storm Damage - UAS Mapping
- 2015 Plainfield Flood Hazard Overlay District Map by CVRPC
- 2015 Great Brook Bridge Analysis Report by Milone & MacBroom Engineering
- 2016 Great Brook Landslide & Flash Floods Presentation, Vermont Geological Survey, by George Springston
- 2017 Landslide Inventory of Washington County, Central Vermont, Vermont Geological Survey, by George Springston
- 2017 Plainfield Emergency Service Road Map
- 2017 Green Mountain Power Marshfield No 6 Dam EAP
- 2018 Green Mountain Power Marshfield No 6 Dam EAP
- 2018 Tactical Basin Plan, Winooski River (Draft) by Agency of Natural Resources
- 2018 Barre City/Barre Town and Plainfield Storm Water Master Plan
- 2018 Goddard College Stormwater Report
- 2018 Goddard College Stormwater Infrastructure Map
- 2018 Dam No. 6 Reservoir Water Level Management and Downstream Effects of Flood Routing Review by Kleinschmidt Engineering
- 2018 Plainfield River Corridor Map
- 2018 Plainfield Hazards Analysis Map – Flooding
- 2018 Plainfield Hazards Analysis Map – Dam Inundation

In the process of updating the local hazard mitigation plan, the following is a list of revisions to the 2012 Plan.

General Updates

- General reorganization/restructuring of the plan according to future FEMA/VEM checklist
- Update of all data and statistics using 2012-2017 Town Reports, 2010 US Census Data and the 2016 American Community Survey (ACS)
- Re-evaluation, identification and analysis of all significant hazards
- Acknowledgment of implemented mitigation strategies since 2012
- Identification of on-going mitigation projects and strategies – see Existing Mitigation Programs, Projects and Activities section

Hazard Analysis Updates

- Added location/vulnerability/extent/impact/likelihood table for each hazard to summarize hazard description
- Review of 2018 Vermont Hazard Mitigation Plan

Maps

- Review of 2011 Areas of Concern map and Local Hazards Analysis map – added additional flooding areas and forest layer
- Flood Inundation Maps (50 and 100 year)
- Milone and MacBroom landslide hazard maps
- Milone and MacBroom in-village flood map update
- Marshfield #6 Dam inundation maps (Kleinschmidt)

Appendices

- Added strategies from Upper Winooski Corridor Plan
- Great Brook July 2015 Storm Damage – Unmanned Aircraft System (UAS) Mapping & report
- Flood Inundation Maps (50 and 100 year)
- Plainfield 2017 (draft) Zoning Regulations update
- Milone and MacBroom landslide hazard maps
- Milone and MacBroom in-village flood map update
- National Weather Service assessment of evolving weather patterns for Plainfield
- Marshfield #6 Dam inundation maps (Kleinschmidt)
- Marshfield #6 Emergency Action Plan (Kleinschmidt 2017)

The following chart provides an overview of Plainfield’s proposed 2012 Local Hazard mitigation actions along with their current status.

2012 Mitigation Action	2019 Status
Replace and/or repair all bridges over Great Brook starting with the bridges at Mill Street and the next one up the Brook Road (# 20 & # 21)	Damage to the roads to the bridges over the Great Brook was done following the 2011 flood events. Exploration of bridge replacement options, including a grant funding request for engineering is in place.
Purchase 25 foot buffer along Great Brook	Not yet in progress – funding not available.
Install four larger culverts – one on each of the following roads: Lower, Gonyeau, Maxfield and Upper.	Larger culvert has been installed on Lower Road (2015). Culverts on Gonyeau, Maxfield, and Upper Roads have yet to be replaced.
Flood proof waste water treatment plant	A compressor was replaced as a result of the 2011 flooding and a generator with improved capacity has also been replaced. Both are now located in a higher location to avoid damage from flooding.
Select projects from Upper Winooski Corridor Plan	Riparian planting was done along the Winooski River adjacent to the Plainfield Recreation Field. A house and garage located on Cochran Road which presented a risk falling into Great Brook above Plainfield Village and its many bridges.
Build dry hydrants near State Forest boundary	Constructing a dry hydrant for this location has been determined to not be feasible
Distribute public education materials about reducing wild fire risk	The Plainfield Fire Department puts out warnings regarding forest fire hazards regularly on social media.
Fire resistant building codes for new construction built near forest area	Plainfield has chosen not to enact building codes
Install sprinkler system in fire house and town hall	The renovation of the Town Hall/Opera House has been underway since 2013. Installation of a sprinkler system wasn't installed and is not a priority for either the fire house or Town Hall/Opera House

Provide training to residents on how to insulate homes (pipes, attics) for extreme cold spells	Plainfield's Energy Team has offered walk-through energy assessments to town residents and made the use of Kill-O-Watt meters available to borrow
Upgrade electrical systems in municipal buildings and shelters to prevent surge/equipment damage from fluctuating current during ice and wind storms	The Municipal Building has surge protection to protect data and also has an automatic off-site backup system for data.
Revise/adopt subdivision regulations, erosion control regulations, board of health regulations to improve floodplain management in community	An update of the Plainfield Zoning Regulations has been underway since 2015. The Planning Commission approved a revised Zoning Regulation on 4/16/2018. Approval by the Town at the 2019 Town Meeting is anticipated. Changes to the Zoning Regulations include more robust floodplain regulation and river corridor protections.
Work with elected officials, the State and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education	Ongoing.

Town Capabilities for Implementing Mitigation Strategy

Services provided by the Plainfield municipality are overseen by a three-member volunteer Selectboard. The volunteer Planning Commission appointed by the Selectboard is charged with developing the Municipal (Town) Plan, as well as any community land use regulations and plans such as the Plainfield Inundation Hazard Area Regulations and updates to the Town Zoning Ordinance to incorporate these provisions and river corridor restrictions into Plainfield zoning.

The Town employs a handful of staff members to carry out services to its residents on a daily basis. The following are the paid positions which are involved in hazard mitigation:

- Town Clerk/Treasurer (Full Time) – Linda Wells
- Assistant Town Clerk (Part Time) – Carol Smith
- Road Foreman & 2-Person Crew (Full Time) – Michael Nolan, Road Foreman, Steve MacLaren and Michael Bingham, road crew
- Water & Wastewater Department Chief System Operator (Full-Time) – Greg Chamberlin and System Operator (Full Time) Tristan MacGregor-Stewart

Volunteer municipal officials also play a crucial role in carrying out hazard mitigation. Bram Towbin is the Road Commissioner. Patrick Martin is the Chief of Plainfield Volunteer Fire & Rescue. Greg Light leads the Plainfield rescue services. Selectboard member, Sasha Thayer, is the volunteer Interim Emergency Management Director. Andy Hebert is the local Forest Fire Warden. The Selectboard oversees all municipal and mitigation activities with assistance and guidance from the Plainfield Hazard Mitigation Committee and the Planning Commission ensures long term community planning, including hazards. Plainfield's fire warden, constable, tree warden, and health officer and deputies also help in the planning, overseeing and implementation municipal & mitigation activities.

The municipal budgeting process occurs on an annual basis, planning for a fiscal year from July through June. The budget is usually developed between early November and early January, and put to voter approval on the first Tuesday in March at Annual Town Meeting Day. The Selectboard is charged with developing and proposing the budget to the voters, including the budget for the Highway Equipment Savings Account, Plainfield Volunteer Fire and Rescue, and Emergency Management, as well as hazard mitigation projects. After the budget has been adopted by vote of town residents, the Selectboard has the authority to modify it in cases of extraordinary circumstances; i.e. natural disaster, unexpected equipment/infrastructure failure (i.e., water well, power failure, major bridge/culvert failure). The budget is monitored several times a month by the Selectboard and by the Town Clerk/Treasurer.

Municipal revenues are generated primarily through levy of taxes on property value. Other major sources are federal & state payments to support the town school, aid (including grants) from the Vermont Agency of Transportation for highways, and payments in lieu of taxes for land owned by the State of Vermont. The municipality also has the authority to incur debt through bonding.

Existing Mitigation Programs, Projects and Activities

The ongoing or recently completed programs, projects and activities are listed by mitigation strategy and were reviewed during the update process. These have occurred since the development of the previous plan and were reviewed by the planning team. They share and incorporate the overall goals of the local hazard mitigation plan. Plainfield has the capacity to maintain these programs and initiatives using town staff and community volunteers described in the Community Capacities above. Unless otherwise noted, there is no need to expand or improve on these programs, projects and activities.

Community Preparedness Activities

- Current Emergency Operations Plan (2017)
- 911 Signage Program – immediate village area & town roads
- Rural Water Supply Plan
- Pandemic Preparation Group
- Development of community resilience through community suppers

Hazard Control & Protective Works

- Maintenance Programs (Culvert and Bridge Survey & Replacement)
- Road Surface Management System (RSMS) – on going
- Participant in the Capital Fire Mutual Aid System
- Removal of house and garage from riverside property on Cahoon Farm Road

Insurance Programs

- Participation in NFIP

Land Use Planning/Management

- Stream Geomorphic Assessment on the Great Brook
- Restoration of the Great Brook to reduce incision
- Assessment of the Winooski River and its major tributaries and identify corrective measures to reduce stream bank erosion;
- Great Brook Landslide Report (2014)
- 2016-02_16 GreatBrookFinalReport_Milone&MacBroom_Engineering
- Plainfield Flood History report (2015)

- Great Brook Bridge Alternatives Analysis by Milone & MacBroom Engineering (2016)
- Vermont Hazard Mitigation Plan (2018)
- Winooski River Tactical Basin Plan draft (2018)
- Zoning Regulations – Floodplain areas designated within Flood Insurance Rate Map for Plainfield (7/16/1996 – Town, 8/1/1983 – Village); Inundation Hazard Ordinance (2010); update of Zoning Regulations to incorporated floodplain and River Corridor restrictions

Protection/Retrofit of Infrastructure and Critical Facilities

Public Awareness, Training & Education

- Fire Safety Educational Programs for Town Residents – high school and Old Home Days celebration
- Participation in Vermont Alert program encouraged

4.3 Plan Maintenance Process

The Plainfield Local Hazard Mitigation Plan will be updated and evaluated annually at a September Selectboard meeting along with the review of the Local Emergency Operations Plan. Updates and evaluation by the Selectboard will also occur within three months after every federal disaster declaration and as updates to town plan/zoning and river corridor plans come into effect. The plan will be reviewed by the Selectboard, the Plainfield Emergency Management Director and public at the above mentioned September Selectboard meeting. CVRPC will help with updates or if no funding is available, the Town Clerk and Selectboard will update the plan.

The process of evaluating and updating the plan will include continued public participation through public notices posted on the municipal website, notice in the municipal building, Fieldnotes (the local community newsletter), and CVRPC newsletter and blog inviting the public to the scheduled Selectboard (or specially scheduled) meeting. Additional stakeholders invited to the meeting will be residents abutting the Great Brook, the Plainfield Fire Department, the Plainfield Rescue Squad, the Health Center, and Goddard College. Also invited in the future will be the VT Agency of Natural Resources (VT ANR), as they are able to provide assistance with NFIP outreach activities, models for stricter floodplain zoning regulations, delineation of fluvial erosion hazard areas, and other applicable initiatives. These efforts will be coordinated by a designated member of the Selectboard.

Monitoring of plan progress, implementation, and the 5 year update process will be undertaken by a designated member of the Selectboard. Monitoring updates may include changes in community mitigation strategies; new town bylaws, zoning and planning strategies; progress of implementation of initiatives and projects; effectiveness of implemented projects or initiatives; and evaluation of challenges and opportunities. The plan is to be a “living document” to allow for new actions to be identified in the five year interim period and amended without formal re-adoption during regularly scheduled Selectboard meetings. Prior to the end of the five year period, the plan will be undergo a formal update and submitted to FEMA for re-adoption following the process outlined the schematic found in the Attachments section.

In order to maintain a current up to date unexpired Plan, within one year of this Plan expiration date, the plan update process with FEMA should begin. For the next Plan update, CVRPC will assist and support the Town of Plainfield at their request provided there is funding and staffing available for CVRPC to do so. If CVRPC is unable to assist the Town of Plainfield, then the Town will update the plan using the LHMP Committee as the lead or the Selectboard will update the plan or the Selectboard may appoint a committee of interested citizens and key stakeholders with the Emergency Management Director and Planning Commission Chair serving on this committee to draft changes. The Town of Plainfield is responsible for the update and maintenance of this Plan.

Plainfield shall also incorporate mitigation planning into their long term land use and development planning documents. The Town will review and incorporate elements of the Local Hazard Mitigation Plan when updating the municipal plan, zoning regulations, and flood hazard/FEH bylaws. The incorporation of 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 shall also review future Upper Winooski Corridor and Great Brook planning documents, and storm water master plans for ideas on future mitigation projects and hazard areas.

In 2013, the Vermont Legislature passed a law requiring all towns to incorporate a flood resiliency element into their Municipal Town Plan for any Plan update after July 1, 2014. As part of meeting this requirement, Plainfield will identify flood hazard and fluvial erosion hazards, strategies, and recommendations to mitigate risks to public safety, critical infrastructure, historic structures, and public investments. This Plan will help Plainfield comply with the new community flood resilience requirements for Municipal Town Plans adopted after July 2014 and will assist the Planning Commission in their work as they update the existing and due to expire. The next update of the Plainfield Town Plan is due to occur in 2019.

5. Risk Assessment

5.1 Hazard Identification and Analysis

Hazard Impacts	Probability	Potential Impact					Score*:
		Infrastructure	Life	Economy	Environment	Average:	
Fluvial Erosion	4	4	3	4	4	3.75	15
Inundation Flooding	4	4	3	4	2	3.25	13
Ice	3	3	3	3	2	2	8.25
Snow	4	1	3	2	1	1.75	7
Wind	4	2	2	1	1	1.5	6
Heat	3	1	3	2	2	2	6
Cold	3	1	3	2	2	2	6
Drought	3	1	2	2	3	2	6
Landslides	3	3	2	1	2	2	6
Wildfire	2	3	3	3	2	2.75	5.5
Earthquake	2	3	3	3	2	2.75	5.5
Invasive Species	2	1	1	2	3	1.75	3.5
Infectious Disease Outbreak	2	1	3	2	1	1.75	3.5
Hail	3	1	1	1	1	1	3

*Score = Probability x Average Potential Impact

Table 17: Hazard Assessment Ranking Criteria

	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

2018 Vermont Hazard Mitigation Plan Hazard Assessment Table

Due to the frequent and severe nature of flooding events, Plainfield feels flooding is the worst natural hazard within the Town and will focus on mitigation efforts to reduce the impacts from flooding events. Those hazards not found to pose the greatest threat to Plainfield such as avalanches, drought, earthquakes, tornadoes, water supply contamination, extreme heat, mudslide/rockslides, invasive species, structure fire, and nuclear power plant failure are not addressed in this Plan and were not included in the risk and vulnerability assessment due to the low occurrence, low probability of impact or negligible potential impact and scarce community resources (time and money).

Hazard	Hazard Score ¹	Likelihood ²	Community Vulnerability ³	Worst Threat
Flash Flood/Flood	1.0	High	Yes	√
Fluvial Erosion/Landslide	2.6	High	Yes	√
Electric Grid Outage	4.0	High	Yes	√
Winter Storm/Ice Storm/Extreme Cold	4.4	Med/High	Yes	√
Dam Release/Failure ⁴	4.4	Med/High	Yes	√
High Wind	4.6	Med/High	Yes	√
Epidemic/Flu Pandemic	4.8	Med/High	Yes	X
HazMat spill Rte. 2	7.2	Med	Yes	X
Active Shooter	9.6	Low/Med	No	X
Multi-Structure Fire	9.8	Low/Med	Yes	X
Terrorist/Cybercrime	9.8	Low/Med	No	X
Wildfire/Forest Fire	9.8	Low/Med	Yes	X
Extreme Heat Wave	10	Low	Yes	X
Earthquake	11.8	Low	No	X
Drought - unscored		Low	No	X
Ice Jam - unscored		Low	No	X
Hurricane - unscored		Low	No	X
Tornado - unscored		Low	No	X
Water Supply Contamination - unscored		Low	No	X

¹ Numerical scoring of hazard likelihood, scaled from 1-20 with 1 being highest likelihood. 1-4 High likelihood; 5-9 Medium Likelihood; 10-20 Low likelihood.

² High likelihood of happening: Near 100% probability in the next year.
Medium likelihood of happening: 10% to 100% probability in the next year or at least once in the next 10 years.

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

³ Does the hazard present the threat of disaster (Yes)? Or is it just a routine emergency (No)?

⁴ A dam release or failure coupled with a storm event provides a high likelihood of deaths, infrastructure damage to roads, and destruction of homes and businesses as well as interruption of services and emergency response due to high water.

A review of the 2018 Vermont State Hazard Mitigation Plan provides a greater explanation of these hazards and possible mitigation strategies to address them. Like the State of Vermont Hazard Mitigation Plan, Plainfield did not include the following hazards in the risk and vulnerability assessment due to the low occurrence, low vulnerability, and or geographic proximity: civil disturbance, coastal erosion, drought, expansive soils, hurricane, ice jam, karst topography, and sinkholes.

A discussion of each significant hazard is included in the subsequent subsections and a map identifying the location of each hazard is attached (See map titled *Areas of Local Concern*.) Each subsection includes a list of past occurrences based upon County-wide FEMA Disaster Declarations (DR-#) plus information from local records and the National Oceanic and Atmospheric Administration (NOAA), National Center for Environmental Information (NCEI), formerly the National Climate Data Center, a narrative description of the hazard and a hazard matrix containing the following overview information:

Hazard	Location	Vulnerability	Extent	Impact	Likelihood
Type of hazard	General areas within municipality which are vulnerable to the identified hazard.	Types of structures impacted	Magnitude of event: scale depends on hazard	Dollar value or percentage of damages.	<u>High</u> : 10% to 100% probability within the next year or at least once in the next 10 years. <u>Medium</u> : less than 10% to 100% probability within the within the next year or less than once in the next 10 years. <u>Low</u> : 1% to 10% probability in the next year or at least once in the next 100 years.



Flooding event in Plainfield Village

5.1.1 Flash Flood/Flood

History of Occurrences: Local and County Wide Data (from NCDC website and FEMA DR List) – nearest flood gauge is 15 miles downstream in Montpelier

Date	Event	Location	Extent
4/15-4/18/2015	Flash Flood	Washington County	Thunderstorms with heavy rainfall moved over northeast Washington County Vermont repeatedly for several hours. The Gunners Brook drainage basin in Barre and Plainfield received the brunt of the storm, with catastrophic flash flooding - DR-4178
6/25-7/11/2013	Flood	Washington County	Record rainfall in May and June saturated the ground and elevated water levels in rivers and streams, making the region vulnerable to flooding - DR-4140
8/28/2011	Flash Flood (TS Irene)	Plainfield - Washington County	Winooski River crested at 19.05 feet in Montpelier– flood stage is at 15'; 5-7" of rain -DR 4022
5/26/2011	Flash Flood	Plainfield - Washington County	4" of rain; Montpelier gauge at 17.59' – DR4001
4/23-5/9/2011	Flash Flood	Washington County	DR 1995 – not a historical crest in Montpelier

8/2/2008	Flash Flood	Washington County	not a historical crest in Montpelier
7/11/2007	Flash Flood	Washington County	3-6" of rain in 2 hrs – DR 1715 - not a historical crest in Montpelier
6/26/2006	Flood	Washington County	3-4" of rain - not a historical crest in Montpelier
9/16/1999	Tropical Storm Floyd	Washington County	Montpelier flood gauge at 9.30 feet, 5-7" rain county wide DR 1307
6/17/1998	Flash Flood	Washington County	3-6" of rain over 2 day period - DR 1228 - not a historical crest in Montpelier
6/12/1996	Flash Flood	Plainfield	Data gap- \$15k damage
8/5/1976	Flood	County Wide	Montpelier flood gauge at 12.31 feet – DR 518
6/30/1973	Flood	County Wide	Montpelier gauge at 17.55 ft DR 397
9/22/1938	Flood/Hurricane	County Wide	Montpelier flood gauge at 14.11 feet
11/03/1927	Flood	County Wide	Montpelier flood gauge at 27.10 feet

Flooding and flash flooding are Plainfield's most commonly recurring hazards. Flooding is the overflowing of rivers, streams, drains and lakes due to excessive rain, rapid snow melt or ice. Flash flooding is a rapidly occurring flood event, usually from excessive rain. Plainfield contains a variety of fast moving and landscape-defining rivers within its jurisdiction, most significantly the Winooski River, the Great Brook, Checkerberry Brook, and Potter Brook.

The Winooski River, the second longest river in Vermont, flows east to west through Plainfield Village south of Route 2 in the northern corner of town (Hazard Analysis Map). The Winooski converges with the Great Brook in the Village. The Great Brook originates southwest of Colby Hill in the southwestern portion of town and flows in a northerly direction through the center of town, draining an area of 14.2 square miles (Town Plan).

"The Great Brook has a history of numerous severe floods, most notably in 1973, 1984, 1989, and 1990 (Barg and Springston, 201a, 2001b). The flood of 1984 destroyed one home and caused extensive road damage, while the flood of 1989 destroyed another home, two bridges, and a long section of road. Between 1984 and 2002, the total cost of bridge replacement and road maintenance along the Brook has exceeded two million dollars. Besides the damage to roads and property, aquatic habitat in the brook has also been impacted. A recent study of riverside erosion hazards along the brook (Barg and Springston, 201a, 2001b) concludes that in order to decrease the potential for damage from future floods and landslides and to improve aquatic and riverside habitat in the brook, it will be necessary to undertake a carefully planned river restoration project."

-Plainfield Town Plan, 2002

The majority of the Town's National Flood Insurance Program (NFIP) designated 100-year floodplain is located along the Winooski River and the Great Brook. Based on the results of overlaying the FIRM flood maps with the location of the E911 points, there are 23 structures in the 100 year floodplain valued at \$23,382,000. This estimate is based off the grand list median value. There are no repetitive loss properties. There are 14 active NFIP policies in Plainfield for a total coverage of \$1,677,400. The effective FIRM date of the Town map is 7/16/1996. The effective FIRM date of the village map is 8/1/1983. The Zoning Administrator is responsible for enforcement of the flood hazard regulations.

As previous events have made clear, areas beyond the NFIP designated 100-year floodplain may be particularly vulnerable to these types of hazards. Channel adjustments with devastating consequences have frequently been documented wherein such adjustments are linked to historical channel management activities, floodplain encroachments, adjacent land use practices and/or changes in watershed hydrology associated with conversion of land cover and drainage activities, within and beyond the NFIP floodplain. The attached Hazard Analysis Map identifies the Fire Station, Town Garage, Water Treatment Plant and Town Offices as outside the designated floodplain, but near the river. Despite the low likelihood of flooding levels reaching these properties, ingress/egress is likely to be an issue during a major flooding event.

Specific data for flood levels in Plainfield is lacking as the closest flood gauge is located in Montpelier. During Tropical Storm Irene, the Montpelier flood gauge was 4 feet above flood stage. The worst flooding event in Plainfield's history was the 1927 event; however, exact data from that event is not available. In 1927 event, the Montpelier flood gauge was at 27.10 feet. However, since the 1927 flood, a number of flood control dams have been installed in the region to prevent the same flooding extent. Lesser but more regular flooding occurs in Plainfield, with generally 1 foot of water in areas designated on the areas of concern map. For the next update, Plainfield can better monitor flood waters by having individuals record flood water levels and submit to the Town Clerk for the Town's records.

Bridges and roads are particularly susceptible to damage in the event of a flash flood. The Areas of Local Concern Map (attached) identifies 9 bridges that have washed out, or given their age and surrounding conditions, are susceptible to washout. These bridges consist of the Main Street Bridge over the Winooski, the Mill Street Bridge over the Great Brook, and the 7 oldest Brook Road bridges over the Great Brook (constructed between 1920 and 1929). The highlighted bridges are crucial to the proper evacuation of the community and the ability for proper emergency services deployment. The entire length of the Brook Road was highlighted because of its history and susceptibility to washouts.

Roads, culverts and structures town-wide suffered substantial damage in the May, 2011 flood – amounting to roughly \$500,000 in repair costs. Damage to roadways and residences was most severe along the lower reaches of the Great Brook.

Major future projects identified as a result of the May, 2011 storm include: replacing two undersized highway bridges over the Great Brook in Plainfield village (bridges # 20 and # 21) where debris jams cause washouts which damage homes. The 2012 HMP called for replacing four undersized culverts on Maxfield, Lower, Gonyeau and Upper roads. The estimated cost of these projects was \$1,000,000.

Since then, dozens of culverts have been replaced, sometimes with larger sized pipes to guard against problems due to increased precipitation. In addition, there have been 4 major culvert replacement projects where box culverts were installed to counter the new climate considerations. In 2013 a major project occurred at the intersection of Gonyeau and Upper Road at a total cost of \$122,000. Country Club Road saw a significant culvert project in 2014. In 2015 a major new culvert was installed on Lower Road, with a cost of \$160,000. 2017, saw the completion of a box culvert on Bean Road that cost \$123,000. The Town sought and received a grant for engineering studies for the replacement of Bridge #2 over the Great Brook.

Hazard	Location	Vulnerability	Extent	Impact	Likelihood
Flooding/ Flash flooding	Properties adjacent Great Brook, downtown Plainfield	Bridges, roads, structures in floodplain	7" of rain during TS Irene in 24 hrs, Montpelier gauge 4' above flood stage	\$500,000/bridge, \$23,382,000 in private property damage possible	Medium

5.1.2 Fluvial Erosion/Landslide

Fluvial erosion is the natural process of degradation and aggradation of sediment in streams and rivers. Although the process is natural, fluvial erosion can be exacerbated by extreme flooding events or anthropogenic influences. A landslide is the sliding of a large mass of rock material, soil, etc., down the side of a mountain or cliff. Landslides can be caused by rainstorms, fires, alternate freezing or thawing and/or by the steepening of slopes by erosion or human modification. In Plainfield, landslides tend to occur or are exacerbated by fluvial erosion as most of the landslides occur on or near a stream bank, and are usually in the form of a stream bank failure.

In Plainfield, the Great Brook consistently floods and its banks are constantly moving. Flood damage along the banks of the Great Brook frequently re-occurs in the same area. In 1984 and 1989, two houses were washed away during flooding events, because of landslides under the houses. Overall, five bridges, four houses and road sections along Brook Road have been damaged, costing over \$2 million. In addition, fluvial erosion can present a risk of damage to existing structures and to bridges and roads downstream. As a result of concern that the residential property adjacent to the Great Brook at 280 Cameron Road was at high risk of destruction through landslide into the Great Brook, the Town sought and received a grant through the Community Development Block Grant – Disaster Relief Program (CDBG-DR) in 2013. This grant, which was administered by Two Rivers-Ottawaquechee Regional Commission (TRORC), provided funds for the removal of the house, garage, outbuildings, and fuel tank on the property and restoration to open land. This was completed in 2017. There have been over twenty-five known bank failures in the Great Brook as well. The extent of landslides/bank failures in Plainfield is not well documented in terms of cubic fill. In the future, Plainfield can record landslides and bank failures according to the amount of cubic fill or when structures are involved use the Alexander Scale for Landslides Damage (see below):

Alexander Scale for Landslide Damage

Level	Damage	Description
0	None.	Building is intact
1	Negligible.	Hairline cracks in walls or structural members; no distortion of structure or detachment of external architectural details
2	Light.	Buildings continue to be habitable; repair not urgent. Settlement of foundations, distortion of structure, and inclination of walls are not sufficient to compromise overall stability.
3	Moderate.	Walls out of perpendicular by one or two degrees, or there has been substantial cracking in structural members, or the foundations have settled during differential subsidence of at least 15 cm; building requires evacuation and rapid attention to ensure its continued life.

4	Serious.	Walls out of perpendicular by several degrees; open cracks in walls; fracture of structural members; fragmentation of masonry; differential settlement of at least 25 cm compromising foundations; floors may be inclined by one or two degrees or ruined by heave. Internal partition walls will need to be replaced; door and window frames are too distorted to use; occupants must be evacuated and major repairs carried out.
5	Very Serious.	Walls out of plumb by five or six degrees; structure grossly distorted; differential settlement has seriously cracked floors and walls or caused major rotation or slewing of the building [wooden buildings are detached completely from their foundations]. Partition walls and brick infill will have at least partly collapsed; roofs may have partially collapsed; outhouses, porches, and patios may have been damaged more seriously than the principal structure itself. Occupants will need to be re-housed on a long-term basis, and rehabilitation of the building will probably not be feasible.
6	Partial Collapse.	Requires immediate evacuation of the occupants and cordoning of the site to prevent accidents with falling masonry.
7	Total Collapse.	Requires clearance of the site.

Source: <http://www.es.mq.edu.au/NHRC/web/scales/scalespage14.htm>



280 Cameron Road was at high risk due to fluvial erosion from the Great Brook. The town received a grant through the Community Development Block Grant in 2017 to conduct a buyout of the property. This included removal of the house, garage, outbuildings, and fuel storage tank on the property.

A fluvial erosion assessment of the Great Brook revealed surficial deposits in the downtown Plainfield area are considered highly erodible. The extent of the possible erosion has yet to be calculated due to lack of funding for more studies/calculations and a lack of historical data. Plainfield can monitor the known trouble spots to possibly determine a more exact extent.

In Plainfield there are nine properties in the fluvial erosion hazard zone. The properties are worth roughly \$1.2 million. The infrastructure over and around, and past uses and activities of the Brook are known sources of increased fluvial erosion. The five miles of the Brook closest to Plainfield village are in the worst condition. Thirteen bridges span this section of the Brook and cause the river channel to be constricted. Certain bridges are also located on severe meander bends of the Brook, the area where the force of water is the greatest. Activities such as channelization, hard armoring, gravel removal, undersized bridges/culverts, woody debris removal, roughness removal and floodplain encroachment in the past twenty-five years have had negative impacts on the health of the Brook and caused the water's velocity and force to increase. Urban land uses also exacerbate the fluvial erosion of the Brook.

After Hurricane Floyd in 1999, river management activates called for the removal of a large bend. It is believed that the removal of the bend caused a future road washout as the slope and velocity of the bed and water were increased. Rip rap was also placed to stabilize damaged banks. Instead of flowing around the rip rap, the water flowed beneath the rocks and further washed away the bank.

The fluvial geomorphic assessment in 2001 of the Great Brook makes several recommendations to reduce fluvial erosion effects. One recommendation is to avoid placement of infrastructure within the channel migration zone, especially on river bends. This area can be mapped by comparing historical aerial photography. Future management practices should avoid channelization, floodplain encroachment, removal of woody debris, and channel constriction. All of these activities create bank instability. A more effective management practice would be to create a continuous buffer of 25 feet along both sides of the Great Brook's banks. Future development practices should concentrate on maintaining this buffer, while also focusing growth on already built areas to maintain open lands and prevent development on bank areas.

The Fluvial Erosion Hazard area for the Winooski River is highlighted on the hazard analysis map. The Fluvial Erosion Hazard area on the Great Brook has yet to be mapped due to lack of funds.

Hazard	Location	Vulnerability	Extent	Impact	Likelihood
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Fluvial Erosion/Landslide	Current and historic banks along most downstream 5 miles of Great Brook; along Brook Road	Structures in FEH zone, bridges, culverts, Brook Rd.	7 on Alexander Landslide Scale	>\$2.2 million in past 25 yrs (combined landslide/fluvial erosion), \$1.2 million private property (fluvial erosion)	Medium (landslide); High (fluvial erosion)
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5.1.3 Wind Storm/Electric Grid Outage



© bram towbin

Wind event in Plainfield on Country Club Road, October 27th, 2017

The North American Electric Reliability Corporation (NERC) requires electric utilities to report events which cause disturbances that interrupt service (i.e., power outages) of more than 300 Megawatts (MW) or affect 50,000 customers or more. A University of Vermont analysis of NERC data describes 933 events causing outages from the years 1984 to 2006.

According to the Vermont study, almost 44% of the events in the period were weather-related (i.e., caused by tornado, hurricane/tropical storm, ice storm, lightning, wind/rain, or other cold weather). The study noted that the data include many events smaller than the NERC reporting threshold. It also noted that some of the reported events have “multiple initiating” causes, since some events (such as lightning) can trigger other outages or operator errors.

One of the major problems associated with wind storms is the loss of electrical power. Major electric utility companies have active, ongoing programs to improve system reliability and protect facilities from damage by ice, severe winds and other hazards. Typically, these programs focus on trimming trees to prevent encroachment of overhead lines, strengthening vulnerable system components, protecting equipment from lightning strikes and placing new distribution lines underground.

Electric service in Plainfield is provided by Green Mountain Power (GMP) and by Washington Electric Cooperative Inc. (WEC). Because the WEC lines serve much of the remote and higher elevation areas in Plainfield they are more prone to damage from falling trees especially during heavy wet snows, ice storms and violent electrical storms. As a result, homes located in these areas may experience a higher frequency and duration of outages than homes located in the low lying areas and valleys such as those along the Route 2 and Route 214 corridors.

Vulnerable populations, such as the elderly and handicapped are of greatest risk to this hazard. If this type of multiple hazard event takes place for an extended period of time, back-up power would be necessary for critical facilities. Both Goddard College and the Plainfield Town Hall/Opera House have generators to provide service for a period of time in the event of an emergency which results in an electric power outage.

5.1.4 Dam Failure

Marshfield Dam, Cabot – The Molly’s Falls, No. 6 Dam is a hydroelectric facility operated by Green Mountain Power (GMP). On August 28, 2011, due to the large amount of rain from Tropical Storm Irene, officials were afraid the dam would breach. Officials considered releasing a large amount of water to ease pressure behind the dam; however, the rain subsided and the release of water from the dam was called off. Massive flooding would have occurred downstream in Plainfield had the dam been released. Preventative evacuation of downstream homes and businesses occurred. There has been no flooding from dam failure or water release, however, the threat of harm from these hazards increases along with frequency and ferocity of storms across the United States in recent years.

Green Mountain Power is being asked to work with adjacent towns, including Plainfield, to improve communications with businesses and residents in times of emergency. Green Mountain Power is also working with the Army Corps of Engineers to develop inundation models to simulate dam failure and identify what sites will be impacted.

In June 2018, Green Mountain Power filed a Petition for a Certificate of Public Good relating to proposed changes to the service spillway and the emergency spillway, and proposing operational changes as well. Plainfield, Marshfield, Cabot and Montpelier are all participating in this case before the Public Utility Commission with a goal of assuring that adequate attention is paid to safety issues that could affect Plainfield both during the construction and, afterwards, generally as well.

Concern is that a wall of water more than 10 feet high could come through the village in the event of a catastrophic dam failure with attendant debris from upstream structures destroyed. In May 2018, Fire Chief Patrick Martin, Hazard Mitigation Committee member (and former Plainfield EMD) Michael Billingsley, and Interim Emergency Management Director and Select Board Member Sasha Thayer participated in a table-top exercise prepared by Kleinschmidt Engineering for Green Mountain Power.

The extent of flooding from dam failure in Plainfield is unknown, but of grave concern. There have been no inundation studies performed and there are few historical records upon which to base estimates. Green Mountain Power filed a Seventh Safety Inspection Report relating to the Marshfield No. 6 Dam, prepared by Findlay Engineering, with the Vermont Public Utility Commission in December 2018 (Case 18A-4289). This report classifies GMP's Marshfield No. 6 Dam as a "high hazard" dam, and makes a variety of recommendations to address the risk presented by the dam. The Town's participation in GMP's petition for a certificate of public good for various updates, maintenance, changes to the dam focuses, in particular, on dam safety concerns. Among those of deep concern are determining the extent of flooding if the dam were to breach from dam failure or high water event associated with heavy rainfall and flooding.

Bancroft Road beaver dam – Beavers periodically dam the Checkerberry Brook which flows out of Bancroft Pond, which has a 14-acre lake area. In May, 2007, the dam gave way, resulting in significant damage to East Hill Road and to the Brook Road because the water flowed around the culverts. In 2009, the state installed beaver baffles at the lake outflow. There has been no flooding from Bancroft Pond since the 2012 Hazard Mitigation Plan.

Hazard	Location	Vulnerability	Extent	Impact	Probability
Dam Failure	Area downstream from No. 6 Marshfield Dam	Loss of life, property, roads, culverts, bridges	Marshfield dam during Tropical Storm Irene was 542 ft above sea level (normally at 536 feet)	\$20 million based on potential residential home loss (average grand list value \$200,000)	Medium
Beaver Dam	Bancroft Pond	Same as above	1.25 miles of riverside property; 14 acres of water – depth unknown	\$20,000 in road repairs (2007)	Medium

5.1.5 Extreme Cold/Winter Storm/Ice Storm

Snow and/or ice events occur on a regular basis during the winter months. Recent significant events have included:

Date	Event	Location	Extent
3/13/2018	Winter Storm	Washington County	Long duration snow event delivered 12-30" across Washington county
3/7/2018	Winter Storm	Washington County	Long duration snow event deposited 7-13" across Washington county
2/7/2018	Winter Storm	Washington County	Widespread 5-8" of snow fell across Washington county
12/22/2017	Winter Storm	Washington County	Snowfall amounts of 6-12" were reported
12/12/2017	Winter Storm	Washington County	Widespread 6-12" of snow fell across Washington county
3/31/2017	Winter Storm	Washington County	Widespread 6-12" of a heavy, wet snow fell across the region
3/14/2017	Winter Storm	Washington County	Snowfall totals across Washington county generally ranged from 14-24" with isolated higher totals
2/12/2017	Winter Storm	Washington County	Widespread 8-14" of snowfall reported
12/29/2016	Winter Storm	Washington County	A widespread 5-10" of snow was observed
11/20/2016	Winter Storm	Washington County	Snowfall across Washington county was 6-12"
2/2/2015	Winter Storm	Washington County	Snowfall across Washington county was 6-12"
1/18/2015	Winter Storm	Washington County	Heavy wet snow of 2-6" fell across Washington county
1/7/2015	Extreme Cold	Plainfield, County wide	26 below zero in Plainfield
12/9/2014	Winter Storm	Washington County	Heavy, wet snowfall totals across Washington county ranged from 6-24"
11/26/2014	Winter Storm	Washington County	Snowfall totals of 8-14"
3/12/2014	Winter Storm	Washington County	Snowfall totals across Washington county were generally 12-20"+
12/14/2013	Winter Storm	Washington County	A widespread 8-12" of snow fell across Washington county
3/19/2013	Winter Storm	Washington County	Total snowfall accumulations were generally 6-14" with some locally higher amounts

2/8/2013	Winter Storm	Washington County	6-12" of snow fell across Washington county
12/26/2012	Winter Storm	Washington County	Snowfall totals of 9-18" were common in Washington county
2/29/2012	Winter Storm	Washington County	9-15" along the east slopes of the central and southern Green Mountains
2/24/2012	Winter Storm	Washington County	Storm total snowfall accumulations ranged from 4-18"
11/23/2011	Winter Storm	Washington County	5-12" of a heavy, wet snow mixed with rain and sleet at times fell across Washington county
3/6/2011	Winter storm	Plainfield, County wide	12-18" of snow, 10,000 customers lost power statewide
2/23/2010	Winter Storm	Plainfield, County wide	20" of snow and 50,000 customers lost power statewide
2/22/2009	Winter Storm	Plainfield, County Wide	16" of snow, 30 mph wind gusts
2/1/2008	Winter storm	Plainfield, County wide	3-7" of snow and ice ¼-1/2" thick, 50 mph wind gusts
2/14/2007	Winter storm	Plainfield, County wide	22" of snow
2/14/2006	Winter storm	Plainfield, County Wide	30" of snow
1/4/2003	Winter storm	Plainfield, County wide	19" of snow
3/5/2001	Winter storm	Plainfield, County wide	15-30" of snow
12/31/2000	Winter storm	County wide	10" of snow
1/15/1998	Winter storm	Plainfield, County wide	10-12" snow (not a DR in Washington County)
12/29/1997	Winter storm	Plainfield, County wide	21" of snow
12/7/1996	Winter Storm	Plainfield, County wide	12" of snow
3/21/1994	Winter storm	Plainfield, County Wide	5-11" of snow
11/1/1993	Winter storm	Plainfield, County wide	15" of snow
1/3/1993	Freezing Rain	Plainfield, Statewide	¼-1/2" freezing rain

A winter storm is defined as a storm that generates sufficient quantities of snow, ice or sleet to result in hazardous conditions and/or property damage. Ice storms are sometimes incorrectly referred to as sleet storms. Sleet is similar to hail only smaller and can be easily identified as frozen rain drops (ice pellets) that bounce when hitting the ground or other objects. Sleet does not stick to wires or trees, but in sufficient depth, can cause hazardous driving conditions. Ice storms are the result of cold rain that freezes on contact with the surfaces coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. Periods of extreme cold tend to occur with these events.

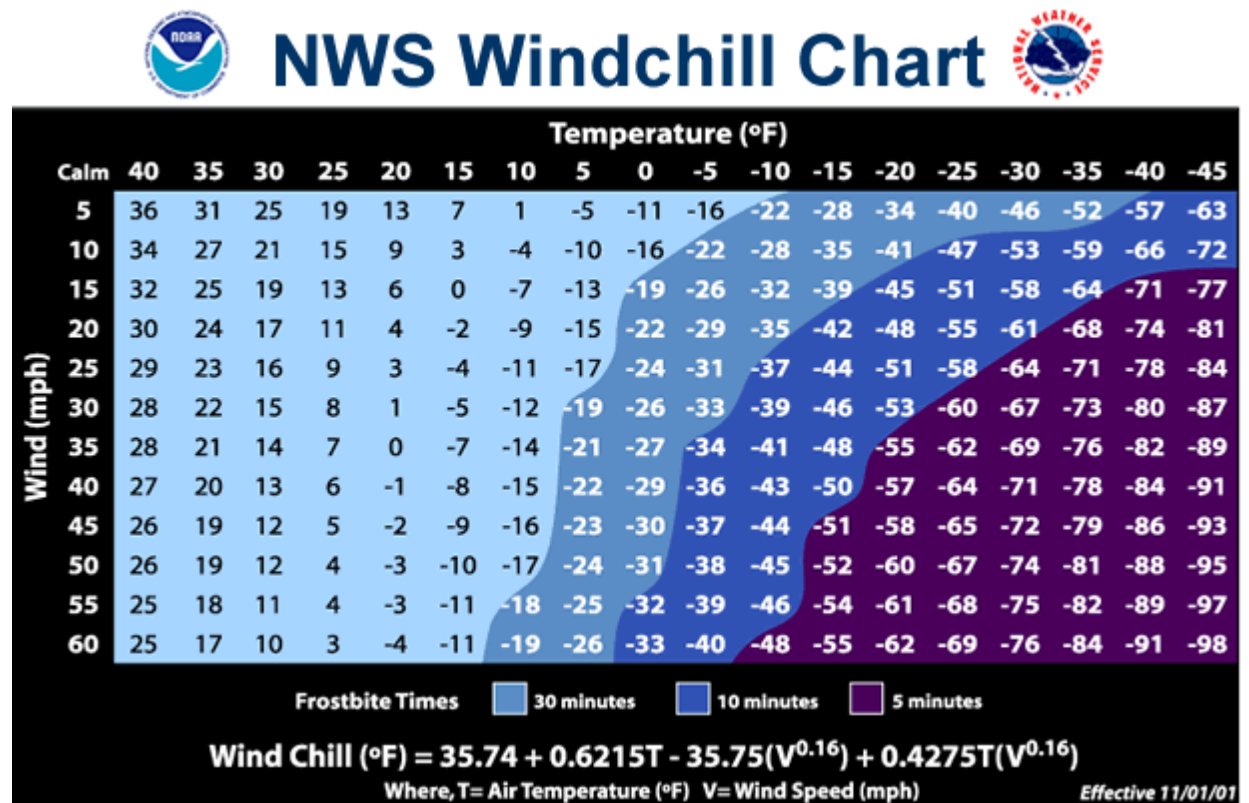
The physical impacts of winter storms are town-wide due to the expansive nature of winter storms. For the next plan update, Plainfield will more closely monitor winter storms to determine the worst impacts possible on the Town. Based on past occurrences, the worst anticipated winter weather Plainfield could experience would be 2-3' in 24 hours of snow with more at higher elevations and several days of power outages. The worst recent storm was in March 2011 and after that the Blizzard of 1888. Scales to measure the extent of winter storms are:

Heavy snowfall – Plainfield is significantly affected when an accumulation of 7 inches or more of snow in a 12-hour period or 13 inches or more occurs in a 24-hour period.

Blizzard – Plainfield is significantly affected when sustained wind speeds in excess of 40 mph accompanied by heavy snowfall or large amounts of blowing or drifting snow occurs.

Ice storm – Plainfield is significantly affected when ice accumulations of ¼" or greater occurs.

Wind Chill Extent Scale



Plainfield is served by two energy utilities, Green Mountain Power for customers within the village and Washington Electric Cooperative for customers in the rest of town. The power generation of both entities is based upon substations, which are not set by jurisdictional lines. The majority of the storm related power outages take place in the Washington Electric Cooperatives service area, given the rural placement of power lines. Approximately a ¼ of the community experienced extensive power outages in relation to the October 24th, 2005 winter storm, with some residents without power for five days.

Additionally, sensitive populations such as the elderly or handicapped may be susceptible to extreme cold when power is lost and heating systems are run on electricity (versus gas or natural fuels). If power is lost, some populations may need to be relocated to areas with power so that medical equipment can function. Additionally limited mobility of some persons may make it difficult to relocate in general or in times of emergencies. The Town encourages neighbors to check on those neighbors who they may believe to be at risk during times of emergency. The Fire Department also has a list of those with medical needs. In the future, the Town can map the location of sensitive populations and trouble spots on roads that reach those populations in order to identify additional routes. Also, the Town can continue to provide outreach and education of the impacts of winter storms to these populations.

Other major problems include closed roads and restricted transportation. By observing winter storm watches and warnings, adequate preparations can usually be made to lessen the impact of snow, ice and sleet, and below freezing temperature conditions on the Town of Plainfield. Providing for the mass care and sheltering of residents left without heat or electricity for an extended time and mobilizing sufficient resources to clear broken tree limbs from roads, are the primary challenges facing community officials, along with citizens' reluctance to leave their homes even in times of serious cold. Plainfield should plan and prepare for these emergencies. That planning and preparedness effort should include the identification of mass care facilities and necessary resources such as cots, blankets, food supplies and generators, as well as debris removal equipment and services. The Plainfield emergency shelter is at Goddard College.

Hazard	Location	Vulnerability	Extent	Impact	Likelihood
Winter Storm/Ice Storm	Town Wide	Elderly & handicapped populations, remote structures, old/under insulated structures, utilities, trees	Below freezing and severe wind chill factor for multiple days; depends on severity of event; 18+” snow in March 2011 storm	\$15,000 - additional plowing/sheltering costs	High

6. Mitigation

The goal of this Plan is to update the local mitigation strategy that makes Plainfield more disaster resistant and reduces its risk from natural hazards. Further, it is the goal of this Plan to take actions to reduce or eliminate the long-term risk to human life and property from:

- The natural hazard of flash flood/flood
- The natural hazard of fluvial erosion/landslides
- The man made hazard of dam failure or emergency releases
- The natural hazard of severe winter and or wind storms (Ice, Snow, Wind, Rain)

6.1 Town Plan Goals that Support Local Hazard Mitigation

1. Improve the stability of the bed and banks of Plainfield's streams by preserving and restoring floodplains, ensuring that riparian buffer zones are maintained and restored throughout the watersheds, and practicing good stormwater management.
2. Develop a policy for traffic management on Rt. 2 and Village roads that supports the economic health of Village businesses, as well as the safety and well-being of Village residents.

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

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

6.2 Proposed Hazard Mitigation Programs, Projects & Activities

Vermont's Division of Emergency Management 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. These agencies and organizations can work together to provide assistance and resources to towns interested in pursuing hazard mitigation projects. 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, Plainfield's need to address the issue, the cost of implementing the strategy combined with the benefit received, and the availability of potential funding. A range of mitigation strategies were considered in the preparation of this Plan, and those that were determined to be feasible are included in the table below.

The Town of Plainfield understands that, in order to apply for FEMA funding for mitigation projects, a project must meet more formal FEMA benefit cost criteria. A project seeking FEMA funds would undergo a full benefit-cost analysis in the FEMA-approved format. The Town must have a FEMA approved Local Hazard Mitigation Plan as well.

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

Hazards Mitigated	Mitigation Action	Local Leadership	Prioritization (High, Med, Low)	Possible Resources	Time Frame
All Hazards	Update communication system to assure that in the event of an emergency, communication between all departments and officials can be coordinated	S.B./EMD	High	HMGP, General Fund	2019-2021
Flooding, Fluvial Erosion/ Landslide	Replace and/or repair all bridges over Great Brook starting with the bridges at Mill Street and the next one up the Brook Road (# 20 & # 21)	S.B./Road Foreman	High	HMGP, General Fund	2019 - 2021
Flooding, Fluvial Erosion/ Landslide	Purchase 25 foot buffer along Great Brook	P.C./S.B.	Med	HMGP, General Fund	2019-2023
Flooding, Fluvial Erosion	Install four larger culverts – one on each of the following roads: Lower, Gonyeau. Maxfield and Upper Roads	S.B./Road Foreman	High	VTrans	2019-2020
Flooding, Fluvial Erosion	Flood proof waste water treatment plant	S.B.	Low	HMGP, USACE	2019-2024
Flooding, Fluvial Erosion/ Landslide	Select projects from Upper Winooski Corridor Plan	S.B./CVRPC /Friends of the Winooski	High	HMGP	2019-2022

Wildfire/Forest Fire	Distribute public education materials about reducing wild fire risk	Fire Dept/S.B.	Med	USDA	2019-2023
Winter Storms/Severe Cold	Provide training to residents on how to insulate homes (pipes, attics) for extreme cold spells	S.B./P.C./Fire Dept	Medium	EMGP	2019-2021
Winter storms/extreme cold/ice storms	Upgrade electrical systems in municipal buildings and shelters to prevent surge/equipment damage from fluctuating current during ice and wind storms	Fire Dept/S.B.	Med	General Funds, EMGP, DPIG	2019-2023
NFIP Compliance, Flooding, Fluvial Erosion	Revise/adopt subdivision regulations, erosion control regulations, board of health regulations to improve floodplain management in community	S.B./P.C.	High	Municipal Planning Grant	2019-2021
NFIP Compliance	Work with elected officials, the State and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education	P.C./ANR	Med	HMGP	2019-2021
All Hazards	Update radio communication devices to provide reliable communication between Fire & Rescue Department, Town Clerk's Office, Water/Wastewater Department, and Emergency Operations Center at Town Hall/Opera House	S.B./EMD	High	HMGP, General Fund	2019-2021

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

7. Attachments

7.1 Hazard Analysis Map

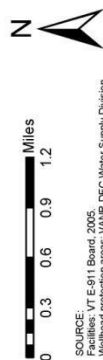
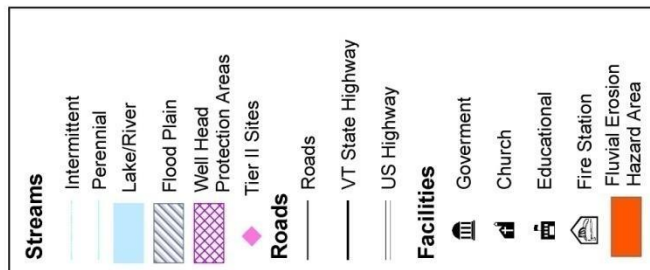
7.2 Local Concerns Map

7.3 Five year plan maintenance/review process

7.4 Certificate of Adoption

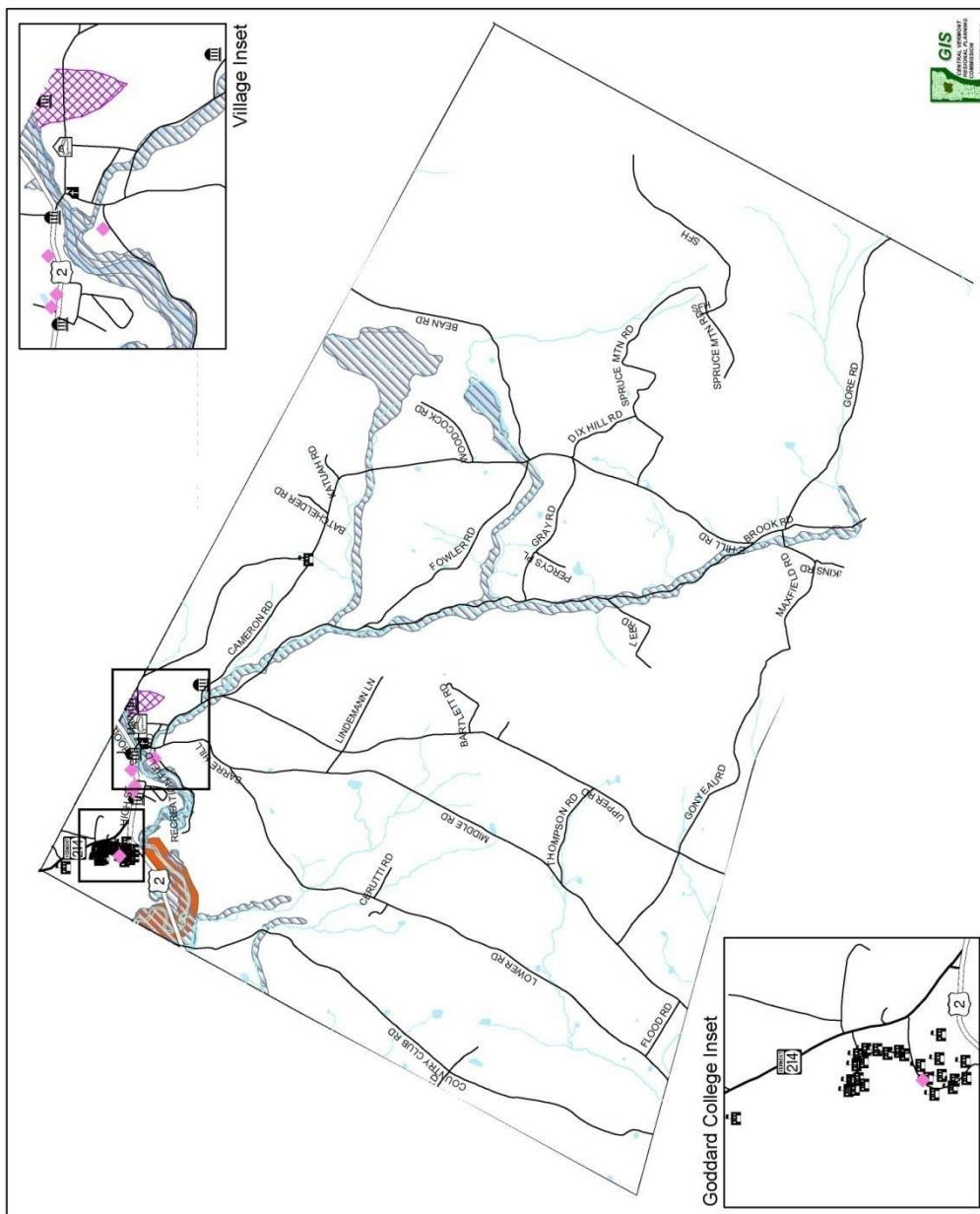
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Town of Plainfield Hazard Analysis Map

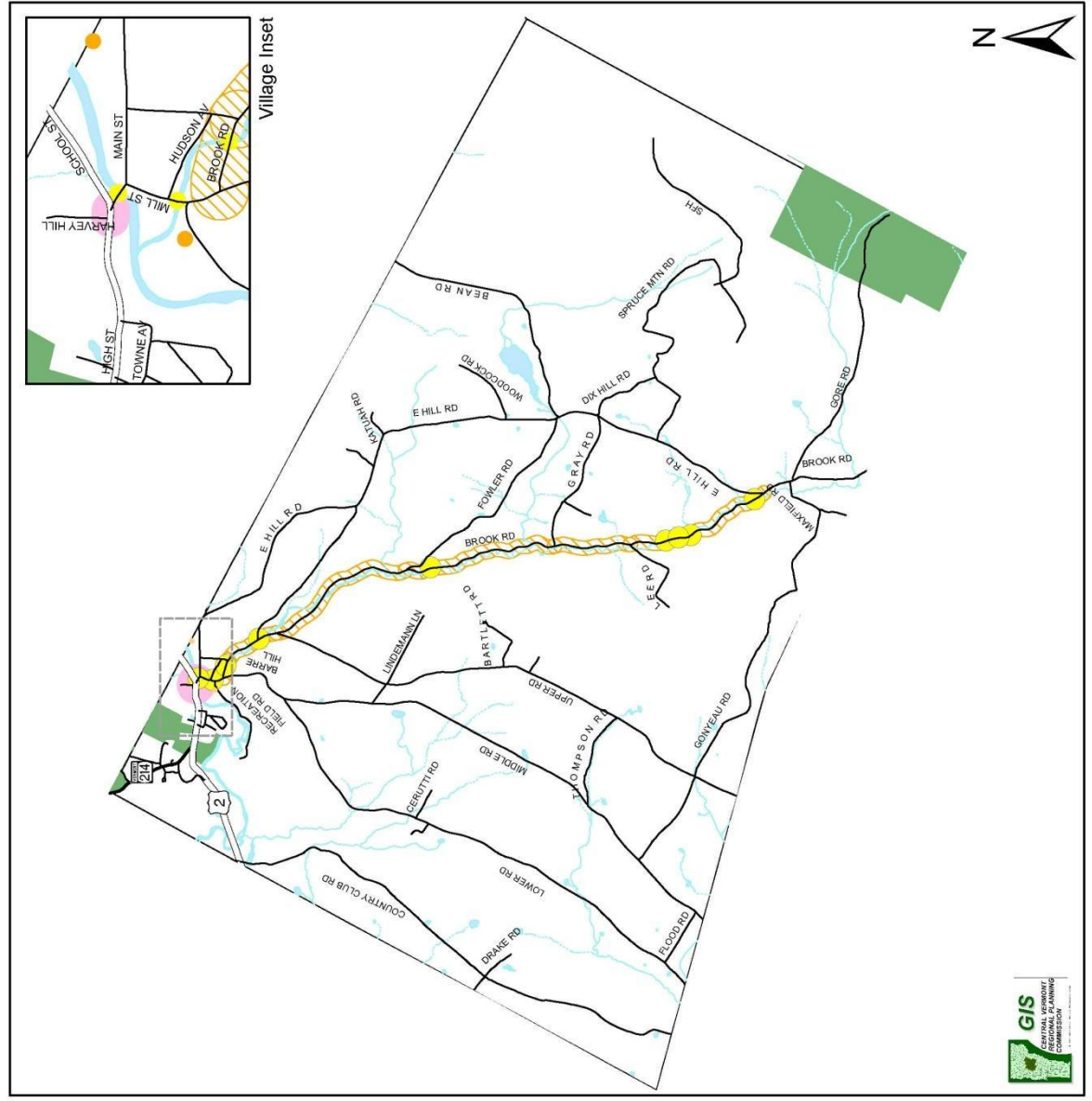


SOURCE: VT E-911 Board, 2005
 Watershed boundaries: VT DEC Water Supply Division
 Wellhead protection: VNR/DEC Water Supply Division
 and VT Dept. of Health, 1986.
 Dams: VNR - VCI, 2004
 Floodplains: FEMA, 1989
 Roads: VAOT, 2005
 Surface Waters: CYPCC Surface Water Data, 1993.
 This map was prepared using ArcGIS 9.3.1
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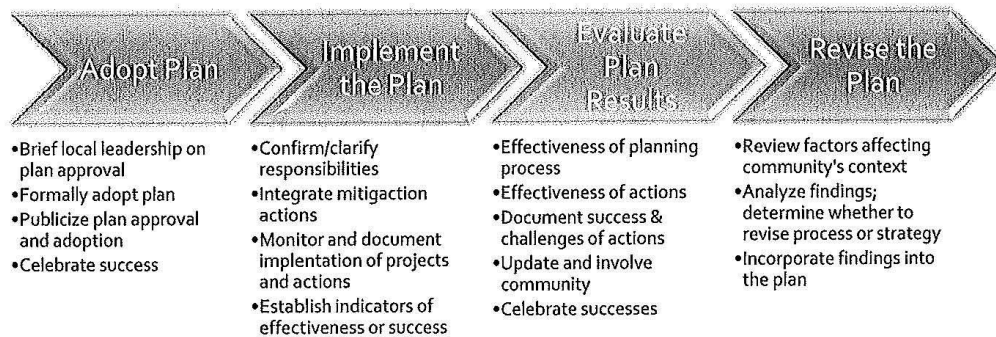
Data is only as accurate as the original sources.
 The map is not intended for professional use.
 This map may contain errors and omissions.



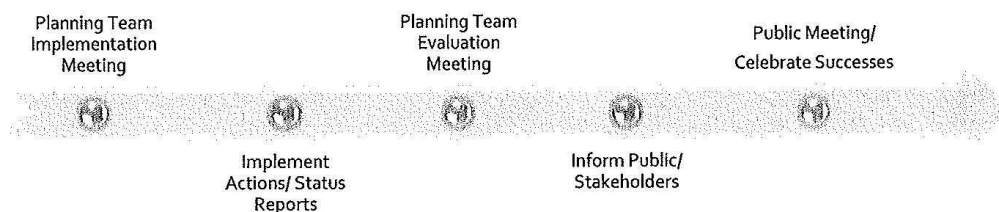
Town of Plainfield Areas of Local Concern



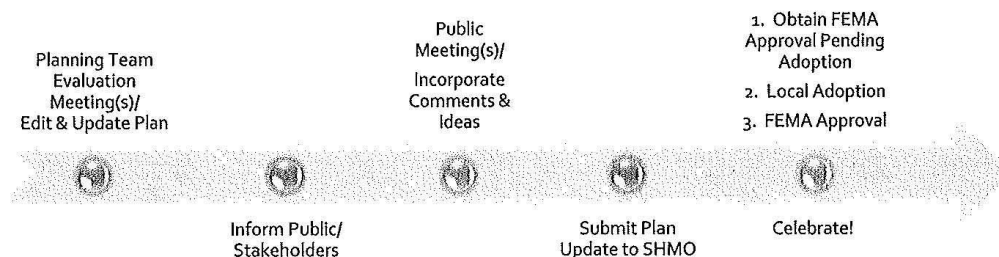
5-Year Plan Review/Maintenance



After Plan Adoption-Annually Implement and Evaluate



Fifth Year, and After Major Disaster Evaluate and Revise



CERTIFICATE OF ADOPTION
_____, 2019
TOWN OF PLAINFIELD, VERMONT SELECTBOARD

A RESOLUTION ADOPTING THE TOWN OF PLAINFIELD, VERMONT 2019 LOCAL HAZARD MITIGATION PLAN

WHEREAS, THE TOWN OF PLAINFIELD HAS HISTORICALLY EXPERIENCED SEVERE DAMAGE FROM NATURAL HAZARDS AND IT CONTINUES TO BE VULNERABLE TO THE EFFECTS OF THE HAZARDS PROFILED IN THE TOWN OF PLAINFIELD, VERMONT 2019 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 PLAINFIELD HAS DEVELOPED AND RECEIVED CONDITIONAL APPROVAL FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FOR ITS 2019 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 PLAINFIELD; AND

WHEREAS, THE PLAN RECOMMENDS SEVERAL HAZARD MITIGATION ACTIONS (PROJECTS) THAT WILL PROVIDE MITIGATION FOR SPECIFIC NATURAL HAZARDS THAT IMPACT THE TOWN OF PLAINFIELD 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 PLAINFIELD ELIGIBLE FOR FUNDING TO ALLEVIATE THE IMPACTS OF FUTURE HAZARDS;

WHEREAS, A DULY-NOTICED PUBLIC MEETING WAS HELD BY THE TOWN OF PLAINFIELD SELECTBOARD ON _____, 2019 TO FORMALLY ADOPT THE PLAINFIELD LOCAL HAZARD MITIGATION PLAN; NOW THEREFORE BE IT

RESOLVED BY TOWN OF PLAINFIELD SELECTBOARD:

1. THE TOWN OF PLAINFIELD, VERMONT 2019 LOCAL HAZARD MITIGATION PLAN IS HEREBY ADOPTED AS AN OFFICIAL PLAN OF THE TOWN OF PLAINFIELD;
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 AS TOWN CAPACITY AND FUNDING ALLOWS;
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 EMD AND LOCAL HAZARD MITIGATION COMMITTEE.

IN WITNESS WHEREOF, THE UNDERSIGNED HAVE AFFIXED THEIR SIGNATURE AND THE CORPORATE SEAL OF THE TOWN OF PLAINFIELD THIS ____ DAY OF ____ 2019.

SELECTBOARD CHAIR

MEMBER OF SELECTBOARD

MEMBER OF SELECTBOARD

ATTEST

LINDA WELLS, TOWN CLERK

DRAFT