









=ANNEX 4: TOWN OF CHARLOTTE

	Chartered: June 24, 1762
	Land Area: 50.3 sq. mi.
	2020 Population: 3,912
	Government Address: Town of Charlotte, P.O. Box 119 Charlotte, Vermont 05445
	Households: 1,462
	Mitigation Focus: Severe Winter Storm, Flooding, Fluvial Erosion, High Winds

This section presents the jurisdictional annex for Town of Charlotte, which provided the following information for the 2022 update to the *Chittenden County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan*:

- Jurisdiction Information (Contact Information and Hazard Mitigation Planning Role)

- Jurisdiction Planning Process
- Hazard Event History
- Hazard Risk Ranking
- Community Assets
- Capabilities Assessment
- Resiliency to Hazards
- Mitigation Actions and Action Plan for Implementation

4.1 HAZARD MITIGATION PLAN – POINT OF CONTACT

Type	Primary Point of Contact	Secondary Point of Contact
Name	Larry Lewack	Christopher Davis
Title	Planner	Emergency Management Director/ Battalion Chief-Fire, Charlotte Fire & Rescue
Agency	Town of Charlotte	Town of Charlotte
Address	P.O. Box 119	P.O. Box 119
City, State, Zip	Charlotte, Vermont 05445	Charlotte, Vermont 05445
Phone	802-425-3071	802-316-6270
Email	townplanner@townofcharlotte.com	cdavis@meachcovefarms.org

4.2 JURISDICTION PROFILE

- Geographic Region: Champlain Valley
- Persons per Household: 2.61
- Persons per Square Mile: 77.7
- Median Age: 49.3 years
- Elevation: 737 feet

This section presents the jurisdictional annex for the Town of Charlotte, which provided the following information for the 2022 update to the *Chittenden County, Vermont Multi-Jurisdictional All Hazards Mitigation Plan (MJAHMP)*:

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Location

The Town of Charlotte is situated in the Champlain Valley in the southwestern corner of Chittenden County. It is bounded on the west by Lake Champlain, on the south by Ferrisburgh and Monkton (both in Addison County), on the east by Hinesburg and on the north by Shelburne. The town encompasses 50.3 square miles, with approximately 9 square miles of water. The town hosts a large network of working farms and forests that are dependent on the fertile soils of the valley. Sugarbushes, orchards, dairies, berry farms, a winery, market gardens, livestock operations, honey houses, grain and community-supported agriculture are just some of Charlotte's agriculture-based enterprises. These lands also provide scenic landscapes, walking and hiking trails, Charlotte Park and Wildlife Refuge, and Mt. Philo State Park, all situated halfway between Middlebury and Burlington, Vermont.

The Town is located on Route 7 about 15 minutes south of Burlington and 15 minutes north of Vergennes.

History

The town was named for Charlotte of Mecklenburg-Strelitz, wife of King George III, and is home to Mt. Philo and Vermont's oldest state park. Created in 1924, Mt. Philo State Park overlooks Lake Champlain Valley and provides views of New York's Adirondack Mountains and the Green Mountains of Vermont. Charlotte is also home to one of the oldest still functioning ferry crossings in America, with service to Essex, NY.

Demographics, Economy, and Governance

The Town of Charlotte population has been relatively stable over the past several decades, showing only marginal growth. The greatest segment of the population (eight percent) is age 65 and over, and almost six percent are below the poverty level.

Table 4.1: Demographics, Economy, and Governance, Town of Charlotte¹

Demographics	Economy	Governance
Population Growth Rate <ul style="list-style-type: none"> 1980: 2,561 1990: 3,148 2000: 3,569 2010: 3,754 2020: 3,912 2020-2030 (Projected): 3.7% Race and Ethnicity Percentage of population identifying as: <ul style="list-style-type: none"> White: 97.93% Two or more races: 2.8% Hispanic/Latino: 3.1% Black/African American: 5.7% American Indian: 0.6% 	<ul style="list-style-type: none"> Median household income (2019): \$108,611 Per capita income (2019): 63,598 Median home value (2021): \$538,100 Number of Single Unit Residences: Population below poverty level (2019): 5.5% 	<ul style="list-style-type: none"> Select Board Town Clerk Treasurer Justices of the Peace

¹ Census Reporter, Town of Charlotte, <https://censusreporter.org/profiles/06000US5000713300-charlotte-town-chittenden-county-vt/>

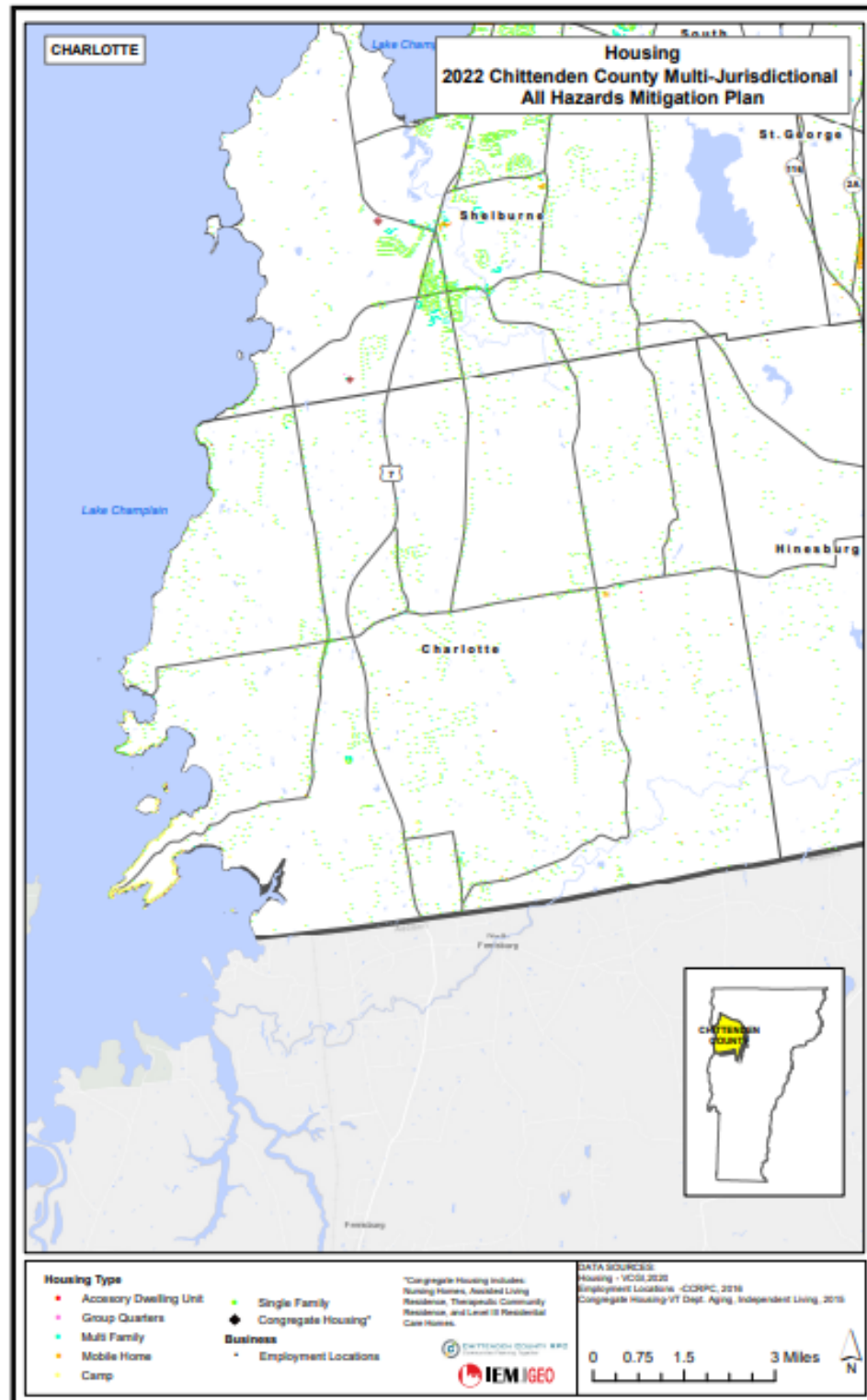


Figure 4.1: Housing and Employment, Town of Charlotte²

² Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

Built Environment and Community Lifelines

For the 2022 MHAHMP update, the critical facility categories used in the 2017 Plan were converted to FEMA's Community Lifeline categories.

The Town of Charlotte has identified twenty-one (21) critical facilities that serve as Community Lifelines. None of these facilities are located in the 100-year floodplain, nor in mapped River Corridors or River Corridor Protection Areas.

Table 4.2: Number of Community Lifelines and Critical Assets by Sector, Town of Charlotte

SECTOR	Safety and Security	Food, Water, Shelter	Health and Medical	Energy	Communications	Transportation	Hazardous Materials	Education	Cultural/Historical	High Hazard Dams
No. Assets	2	1	0	4	6	2	0	1	5	0

Safety and Security

There is one fire station and one Emergency Operations Center in the Town of Charlotte. There is also a government/military facility; however, this is not included as a Community Lifeline in the Town.

Food, Water, Shelter

Food commodities are available throughout Chittenden County from public retail providers, wholesalers, and contracted services for specific institutions and facilities. Additional contracts may be entered into for post-disaster needs. There is one emergency shelter within the town.

The Town of Charlotte provides both water services and sewer services to the community.

Health and Medical

There are no public health care facilities in town. Residents must travel to Hinesburg or Williston to access primary health care practices. There are also two veterinary practices in the town.

Energy

Energy distribution is via Green Mountain Power. VELCO transmission lines and a substation are also located in town.

The Town of Charlotte received an Energy Efficiency and Conservation Block Grant (EECBG) from the State of Vermont Department of Public Service, which received the funds from the Federal American Recovery and Reinvestment Act (ARRA). The purpose of this grant is for energy efficiency retrofits (i.e., improvements) in the Town Offices building.

This project involves weatherization, selective lighting replacements, and retro commissioning of the Charlotte Town Offices constructed in 1994. Based recent energy audits, the Charlotte Energy Committee has prioritized a number of areas for building energy efficiency improvements which have reasonable payback. These improvements can be divided into two main areas of opportunity to

significantly reduce the energy use of the Charlotte Town Offices – Building Weatherization and lighting and heat, ventilation, and air conditioning controls and retro-commissioning.³

In addition, the Charlotte Energy Committee manages a web site that covers the ways in which the Town has been working to improve the way it produces and uses energy since 2010. Topics covered on the site include energy efficiency, renewable energy, and policy and tracking.⁴

Communications

FairPoint Communications and Comcast provide services countywide. Champlain Valley & Waitsfield Telecom is the local wired telephone and internet access provider. In addition, the town identifies six communication towers/ transmission facilities.

Most communications and information systems and infrastructure in the United States are privately-owned; however, the Town maintains authority and control over public safety communications for fire, police, and other responding agencies. In recent years, the Federal government has taken a stronger role in protecting information and communications infrastructure, which may also present a challenge in relation to disaster impacts. Increasing reliance on this infrastructure by individuals, businesses, and government could cause vulnerabilities which emergency managers should take into consideration in pre-and post-incident planning and operations.

Transportation

Highway 7, also known as Ethan Allan Parkway, runs parallel to Lake Champlain in a north-south direction. Prominent paved secondary town roads serving residential neighborhoods include Spear St., Mt. Philo Rd., Church Hill Rd., Dorset St., Greenbush Rd., Thompson's Point Rd., and Hinesburg Rd. Many businesses and community amenities are located near or along these roadways. The town is also served by Vermont Railways, a freight line that parallels Rte. 7 through town, which (starting in July 2022) also carries daily Amtrak passenger service linking Burlington to New York City, and by a private passenger & motor vehicle ferry service linking Charlotte to Essex, New York.

Hazardous Materials

Ten Hazardous Waste sites are identified in the MJAHMP.

Education

There is one kindergarten through eighth grade school located within the town, Charlotte Central School, which is part of the Champlain Valley School District.

Recreational, Cultural and Historic Sites and Assets

The community includes a number of assets that lend themselves to improving community lifestyle. The Senior Center bills itself as a site "for curious and active people" and provides a healthy lunch every Monday, art exhibits, classes, lectures, and other activities. An example of presentations made

³ Town of Charlotte, Request for Proposal – Energy Efficiency Retrofit, May 17, 2010, https://www.charlottetvt.org/index.asp?SEC=FA908876-7D67-44B6-8E9D-0C25698C73EB&Type=B_BASIC

⁴ CEC, Charlotte Energy Committee, <https://www.charlotteenergy.org/>

to the community included “Farms in Charlotte: Who, What, When, Where, and How,” presented by the Charlotte Grange.

Charlotte Recreation Department activities are posted at www.charlotterec.com, where information about spring and summer program offerings; access to Charlotte Beach, which is open from Memorial Day weekend through Labor Day weekend; and amenities such as the playground, school athletic fields, a disc golf course; and the Public Ice Rink. This is not a complete list of amenities, but a sample to show the range of recreational assets.

The Charlotte Park and Wildlife Refuge was established is to preserve Park and Refuge lands in their undeveloped state, protecting the scenic vistas, biodiversity, and natural beauty of the property, while continuing some historic agricultural uses as appropriate; and to provide the residents of Charlotte and the general public with opportunities for aesthetic enjoyment, passive outdoor recreation and the study of nature. In addition to being able to view nature in the wild, the Refuge provide trail maps for those interested in walking or hiking through the Refuge.

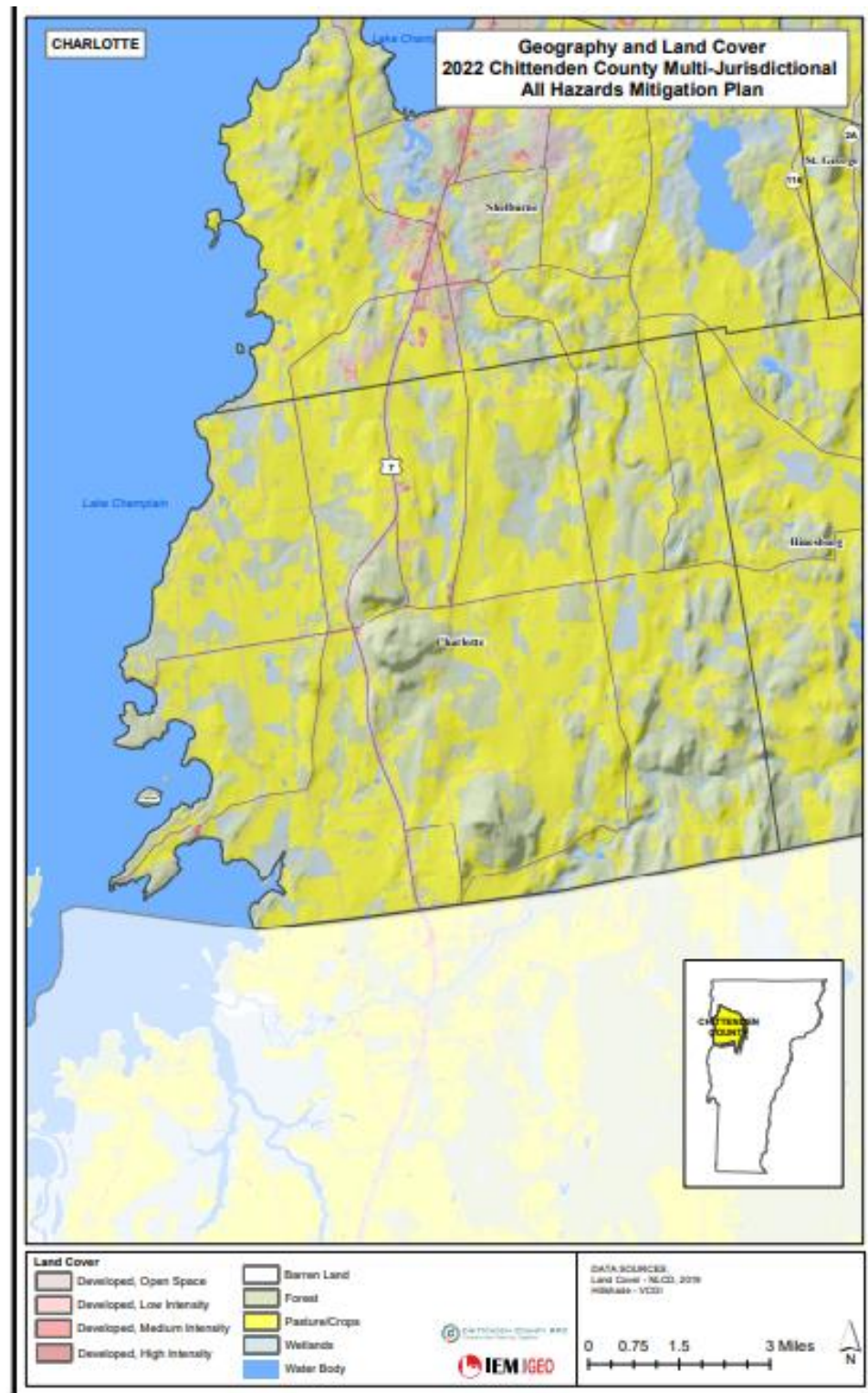


Figure 4.2: Geography and Land Cover, Town of Charlotte⁵

⁵ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.



⁶ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

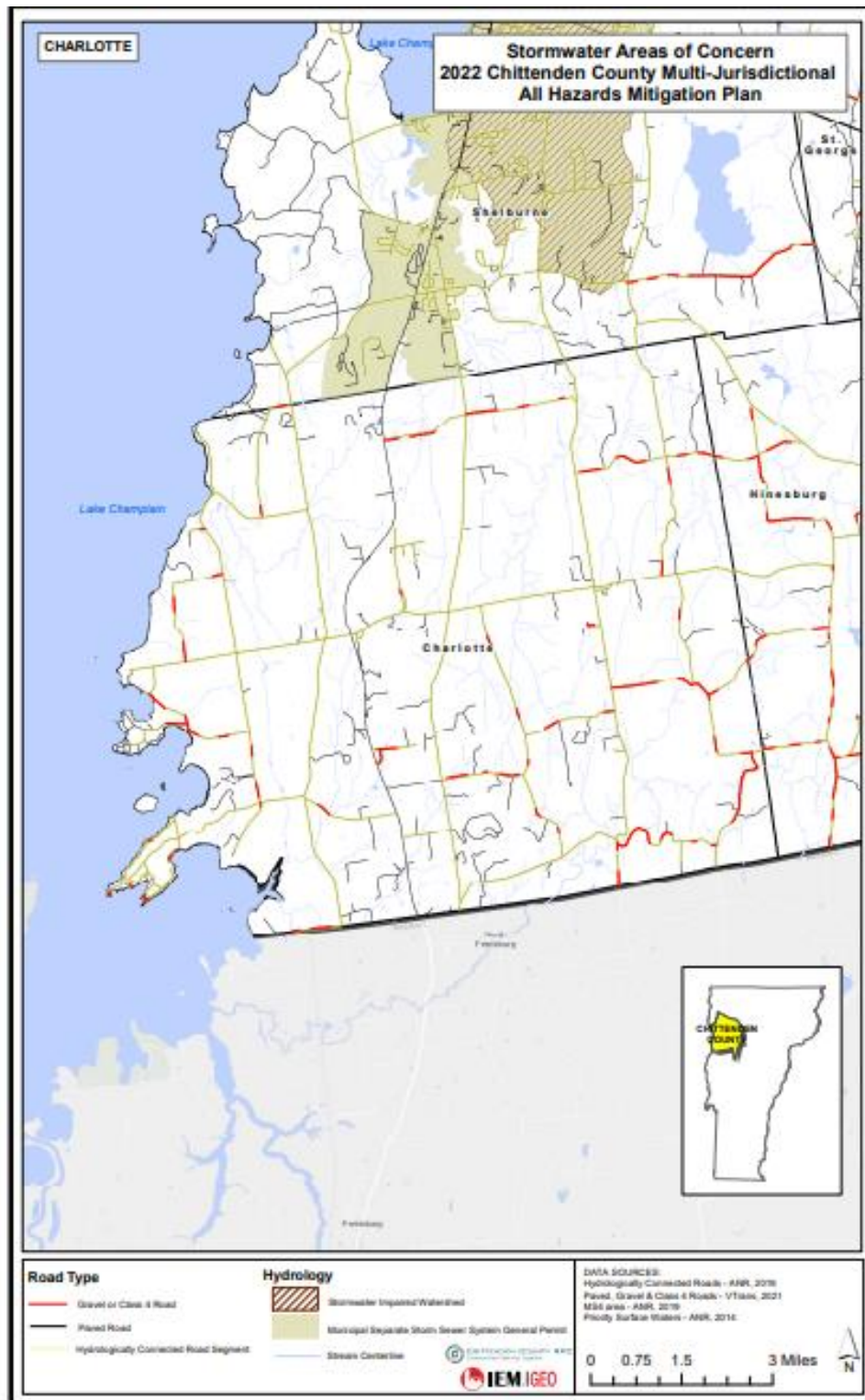


Figure 4.4: Stormwater Management Systems, Town of Charlotte⁷

⁷ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

Growth and Development Trends

Land use in the Town of Charlotte is primarily residential and agricultural. The population of Charlotte is distributed relatively evenly throughout the town, with denser concentrations along Greenbush Road, Ferry Road, Church Hill Road, Mount Philo Road, Spear Street and Dorset Street. With the exception of limited commercial development and municipal buildings along Ferry Road, and smaller preexisting residential lots at the East and West Village locations, the predominant use of the landscape in Charlotte is for large-lot (5+ acres) residential development and agriculture.

There are a significant number of conserved or undevelopable parcels in Charlotte. Most parcels have been conserved for their scenic, agricultural, and natural public value. It is likely that the number and extent of conserved parcels in Charlotte will continue to grow. The Town of Charlotte allocates a few cents of its municipal tax rate every year toward land conservation and also provides operational funding to the Charlotte Land Trust. The Town also works in partnership with regional land conservation entities such as the Vermont Land Trust, Vermont Housing and Conservation Board, The Nature Conservancy, Lewis Creek Association, and The Trust for Public Land. The Charlotte Town Plan is a natural resource-based plan that values protection of natural systems, farming and forestry-based economies and rural community lifestyles. The Town Plan also states that land conservation measures should be achieved in part through non-regulatory methods.

Table 4.3: Population Trends, Town of Charlotte 2010 - 2020

2010	2020	Net Change 2010-2020	% Change 2010-2020
3,754	3,912	158	0.04%

The primary method to predict future development is by analysis of municipal zoning bylaws. As the municipality participates in the National Flood Insurance Program (NFIP), zoning bylaws heavily regulate development in designated flood hazard areas. Additionally, the Town also regulates development near other waterbodies and wetlands. As a result, little or no development is likely to take place in flood hazard areas or river corridor protection areas. These zoning requirements effectively mitigate damages from Flood and Fluvial Erosion hazards to reduce risk of flood hazards impacting future structures. Further, with a five-acre minimum lot size for residential structures, and with nearly one-third of the land base in some form of conservation protection, these also serve to limit the amount of new development that can occur.

The Town of Charlotte annex to the 2017 MJAHMP noted that “since the adoption of the 2011 municipal annex, development activity in the Town had not increased vulnerability. Additionally, through at least 2022, there was no known or projected development of new buildings or infrastructure anticipated to be constructed in areas known to be particularly vulnerable to natural hazards”⁸. As shown in Table, population projections from 2020-2030 continue to support the Town’s carefully controlled growth, showing only a 3.7 percent increase.

⁸ 2017 Town of Charlotte All-Hazards Mitigation Plan, dated December 28, 2017, p. 41. Retrieved at: https://www.ccrpcvt.org/wp-content/uploads/2016/01/2017_Charlotte_VT_AllHazardsMitigationPlan_FINAL.pdf

Table 4.4: Population Projection, Town of Charlotte 2020 - 2030

2020	2030	Net Change 2020-2030	% Change 2020-2030
3,912	4,058	146	+3.7%

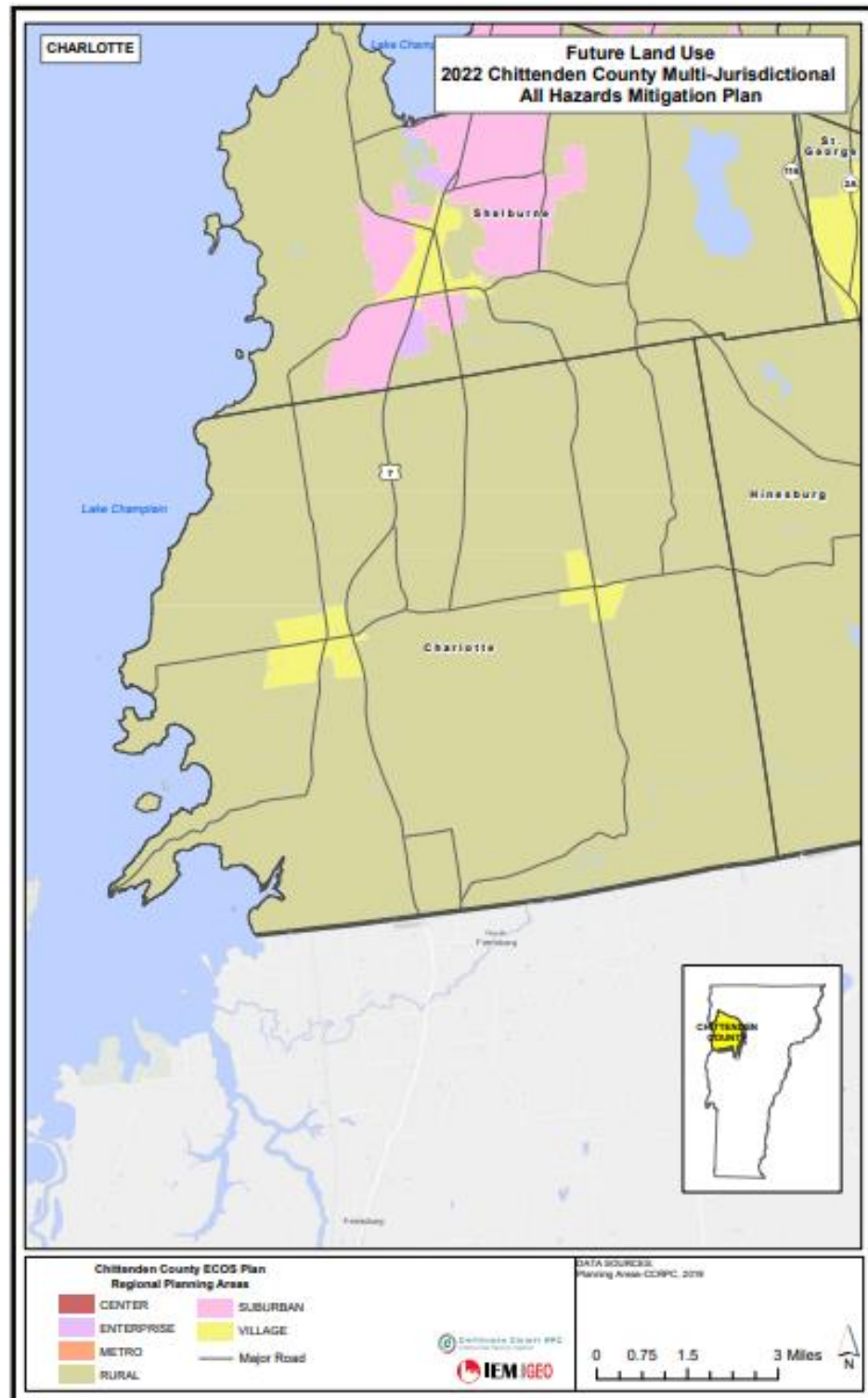


Figure 4.5: Future Land Use, Town of Charlotte⁹

⁹ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

4.3 JURISDICTION PLANNING PROCESS

Table 4.5: 2022 Participants in Hazard Mitigation Planning, Town of Charlotte

Name	Position/Title	Department/Agency
Larry Lewack	Planner	Town of Charlotte
Christopher Davis	Emergency Management Director/ Battalion Chief-Fire, Charlotte Fire & Rescue	Town of Charlotte
Karina Warshaw	Emergency Management Coordinator	Town of Charlotte
Dan Albrecht	Senior Planner	Chittenden County RPC

The jurisdiction identified its chief hazard mitigation planning responsibility as participating in the planning process and providing data and information through the Chittenden County Hazard Mitigation Plan Review and Update Committee. The county also identified the following tasks as part of its mitigation planning responsibilities:

- Jurisdictional Planning Committee
- Management support for the planning effort
- Planning Group resource/subject matter expert
- Hazard risk and vulnerability assessment
- Provide technical data and hazard information
- Capabilities assessment
- Mitigation strategy development
- Sponsor mitigation actions
- Review Plan drafts and provide input
- Public outreach activities
- Implementation of the Plan
- Maintaining the Plan

Public Participation

Several opportunities for public involvement were provided during the planning process, including a Public Hazard Survey and access to the draft plan for review and input.

The Public Hazard Survey was released through a web link posted on the Chittenden County Regional Planning Commission's (CCRPC) "Front Porch" e-newsletter.

In addition to the survey, the public was offered the opportunity to review and provide input to the Draft 2022 MJAHMP update. Notification of the Draft Plan release was made through the same CCRPC web link. Documentation of the public survey and draft plan review is included in [Attachment 3](#) of this annex.

4.4 JURISDICTION-SPECIFIC HAZARD EVENT HISTORY

The Town of Charlotte has been included in fourteen Federal Disaster or Emergency Declarations since 1990, all but four as a result of severe storms/rainstorms or flooding.

Table 4.6: Federal Disaster and Emergency Declarations (1990-2021), Town of Charlotte¹⁰

Declaration	Date	Hazard	Assistance Type
EM 3567	August 2021	Tropical Storm Henri	P(B)
DR-4532	April 2020	Vermont Covid-19 Pandemic	IA, PA(B)
EM-3437	March 2020	Vermont Covid-19	PA(B)
DR-4474	January 2020	Severe Storm and Flooding	-PA (A-G)
DR-4380	May 2018	Severe Storm and Flooding	PA (A-G)
DR 4232	June 2015	Severe Storm and Flooding	PA (A-G)
DR 4163	January 2014	Severe Winter Storm	PA (A-G)
DR 4140	August 2013	Severe Storms and Flooding	PA (A-G)
DR 4022	September 2011	Tropical Storm Irene	IA, PA(A-G)
DR 1995	June 2011	Severe Storms and Flooding	IA, PA(A-G)
EM 3167	April 2001	Snowstorm	PA(B)
DR 1228	July 1998	Severe Storms and Flooding	IA, PA(A-G)
DR 1101	January 1996	Ice Jams and Flooding	PA(A-G)
DR 875	June 1990	Flooding	PA(A-G)

Table 4.7: Summary of Storm Events in the Town of Charlotte, 1950 - May 31, 2021¹¹

Event Type	Number of incidents	Direct Deaths	Indirect Deaths	Direct Injuries	Indirect Injuries	Property Damage (\$)	Crop Damage (\$)
Hail	6	0	0	0	0	11,000	0
Lightning	2	0	0	0	0	200,000	0
Thunderstorm Wind	8	0	0	0	0	165,000	0
Cold/Wind Chill	10	0	0	0	0	100,000	0
Extreme Cold/Wind Chill	5	0	0	0	0	0	0
Flood	11	0	0	0	0	168,000	0
Frost/Freeze	3	0	0	0	0	0	275,000
Heat	7	0	0	0	0	0	250,000
Heavy Snow	5	0	0	0	0	247,000	0
High Wind	14	0	0	1	0	1,440,000	0
Ice Storm	1	0	0	0	0	750,000	0
Lakeshore Flood	5	0	0	0	0	55,200,000	0
Strong Wind	30	1	0	0	0	369,000	0
Winter Storm	68	0	0	2	0	1,758,000	10,000
Winter Weather	97	1	3	0	0	951,000	0
Flash Flood	4	0	0	0	0	715,000	0
Heavy Rain	6	0	0	0	0	50,000	0

¹⁰ FEMA, Federal Disaster Declarations. Retrieved at: <https://www.fema.gov/disaster/declarations>¹¹ NOAA, National Centers for Environmental Information, Storm Events Database, 1950 – May 31, 2021.

Total	282	2	3	3	0	\$62,124,000	\$535,000
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Table 4.8: Significant Hazard Events Identified by Town of Charlotte, 2017-2021

Date	Hazard	Event and Description
June 29, 2017	Flash Flood	A band of showers and thunderstorms developed in an east-west oriented line in the late afternoon and overnight hours across northern Vermont from Chittenden County into Lamoille and Washington Counties. Rainfall amounts of two to three inches in just a few hours on saturated soils from previous June rainfall caused flash flooding.
1998	Ice Storm	Due to their aspect to Lake Champlain and the presence of forested cover, areas hardest hit during this event were Mt. Philo State Park, Mutton Hill, Lewis Creek Road, West Charlotte Village and Pease Mountain
October 16, 2021	Thunderstorm Wind	A strong cold front moved across VT during the late afternoon and evening hours of October 16th. Preceding the cold front, a line of strong showers with some embedded thunderstorms moved into a very strongly sheared environment with southerly winds in excess of 60 mph around 5000 feet. A few of these stronger showers and thunderstorms tapped into those low-level winds and caused some isolated wind damage, mainly in the form of small, softwood trees toppled over by the wind.

High Hazards of Concern to the Jurisdiction

The Town of Charlotte indicated that Severe Winter Storms is the highest natural hazard of concern for the jurisdiction. The hazard is fully profiled in [Section 4, Base Plan](#). Several other hazards listed below were identified by the town, but not ranked as high hazards of concerns. In addition to these hazards, dam/levee failure was considered because of the presence of multiple dams inside or outside of the city, but not rank is a high hazard.

Severe Winter Storm

Severe winter storms are not formally analyzed or mapped for the Town due to the random nature of where such damage occurs; however, these events do occur with some frequency and are addressed in [Section 4.8, Base Plan](#).

Dam/Levee Failure

There are no dams in the Town of Charlotte under the jurisdiction of Vermont Department of Environmental Conservation (DEC)¹² pursuant to 10 VSA Chapter 43 §1081 and subject to 10 VSA

¹² Information on dams is available from two sources: a database of dams regulated by the Vermont Department of Environmental Conservation, and the National Dam Inventory, maintained by the U.S. Army Corps of Engineers.

Chapter 43 §1082 Authorization (i.e., dams capable of impounding more than 500,000 cubic feet of water or other liquid).

The National Dam Inventory shows two dams, one of unknown hazard potential and the other of low hazard potential, located in the municipality.

Table 4.9: Dams Located in the Town of Charlotte, as of May 2021¹³

Name	Owner	River	Description	Impoundment Capacity (acre-feet)	Hazard Potential
Charlotte-1	Unknown	Holmes Creek	No detailed data available in Vermont ANR database.	Unknown	Unknown
Scott Pond	[Privately owned]	Lewis Creek	Concrete Gravity dam, construction data unknown, originally built for mill power. Current purpose is recreation in that it is maintained by ANR/Dept. of Fish & Wildlife as a lamprey eel barrier control dam. Rebuilding costs would be significant if breached.	Unknown	Low

Flood/Flash Flood

According to the Charlotte Town Plan, portions of the shoreline of Lewis Creek have been designated flood hazard areas based upon the FEMA 100-year floodplain data. In the current data, some of the town's flood hazard areas are not mapped, including the flood hazard area of the LaPlatte River. Updates of the floodplain data does not address this problem. As a result, significant flood hazard risks may remain in areas outside of flood hazard areas that are currently not covered by the National Flood Insurance Program (NFIP).

Individual residences are the most common building type located in the floodplain, particularly older homes and vacation "camps" built prior to the implementation of local zoning bylaws and the National Flood Insurance Program. The Town is participating in NFIP as of September 2021, and thus limits/regulates development in these hazard zones.

A simple GIS intersection analysis reveals that portions of town roads are located within the mapped 100-year floodplain associated with Lewis Creek, as are culverts, bridges, and utility poles. Unfortunately, this level of analysis does not take into account the additional risk of flooding due to fluvial geomorphology (volume, velocity, direction, etc.) nor, more importantly, does it factor in the elevation of the road relative to flood elevation. Analysis also reveals farmland located in the floodplain. Without accurate detailed studies, it is not currently possible to predict how many cubic yards of productive soils would potentially be lost during a flood event.

Because of the town's shoreline on Lake Champlain, it is important to note potential flood stages.

¹³ National Inventory of Dams, U.S. Army Corps of Engineers.

FEMA establishes the Base Flood Elevation of Lake Champlain as 102.0 feet, while flood stage established by the National Weather Service is 100 feet. Definitions linked to flood stages include:

- 100 feet – Water begins to enter some lake front properties. Water also begins to threaten low lying roads, piers, and docks. Wave action can compound flooding on windward facing shorelines.
- 101 Feet – Flooding becomes serious, and wave erosion on windward shores becomes a problem. If lake ice is present, structural damage can occur.
- 102 feet – Severe flooding occurs with widespread inundation of lakeside properties, and closure of low-lying roads.

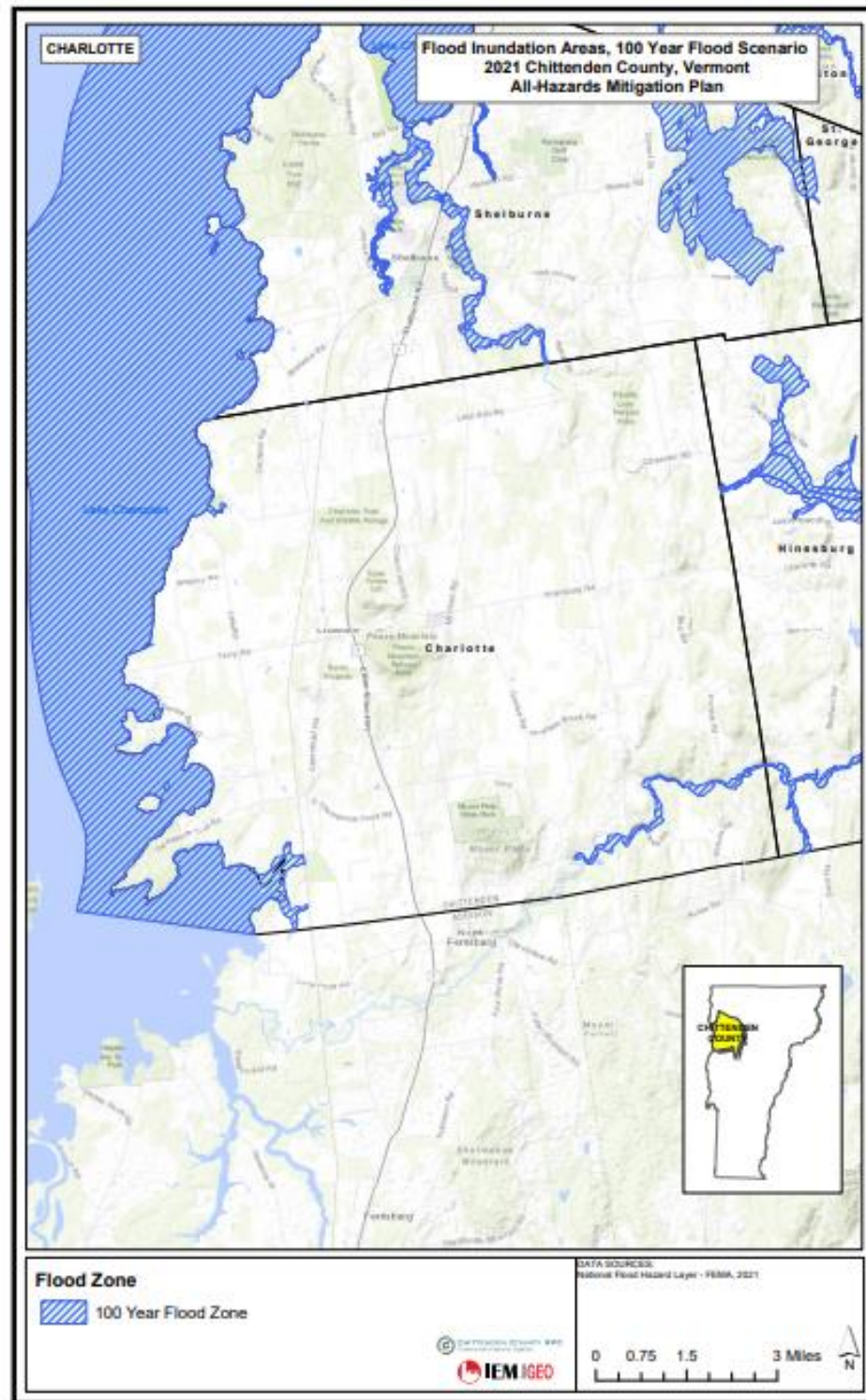


Figure 4.6: Town of Charlotte, 100-Year Flood Scenario¹⁴

Fluvial Erosion

¹⁴ Hazus, 100-Year Flood Scenario Run, October 14, 2021.

Fluvial erosion areas have been initially mapped for some of Lewis Creek. A River Corridor Management Plan has been created for this waterway and structures and road infrastructure at potential risk are identified. A previous Lewis Creek bank stabilization project has caused erosion hazards and potential safety issues near Covered Bridge #29, the Quinlan Bridge. Additional information related to potential flooding and fluvial erosion is provided in [Section 4.3, Flood/Flash Flood](#), and [Section 4.4, Fluvial Erosion](#) of the [Base Plan](#).

Ice Jams

While Charlotte is not necessarily at greater risk for ice jams than other parts of the county, municipal officials and community partners are concerned about the effect of ice jams on bridges and other infrastructure, particularly along Lewis Creek. Inundation from ice jams can damage or destroy road or stormwater infrastructure in addition to jeopardizing structures. Officials are also concerned that the sheer volume of ice moving downstream in an ice jam could damage or destroy bridges, particularly some of the more vulnerable covered bridges in the municipality.

Severe Rainstorm

Damage to roads, culverts, and bridges from thunderstorm events has been assumed in the past to be caused by overflowing of nearby streams, rivers, or lakes. More recent analysis has shown that this damage is caused by intense, localized thunderstorms which cause excessive and rapid water flows on and over paved and gravel roads, roadside ditches, driveway culverts, stormwater systems, etc. In many cases, damaged infrastructure is located outside of formally mapped floodplains, Fluvial Erosion hazard Areas (FEHA) or River Corridors (RC). Some of the most vulnerable infrastructure is road culverts.

Impacts from previous hazard events include general road repairs, debris removal and cleanup, and increased contractual costs for snow removal.

4.5 HAZARD RISK RANKING

After developing hazard profiles, the Town of Charlotte Planning Committee conducted a two-step quantitative risk assessment for each hazard that considered population vulnerability, geographic extent/location, probability of future occurrences, and potential impacts and consequences. The numerical scores for each category were totaled to obtain an [Overall Risk Score](#), which is summarized as one of these risk and vulnerability classifications:

- **Low:** Minimal potential probability and impact. Minimal or no property damage or loss of life expected.

- **Medium:** Moderate probability and potential impact; moderate threat level to the general population and/or the built environment. The potential damage is more isolated and less costly than a widespread disaster.
- **High:** Significant probability and widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past, causing significant impact.

The two-step hazard risk ranking methodology is detailed in [Section 4.X, Base Plan](#). The Hazard Risk Ranking scores for Town of Charlotte are provided in [Attachment 2](#) of this annex.

The **Overall Risk Score** for each hazard served as the basis for determining whether a vulnerability assessment should be conducted. Natural hazard profiles are presented within the hazard sub-sections in [Section 5, Base Plan](#), and local detail is provided in the Jurisdiction Annexes.

Table 4.10: Hazard Risk Ranking Summary Natural Hazards, Town of Charlotte

Hazard	Total Probability Score	Overall Risk Score	Total Consequence Score	Hazard Ranking
Severe Rainstorm	10	5	50	Medium
Extreme Temperatures	10	5	50	Medium
Severe Winter Storm	9	4	36	High
Human Infectious Disease	9	4	36	Low
Flood	7	4	28	Medium
Invasive Species	7	4	28	Medium
Fluvial Erosion	5	5	25	Medium
Wildfire	6	4	24	Low
Dam/Levee Failure	[Not Ranked]			

Table 4.11: Hazard Risk Ranking Summary Technological Hazards, Town of Charlotte

Hazard	Total Probability Score	Overall Risk Score	Total Consequence Score	Hazard Ranking
Hazardous Materials Incident	12	4	48	High
Power Loss	7	5	35	Medium
Major Transportation Incident	8	4	32	Medium
Telecommunications Failure	7	4	28	Medium
Water Pollution (algal bloom, etc.)	4	5	20	Medium
Other Fuel Service Loss	8	2	16	Low
Multi-structure Fire	5	3	15	Low
Water Supply Loss	6	2	12	Low
Sewer Service Loss	4	2	8	Low
Natural Gas Service Loss	0	0	0	Low

Table 4.12: Hazard Risk Ranking Societal Hazards, Town of Charlotte

Hazard	Total Probability Score	Overall Risk Score	Total Consequence Score	Hazard Ranking
Economic Recession	8	4	32	Medium
Crime	6	5	30	Medium
Key Employer Loss	3	4	12	Low
Terrorism	9	1	9	Low
Civil Disturbance	3	1	3	Low

4.6 VULNERABILITY ASSESSMENT

The methodology for calculating loss estimates presented in this annex is the same as that described in [Section 4, Base Plan](#). Quantitative loss estimates are provided when available. Qualitative measurement considers hazard data and characteristics, including the potential impact and consequences based on past occurrences. Accompanying the data is a discussion of community assets potentially at risk during a hazard event.

Typical vulnerabilities from common hazards consist primarily of:

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

More specifically, these vulnerabilities typically occur in association with the hazards profiled in Section 4, Base Plan

Table 4.13: Typical Vulnerabilities of Natural Hazards of Highest Concern, Town of Charlotte

Hazard	Typical Vulnerabilities	Potential Cascading Vulnerabilities
Extreme Temperatures	<ul style="list-style-type: none"> • Damage to public infrastructure • Loss of water service 	<ul style="list-style-type: none"> • Budget impacts due to needed repairs
Flooding	<ul style="list-style-type: none"> • Temporary closures of roads and bridges including from debris • Temporary loss of power and/or telecommunications • Temporary isolation of vulnerable individuals • Damage to public infrastructure 	<ul style="list-style-type: none"> • Budget impacts from road/bridge closures and repairs to public infrastructure • Damages to individuals' properties and businesses
Fluvial Erosion	<ul style="list-style-type: none"> • Temporary closures of roads and bridges including from debris • Temporary loss of power and/or telecommunications 	<ul style="list-style-type: none"> • Budget impacts from road/bridge closures and repairs to public infrastructure

Hazard	Typical Vulnerabilities	Potential Cascading Vulnerabilities
	<ul style="list-style-type: none"> Temporary isolation of vulnerable individuals Damage to public infrastructure 	<ul style="list-style-type: none"> Damages to individuals' properties and businesses
Human Infectious Disease	<ul style="list-style-type: none"> Temporary closures of schools, businesses, places of assembly Increased demand on medical services 	<ul style="list-style-type: none"> If an epidemic is widespread and long-lasting, impact could be severe
Invasive Species	<ul style="list-style-type: none"> Small but ongoing cost to monitoring level of occurrence 	<ul style="list-style-type: none"> Unknown at this point
Severe Rainstorm	<ul style="list-style-type: none"> Temporary closures of roads and bridges including from debris Temporary loss of power and/or telecommunications Temporary isolation of vulnerable individuals Damage to public infrastructure 	<ul style="list-style-type: none"> Budget impacts from road/bridge closures and repairs to public infrastructure Damages to individuals' properties and businesses
Severe Winter Storm	<ul style="list-style-type: none"> Temporary closures of roads and bridges including from debris Temporary loss of power and/or telecommunications Temporary isolation of vulnerable individuals 	<ul style="list-style-type: none"> Budget impacts from debris cleanup
Wildfire	<ul style="list-style-type: none"> Damage to private property 	<ul style="list-style-type: none"> Damage or loss of water, communications and transportation infrastructure

Relative to the county as a whole, the Town of Charlotte has a higher vulnerability to the following natural hazards:

- Severe Rainstorms
- Fluvial Erosion due to the high amount of gravel roads and road culverts
- Flooding of low-lying lands along the Lake Champlain shoreline

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

Table 4.14: Typical Vulnerabilities of Technological Hazards of Highest Concern, Town of Charlotte

Hazard	Typical Vulnerabilities	Potential Cascading Vulnerabilities
Gas Service Loss	<ul style="list-style-type: none"> No vulnerability as no service in Charlotte 	<ul style="list-style-type: none"> N/A

Hazard	Typical Vulnerabilities	Potential Cascading Vulnerabilities
Hazardous Materials Incident	<ul style="list-style-type: none"> Temporary closures of roads, bridges, and facilities during cleanup 	<ul style="list-style-type: none"> If large event, potential high cleanup costs Injuries to persons
Major Transportation Incident	<ul style="list-style-type: none"> Temporary closures of transportation infrastructure Injuries, deaths 	<ul style="list-style-type: none"> If major event, potential long-term closure of infrastructure
Other Fuel Service Loss	<ul style="list-style-type: none"> Temporary loss of service Temporary impacts to vulnerable individuals 	<ul style="list-style-type: none"> If extensive loss, potential budget impacts to service providers
Power Loss	<ul style="list-style-type: none"> Temporary loss of electrical service Temporary impacts to vulnerable individuals Damage to public infrastructure 	<ul style="list-style-type: none"> If extended event, damage to perishable goods or business income If extensive loss, potential budget impacts to service providers
Sewer Service Loss	<ul style="list-style-type: none"> Temporary loss of service Temporary impacts to vulnerable individuals Limited vulnerability due to limited municipal or centralized service 	<ul style="list-style-type: none"> Potential budget impacts to service providers
Telecommunications Failure	<ul style="list-style-type: none"> Temporary loss of service Temporary impacts to vulnerable individuals 	<ul style="list-style-type: none"> If extensive loss, potential budget impacts to service providers
Water Pollution	<ul style="list-style-type: none"> Ongoing budgetary impacts due to permit requirements 	<ul style="list-style-type: none"> If repeat events, impacts to tourism-based businesses
Water Service Loss	<ul style="list-style-type: none"> Temporary loss of service Temporary impacts to vulnerable individuals Limited vulnerability due to no municipal or centralized service 	<ul style="list-style-type: none"> If extensive loss, potential budget impacts to service providers

Relative to the County as a whole, the Town of Charlotte has a slightly higher vulnerability to the following technological hazards:

- Hazardous Materials Incident/Major Transportation Incident due to the traffic along U.S. RT 7, as well as materials transported along the rail line or stored on rail sidings in town.

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

Table 4.15: Typical Vulnerabilities of Societal Hazards of Highest Concern, Town of Charlotte

Hazard	Typical Vulnerabilities	Potential Cascading Vulnerabilities
Civil Disturbance	<ul style="list-style-type: none"> Injuries to persons Damage to public and private property 	<ul style="list-style-type: none"> Budget impacts to police services, depending upon severity of event Damage to public and private property Deaths
Crime	<ul style="list-style-type: none"> Increased demands on police services and social services 	<ul style="list-style-type: none"> Injuries Deaths
Economic Recession	<ul style="list-style-type: none"> Loss of economic activity Increased demands on social services Some loss of tax revenue 	<ul style="list-style-type: none"> Effects increased if event is of extended duration
Terrorism	<ul style="list-style-type: none"> Injuries to persons Damage to public and private property 	<ul style="list-style-type: none"> Injuries Deaths

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

Population

The Centers for Disease Control and Prevention's (CDC) **Social Vulnerability Index (SVI)** is a tool that can be used to identify specific vulnerable populations. The CDC SVI depicts the vulnerability of communities at census tract level, by county, into fifteen census-derived factors grouped into four themes—socioeconomic status, household composition/disability, race/ethnicity/language, and housing type/transportation. Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills.

Because the town's boundaries form one single census tract, more detailed information in relation to specific locations with a concentration of vulnerable individuals within the municipality is available. Looking only at the census tract level indicates that the Town of Charlotte is in an area of low vulnerability with few socioeconomy variables.

Table 4.16: Vulnerable Population in the Town of Charlotte, by Age Group¹⁵

Population Category	Percentage of Population
Children Under 18	22.63%
Population, age 64+	7.7%
Disabled Population	7.13%
Population Below Poverty Level	5.5%

¹⁵ Vermont Department of Health, Vermont Social Vulnerability Index (SVI). Retrieved at: <https://ahs-vt.maps.arcgis.com/apps/MapSeries/index.html?appid=9478be15d6d4410f8eef8d420711310b>

Built Environment

Although a vulnerability analysis was conducted utilizing the Hazus modeling scenarios, it was conducted at the county level and no additional Hazus data is available for specific jurisdictions. Based on information provided by the jurisdiction the following Community Lifeline sites or facilities potentially at risk.

Bridges and Culverts

There are a variety of bridges and culverts located in the municipality. The following bridges are contained in an inventory maintained by Vermont Center for Geographic Information, Vermont Department of Transportation and the Chittenden County Regional Planning Commission (CCRPC). A GIS intersection was performed for the 2017 Plan to determine which bridges are located in the designated flood hazard area. This analysis was determined to still be current, but does not take into account the fluvial geomorphology or the elevation of the bridge above the floodplain. The Lewis Creek Association (LCA) notes that bridges and culverts in the fluvial erosion hazard areas are identified in the River Corridor Plans for Lewis Creek and the LaPlatte River, and will be included in future updates of this Plan, when fluvial erosion hazard area delineations are finalized. The LCA also notes that some bridges in the town are undersized with regards to stream stability needs. Less data is available for the Town Short bridges.

Table 4.17: Bridges Located in the Special Flood Hazard Area or River Corridor Protection Area, Town of Charlotte¹⁶

Bridge Type/ Number	Location	Mile-point	Route Name	Year Built	SFHA	RCPA	Stream
Rolled Beam	0.2 mi to Jct. W CL3 TH12	008061	C2001	1957	No	Yes	LaPlatte RMPSFEH 050610
Tied Arch Covered Bridge	0.2 mi to Jct. W CL3 TH43	000000	C3009	1898	Yes	No	-
Arch/King Post Covered Bridge	0.1 mi to Jct. w C3 TH28	000000	C3039	1849	Yes	Yes	Lewis Creek RMPSFEH 031912
Gal Rolled/	0.1 mi to Jct. W CL2 TH1	000000	C3036	1849	Yes	Yes	Lewis Creek

¹⁶ Vermont Center for Geographic Information, Vermont Department of Transportation, Chittenden County Regional Planning Commission; as presented in the 2017 *Chittenden County Multi-Jurisdictional All Hazards Mitigation Plan*.

Bridge Type/ Number	Location	Mile-point	Route Name	Year Built	SFHA	RCPA	Stream
Covered Bridge							RMPSFEH 031912
Rolled Beam	0.52 mi to Jct. W CL2 TH1	000000	C3014	1956	No	Yes	LaPlatte RMPSFEH 050610
Rolled Beam/ Floor Beam	0.2 mi to Jct. W CL3 TH14	000000	C2009	1939	No	Yes	LaPlatte RMPSFEH 050610
RC Box Culvert	6.5 mi N Jct. VT 22A	000651	US7	1929	No	Yes	Direct Drainage RMPSFEH 032509

As noted in the 2017 *MHAHMP*, the CCRPC has conducted an inventory of culverts in the county's municipalities, including Charlotte. The inventory collected data on the location, material, diameter, and length of each culvert. It also made qualitative judgments on the condition of the culvert. This data is updated by the town annually. The inventory data does not enable a vulnerability assessment to be conducted on this infrastructure in relation to natural water and sediment flow regimes.

Table 4.18: Culvert Inventory, Town of Charlotte, as of September 2017

Total Number of Driveway Culverts		429
	Number of Driveway Culverts in Poor or Worse Condition	20
	Number of Driveway Culverts in Unknown Condition	0
Total Number of Public Culverts		549
	Number of Public Culverts in Poor or Worse Condition	22
	Number of Public Culverts in Unknown Condition	5
Total Number of Culverts with Unknown Type		1
	Number of Culverts with Unknown Type in Poor or Worse Condition	0
	Number of Culverts with Unknown Type in Unknown Condition	0
Total Number of Charlotte Culverts		979

A large portion of the County's streams have had detailed Phase II Stream Geomorphic Assessments (SGAs) conducted. With regard to Charlotte, studies identify specific stream reaches where fluvial erosion is a concern, as well as where infrastructure, primarily culverts, as noted in Table 4.19, is at risk.

Table 4.19: Culverts with a Geomorphic Compatibility Rating of "Mostly Incompatible" or "Incompatible"¹⁷, Town of Charlotte

¹⁷ Chittenden County Regional Planning Commission, 2017. "Mostly incompatible" means the structure is mostly incompatible with current form and process, with a moderate to high risk of structure failure "Incompatible"

Bankfull Width	Compatibility Score	Location	GIS Road Name	Stream Name
22.14	7	.3 Mi E Greenbush Rd	East Thompsons Point Rd	Thorp Brook
40.00	9	[Not provided]	Roscoe Rd	Unnamed

Road Infrastructure

The statistical overview of roads in the Town of Charlotte, shows the range of road types within the town, from highways to unpaved roads. The different road types have different hazard vulnerabilities. Unpaved roads are more vulnerable to being washed out in a flood or heavy storm, while traffic incidents are more likely to occur on large, arterial roads. Municipal highways, bridges and dams are well mapped in Chittenden County. The state divides municipal (town) highways into three classes (described in [Section 3, Base Plan](#)) for purpose of highway maintenance and state aid.

Table 4.20: High Crash Locations, Town of Charlotte

Road	Road Type	Section (miles)	Severity Index (\$/Crash)
US-7, FAS 0208 Town Road 0003	Principal Arterial (r) Major Collector (r)	3.360-3.520	\$31,982
US-7, FAS 0208 Town Road 0003	Principal Arterial (r) Major Collector (r)	3.360-3.520	\$22,559

Table 4.21: Highway Mileage by Class, Town of Charlotte

Class 1	Class 2	Class 3	Class 4	State Hwy	Fed Hwy	Interstate	Total 1, 2, 3, State Hwy
-	31.790	42.45	0.20	-	6.550	-	80.790

Table 4.22: Highway Mileage by Surface Type, Town of Charlotte

Paved	Gravel	Soil or Graded	Unimproved	Impassable	Unknown	Total
47.141	28.992	4.657	0	0.2	0.46	81.45
Total Known	Total Unpaved	% Paved	% Unpaved			
80.99	33.647	41.79%	58.21%			

Table 4.23: Hazardous Materials or Fuel Storage Sites, Town of Charlotte

means the structure is fully incompatible with channel and high risk of failure. In both conditions, re-design and replacement should be performed to improve geomorphic compatibility.

Owner/Facility	Type of Substance
Point Bay Marina	Gasoline
Point Bay Marina	Diesel Fuel
RCC-Charlotte ATC	Lead Acid Batteries
RCC-Crabbe	Lead Acid Batteries
RCC-Crabbe-USID 102876	Lead
S.B. Collins, Inc.- (Spears Store)-Charlotte	Fuels, Gasoline
Velco Charlotter Substation	Battery Lead
Velco Charlotter Substation	Mineral Oil
Velco Charlotter Substation	Battery Acid
Velco Charlotter Substation	Sulfur Hexafluoride
VerizonWireless Charlotte, VT (ID:55223)	Sulfuric Acid

Figures 4.8 illustrates the historical development pattern of the town, including the proximity to the 100-year floodplain, River Corridors and River Streams. Analysis of this pattern indicates that most residential and non-residential development is clustered in valleys or low-lying areas; however, they are not typically located in SFHAs or River Corridors.

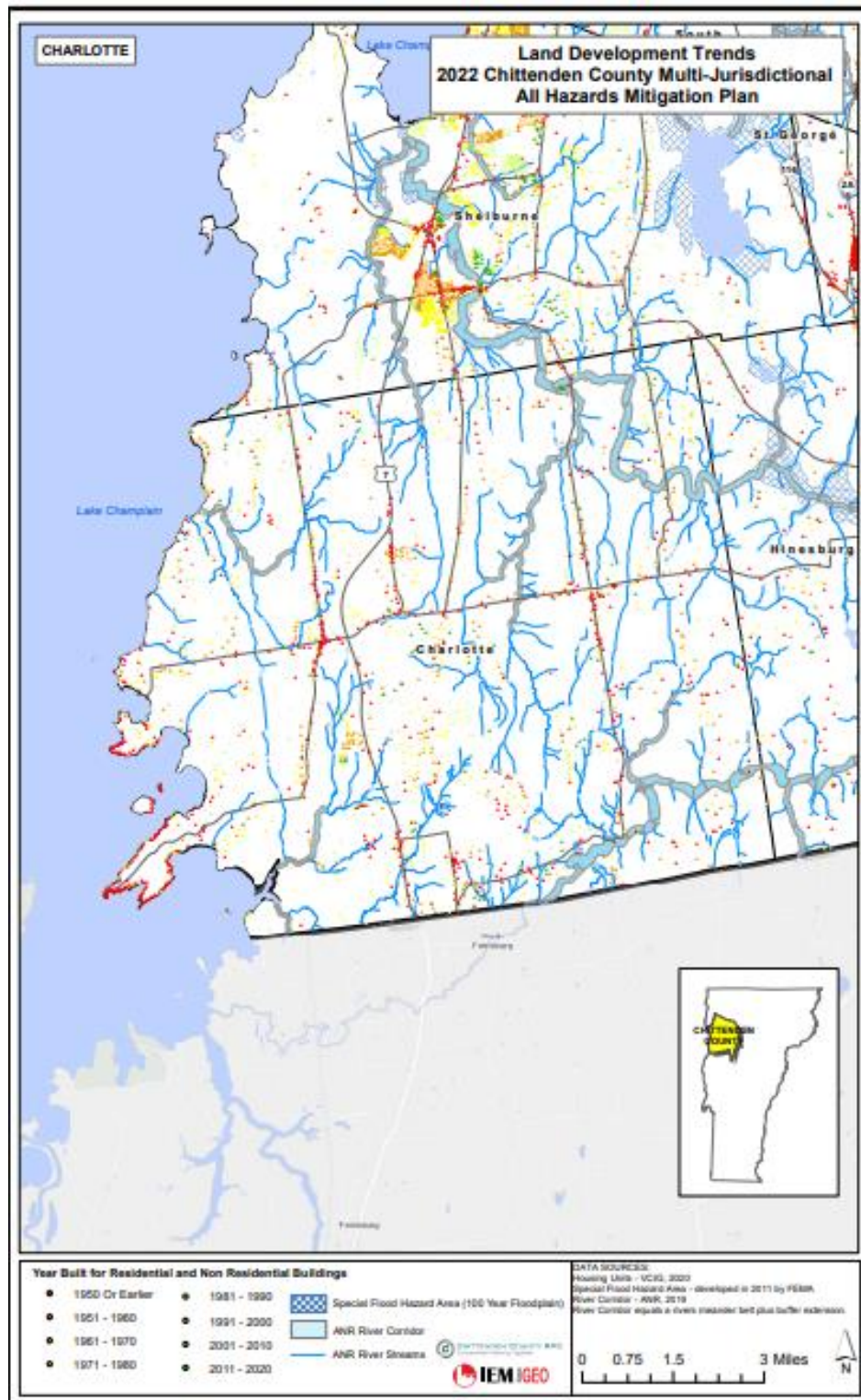


Figure 4.7: Land Development Trends, Town of Charlotte- 1950-2020¹⁸

¹⁸ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

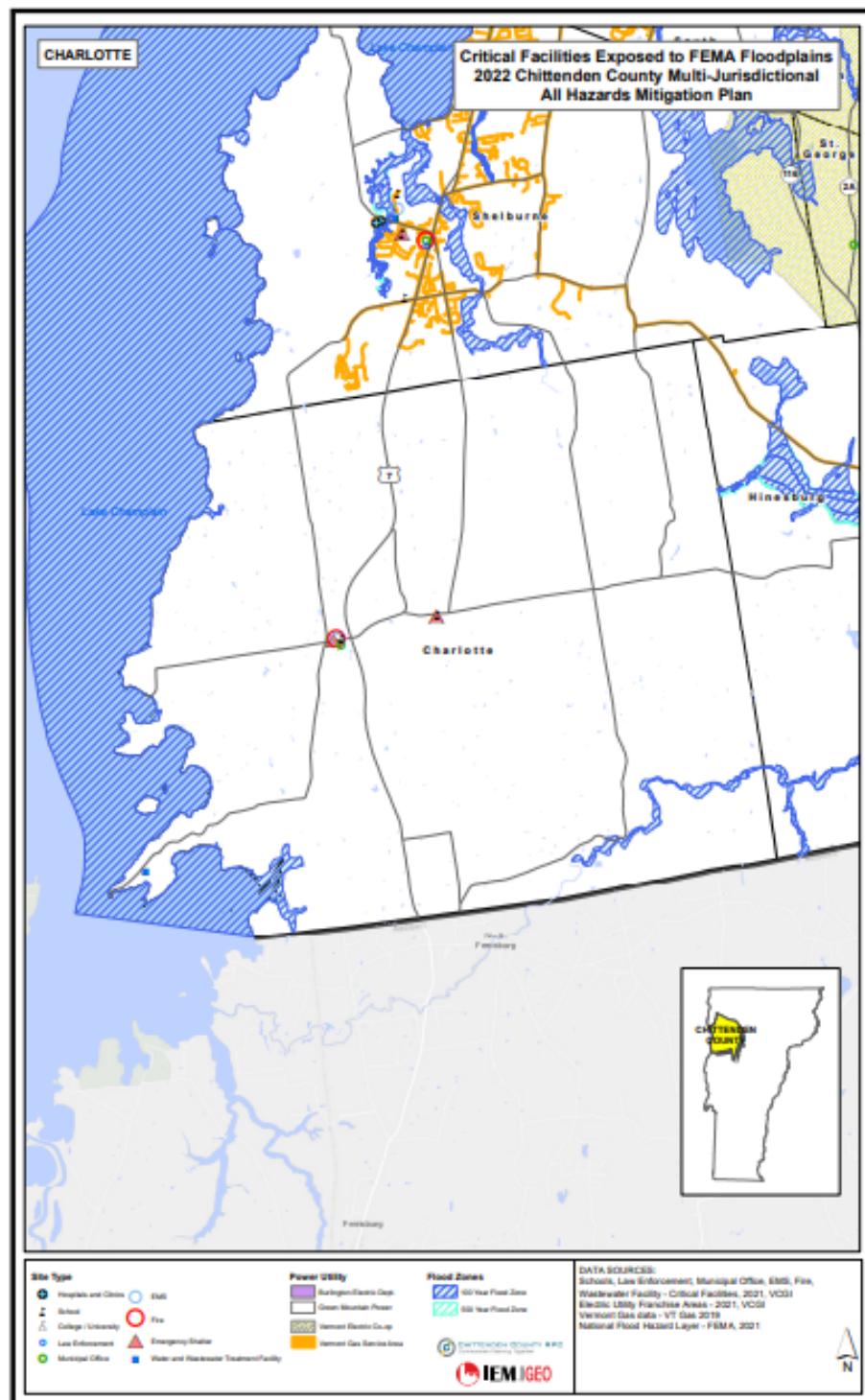


Figure 4.8: Critical Facilities, Town of Charlotte¹⁹

¹⁹ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

The Town *MJAHMP* Planning Committee noted the following buildings or sites as its top assets and their relation to flood hazard areas.

Table 4.24: Critical Facilities Exposed to FEMA Floodplains, Town of Charlotte

Total Facilities	In 100-year Floodplain	In 500-year Floodplain
0	0	0

Historical/Cultural Assets

Nearly all residences identified on the state Historic Register are well outside the flood hazard zones of the LaPlatte River and Lewis Creek. There are many lakeside historic seasonal cottages in the Cedar Beach and Thompson's Point Historic districts, but most are built well above the 98 ft. mean high water line of Lake Champlain. Exceptions are summarized in Table 4.25, below, and include the Jimerson and Morse residences within the Lewis Creek floodplains, and the Quinlan and Sequin bridges (Lewis Creek).

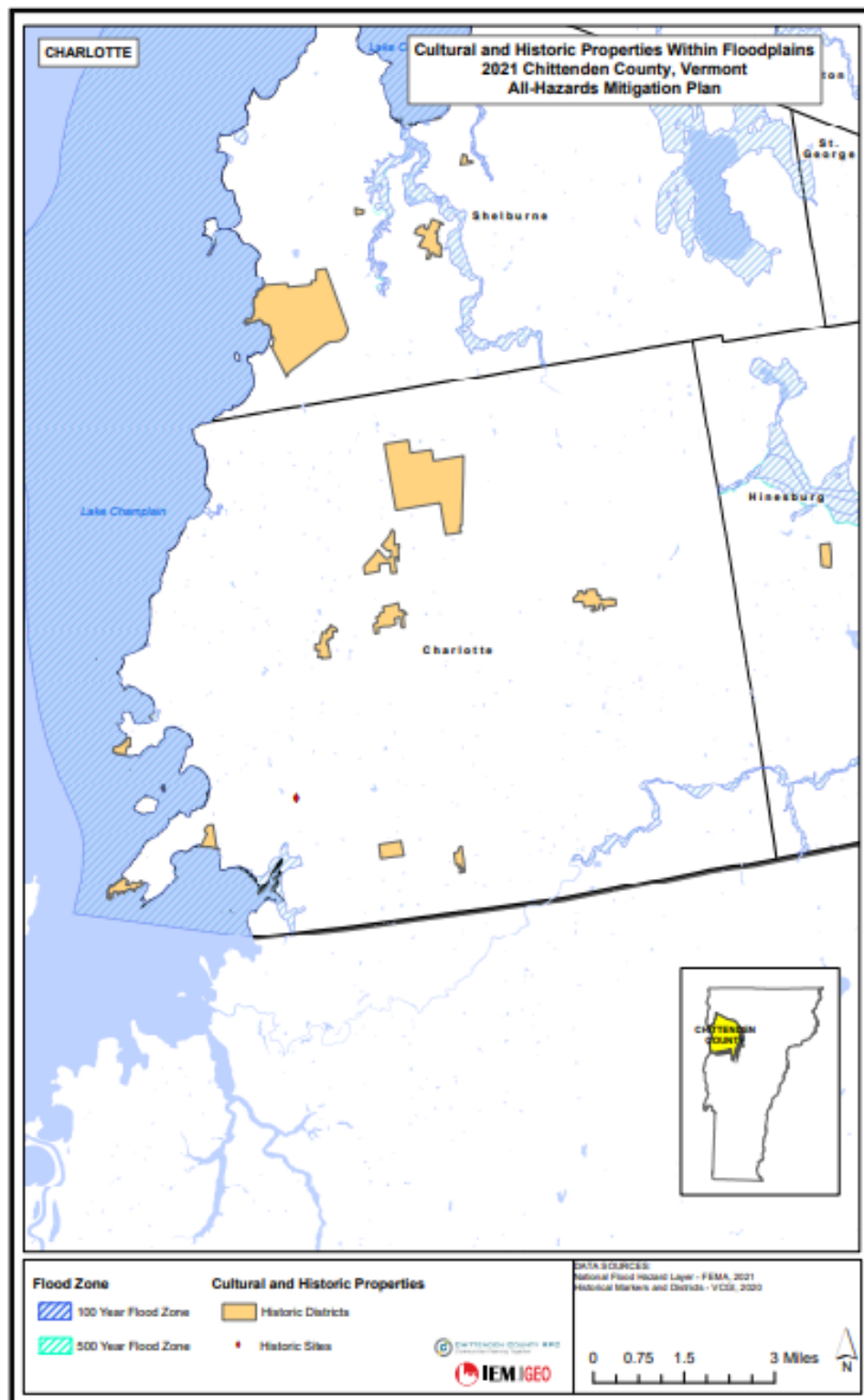


Figure 4.9: Cultural and Historic Properties Exposed to FEMA Floodplains, Town of Charlotte²⁰

²⁰ National Flood Hazard Layer, FEMA 2021; Vermont Center for Geographic Information, 2022.

4.7 CAPABILITY ASSESSMENT

Capabilities Assessment Summary Ranking and Gap Analysis

Planning and Regulatory

The Town of Charlotte has identified the following planning and regulatory capabilities.

Table 4.25: Summary of Planning Regulatory Capabilities, Town of Charlotte

Comprehensive Plans	X
Capital Improvements Plans (Highway Dept.)	-
Economic Development Plan	-
Local Emergency Operations Plan	X
Continuity of Operations Plan	-
Transportation Plan (Town Plan, MRGP, Bridge Capital)	-
Stormwater Management Plan	X
Community Wildfire Ordinances	-
Floodplain ordinance/plan	-
Zoning Ordinance	X
Subdivision Ordinance	-
Total	4

The Town of Charlotte has moderate planning and regulatory capabilities and has identified the following areas for improvement:

- Ideally, the Planning Commission would initiate a Capital Improvements Plan that identified vulnerabilities and needed improvements in town roads, bridges, culverts and facilities, then bring it to the Selectboard for approval. Once adopted, that plan could serve as a template for priorities for infrastructure funding, supplemented by state & federal funds as they become available. That Plan would also provide a legal basis for levying impact fees for new developments above a certain size, should the Selectboard authorize that via an ordinance.
- Standards for Roads & Driveways (1997) need to be updated to reflect current fire protection and emergency access needs for new development projects, so these can be required in connection with permitting for such projects.

Administrative and Technical Capabilities

The Town of Charlotte has identified the following administrative and technical capabilities:

- Professional staff trained in construction practices that reduce hazard impacts related to buildings and infrastructure.
- Planners/engineers with an understanding of natural and/or manmade hazards.
- Full-time personnel for emergency management and grant writing/management.
- Continue to work with the CCRPC to expand municipal capabilities.

Table 4.26: Summary of Administrative and Technical Capabilities, Town of Charlotte

Planner(s) or engineer(s) with knowledge of land development and land management	X
Engineer/professionals trained in construction practices related to buildings and/or infrastructure	X
Planners/ Engineer(s) with an understanding of natural and/or manmade hazards	-
Floodplain manager Mutual Aid Compacts	-
Surveyor(s) Building Inspection	-
Staff with education or expertise to assess the community's vulnerability to hazards	-
Emergency Manager	X
Personnel skilled in GIS and/or HAZUS	-
Scientist familiar with hazards of the community	-
Civil Engineer Emergency Manager	-
Grant Writer(s)	X
Warning systems or services (automated callout, sirens, etc.)	-
Total	4

The Town of Charlotte has low administrative and technical capabilities and has identified the following issue that provides an opportunity for improvement:

- Having volunteers serve as emergency managers leaves the town vulnerable to turn-over and potential need to onboard new folks into the role at a higher frequency than if paid staff were carrying this work.

Fiscal Capability

The Town of Charlotte has identified the following fiscal capabilities.

Table 4.27: Summary of Fiscal Capabilities, Town of Charlotte

Capital improvements project funding	-
Authority to levy taxes for specific purposes	-
Fees for water, sewer, gas, or electric services	-
Impact fees for new development	-
Stormwater utility fee	-

Incur debt through general obligation bonds and/or special tax bonds	X
Incur debt through private activities	-
Community Development Block Grant (CDBG)	X
Other Federal funding programs, Historical Preservation	X
State funding programs	X
Public/Private partnership funding sources	X
Total	5

The Town of Charlotte has moderate fiscal capabilities and has identified the following area for improvement:

- Establish a capital budget as a vehicle for sustainable funding for scoping and financing capital improvements.

Program/Organization Capabilities

The Town of Charlotte has identified the following program and organizational capabilities.

Table 4.28: Summary of Program/Organization Capabilities, Town of Charlotte

Civic groups serving special community needs *	X
Ongoing public education or information program	X
Natural disaster or safety related school programs	X
StormReady certification	-
Firewise Communities certification	-
Public-private partnership initiatives addressing disaster-related issues	X
Other	-
Total	4

The Town of Charlotte has moderate program and organizational capabilities but has not identified additional areas for improvement at this time.

NATIONAL FLOOD INSURANCE PROGRAM CONTINUED COMPLIANCE

An additional component of the Capabilities Assessment was a survey of the jurisdiction's National Flood Insurance Program (NFIP) status.

Charlotte has participated in NFIP regular program since 1988 and has a designated Floodplain Manager. The last Community Assistance Contract (CAC) was conducted on April 6, 2016, with no outstanding deficiencies. There are eleven NFIP policies with total insurance coverage of \$3,750,000; and there are no repetitive loss properties reported. The Town does not participate in the voluntary Community Rating System (CRS).

Although program participation is not a hazard mitigation action to be included in the mitigation strategy per se, the Town will continue to participate in NFIP and enforce the Town's Floodplain Management regulations. This includes:

- Identifying the purpose of the floodplain regulation(s), as well as current and proposed ways to reduce flood losses.
- Serving as a mechanism for identifying flood hazard areas and related flood mapping issues.
- Oversees permit requirements for current and projected development projects.
- Inspect all development for continued compliance with town code.
- Applies development standards for flood-prone areas that minimize personal injury and property damage; and maintains documentation and risk analyses required for projects developed in these areas.
- Assist residents in obtaining information on flood hazards, flood maps, flood insurance and proper mitigation measures.

In an effort to meet NFIP requirements, the Town of Charlotte will make updates and revisions to Floodplain Management regulations as it deems necessary. These updates and revisions may be prompted by changes in local demographics; shifts in land use; trends such as the frequency and intensity of flood events; and other factors that may warrant municipal action. The Town will also continue to incorporate into future planning documents, including HMP updates, changes to the locations and designations of mapped floodplains.

Table 4.29: National Flood Insurance Program Status, Town of Charlotte

Current Effective Map Date	Number of Policies	Total Premiums (in dollars)	Total Coverage (in dollars)	Total Number of Claims Since 1978	Value of Claims Paid Since 1978 (in dollars)	Number of Repetitive Loss Properties
07/18/2011	11	\$15,524	\$3,750,000	5	\$135,095	0

Support for Municipal Capabilities

It should be noted that the Chittenden County Regional Planning Commission (RPC) provides multiple support services to the municipalities that assist in filling planning and regulatory, administrative and technical, and education and outreach capabilities. In addition, the RPC assists municipalities with identifying and managing funding opportunities through grants and other sources.

As an optional activity during the capability assessment, the Town of Charlotte conducted a Safe Growth assessment, which is provided in the Capability Assessment Worksheet, Attachment 2 of this Annex.

Table 4.30: Capability Assessment Summary Ranking for Town of Charlotte

Planning & Regulatory	Administrative and Technical	Fiscal	Program and Organizational
Moderate	Moderate	Moderate	Moderate

New Hazard Risk Challenges or Obstacles to be Monitored in the Next Planning Cycle

- The risk of cyber related incidents on Community Lifeline sites
- Climate change
- Increases in the number of excessive rainfall events that impact new areas with flood

4.8 MITIGATION ACTIONS

Changes in Priorities

Charlotte experienced moderate population growth that can affect the availability of affordable housing and increase flood threat. However, the town's priorities have not changed since the last plan update and continue to make progress on mitigation actions.

Goals and Objectives

The Town of Charlotte adopted the five regional goals defined in [Section 6, Mitigation Strategy](#) and did not identify additional jurisdiction-specific objectives.

Status of Previous Actions

The Town of Charlotte reviewed its Mitigation Actions described in the 2017 *MHAHMP* and noted the status as documented in Table 9.33.

Table 4.31: Status of Previous Mitigation Actions, Town of Charlotte

Action Date	Action #	Title of project	Hazard(s)	2022 Status Update
2017	A-1	Culvert and Stormwater Infrastructure Upgrades Upgrade culvert size and replace corrugated metal with corrugated high-density polyethylene. Upgrade culverts, culvert wings and ditching along the following roads to mitigate against repeated damages from stormwater. Lime Kiln Rd. at Route 7 (first four cross-culverts), Greenbush Rd. (underpass culvert)	Decrease flooding hazards to town roads through upgrades to low-flow or failed culverts	COMPLETE - <ul style="list-style-type: none"> • 4598 Mt. Philo Road, driveway: old 12-inch x 40 ft. metal culvert upgraded to 15-inch x 40 ft. metal culvert • 6974 Spear Street, horseshoe driveway: replaced 40 ft. x 6-inch metal culvert with 40 ft. x 15-inch metal and replaced 40 ft. x 15-inch plastic culvert with 40 ft. x 15-inch metal culvert • 3359 Greenbush Road, driveway: upgraded 15-inch x 30 ft. plastic culvert

Action Date	Action #	Title of project	Hazard(s)	2022 Status Update
				<p>to 18-inch x 30 ft. metal culvert</p> <ul style="list-style-type: none"> • Greenbush Road, near mailbox 1252, box culvert: replaced 48-inch x 30 ft. metal culvert with 48-inch x 30 ft. plastic culvert • Flat Rock Road, across road from mailbox 516: replaced 12-inch x 20 ft. metal culvert with 12-inch x 20 ft. metal • Ferry Road, before ferry parking lot, cross culvert: upgraded 15-inch x 30 ft. plastic with 18-inch x 30 ft. metal culvert
2017	A- 2	<p>Improve road drainage</p> <p>Implement strategies for areas prone to erosion due to flood events, including steep gravel roads in the eastern portion of town, such as Lewis Creek, Roscoe, Converse Bay, Prindle Rd. and Dorset St.</p> <p>-Undertake erosion mitigation projects where municipal roads may incur damage from streams, such as Cedar Beach Rd., Garen Rd., Spear St., Lime Kiln Rd., Roscoe Rd., Lewis Creek Rd., Hills Point Rd., Prindle Rd.</p> <p>-Maintain vegetated cover of floodplains and lands adjacent to stream corridors. Use geomorphic results to guide river corridor management strategies.</p> <p>-Consider opportunities to move or alter roadways to accommodate buffers that would prevent stream sedimentation, channel instability and threats to town infrastructure</p>	Decrease erosion hazards along town roads; reduce risk to roads from flood events	<p>COMPLETE -</p> <ul style="list-style-type: none"> • With assistance from Dubois & King, the Town completed an engineering design to address road edge subsidence on Monkton Road. The Town applied for and received a \$175,000 grant from the State of Vermont to construct the recommended repairs in upcoming years. • Using FEMA Public Assistance funds, the Town repaired a culvert on East Thompson's Point damaged in the Halloween Storm of 2018 (FEMA DR#4474).

Action Date	Action #	Title of project	Hazard(s)	2022 Status Update
		-Construct roadside ditches at select locations with stone lining -Continue rebuilding town-owned gravel roads, including dead-end roads, to improve drainage and stormwater issues		
2017	A-3	Develop strategies to mitigate losses from identified fluvial erosion hazards		• <i>Ongoing</i>
2017	B-1	Develop Roads Stormwater Management Plan Improve existing road and stormwater management infrastructure	Decrease erosion hazards along town roads	COMPLETE - Town reports progress as follows in 2020: <ul style="list-style-type: none"> • The Town previously applied for and received an MRGP permit from the State in 2018. • The Road Erosion Inventory has been completed with the assistance of the CCRPC. • With assistance from CCRPC the Town submitted their RSWMP data report to the DEC MRGP portal in advance of the December 31, 2020, deadline. • With CCRPC assistance, a consultant completed a design for culvert and swale work on Morningside Drive near the Morningside Cemetery.
2017	B-2	Begin Roads Stormwater Management Plan implementation Implement Roads Stormwater Management Plan	Decrease erosion hazards along town roads	COMPLETE - Lane's Lane: Road segment #122995.0 was brought up to MRGP standard. The Town added stone-lined ditching on one side of the road and replaced ~140 ft. of 24-inch culvert with a new ~140 ft. of 36-inch culvert and added stone

Action Date	Action #	Title of project	Hazard(s)	2022 Status Update
				reinforcement to the culvert outlet to address significant erosion problem into Lake Champlain.
Acronym Key:	Dam Failure: DF			
	Extreme Temperatures: ET			
	Flood: F			
	Fluvial Erosion: FE			
	Human Infectious Disease: HID			
	Invasive Species: IS			
	Severe Rainstorm: SR			
	Severe Winter Storm: SWS			
	Wildfire: WF			

Figure 4.10 depicts the locations of previous FEMA Public Assistance Projects in the Town of Charlotte, demonstrating recovery and mitigation activities including protective measures; and recreational or other site impacts.

Additionally, as part of previous planning period (2017-2022) activities with the assistance of the CCRPC each of the participating municipalities integrated were appropriate the mitigation actions outlined in the previous plan into their current Town's plan. A similar process will be implemented as part of plan integration activities during the 2022-2027 planning period.

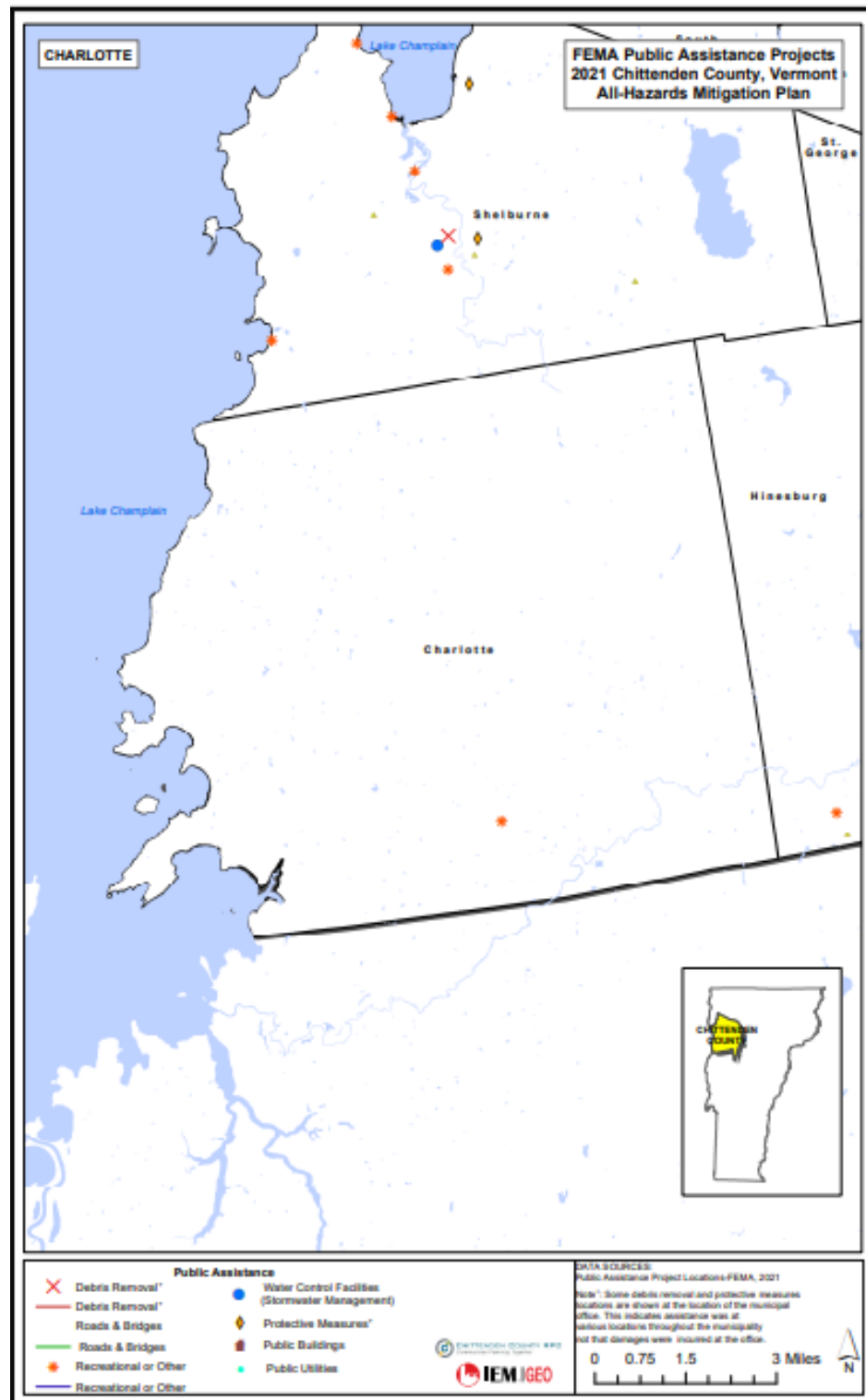


Figure 4.10: Previous FEMA Public Assistance Projects, Town of Charlotte²¹

²¹ Chittenden County Regional Planning Commission, GIS Database, October 14, 2021.

New Mitigation Actions

The Town of Charlotte identified four mitigation actions for the 2022 update and prioritized based on the Mitigation Action Ranking System described in **Section 6, Base Plan**.

Table 4.32: 2022 Prioritized Mitigation Actions, Town of Charlotte

Action #	Proposed Action	Agency/ Departments	Risk Reduction Benefit	Hazard(s) Addressed	Est. Cost	Funding Source	2021 Status	Ranking
2022-1	Retrofit new and existing critical fatalities to withstand the impacts of identified hazards.	Town Highway Forman	Addresses damage to new/existing public infrastructure and buildings. Mitigates temporary road and bridge closure and budgetary impacts	Wildfire, Severe Rainstorm, Severe Winter Storm, Flooding, Fluvial Erosion	High: \$100,000 or greater	State VANR Grants, HMA, Municipal funds	2022-2027 NEW	Medium
Action #	Proposed Action	Agency/ Departments	Risk Reduction Benefit	Hazard(s) Addressed	Est. Cost	Funding Source	2021 Status	Ranking
2022-2	Retrofit hazard-prone structures with an emphasis on repetitive loss structures.	Town Highway Forman	Addresses damage to existing flood prone buildings.	Severe Rainstorm, Severe Winter Storm, Flooding, Fluvial Erosion	High: \$100,000 or greater	State VANR Grants, HMA, Municipal funds	2022-2027 NEW	Medium
Action #	Proposed Action	Agency/ Departments	Risk Reduction Benefit	Hazard(s) Addressed	Est. Cost	Funding Source	2021 Status	Ranking
2022-3	Develop a Capital Improvements Plan that identified vulnerabilities and needed improvements in town roads, bridges, culverts and facilities, then bring it to the Selectboard for approval.	Town Highway Forman	Addresses damage to new/existing public infrastructure and buildings; Mitigates temporary road and bridge closure and budgetary impacts	Severe Rainstorm, Severe Winter Storm, Flooding, Fluvial Erosion	Medium: \$10,000 to \$100,00	State VANR Grants, HMA, Municipal funds	2022-2027 NEW	Medium
Action #	Proposed Action	Agency/ Departments	Risk Reduction Benefit	Hazard(s) Addressed	Est. Cost	Funding Source	2021 Status	Ranking
2022-4	Update Standards for Roads & Driveways (1997) to reflect current fire protection and emergency access needs for new development projects.	Town Highway Forman	Addresses damage to new/existing public infrastructure and buildings; Mitigates temporary road and bridge closure and budgetary impacts	Wildfire, Severe Rainstorm, Severe Winter Storm, Flooding, Fluvial Erosion	Low: Less than \$10,000	State VANR Grants, HMA, Municipal funds	2022-2027 Cont'd	Medium

Action Plan for Implementation and Integration

The Town of Charlotte identified several existing plans or planning processes that can serve to integrate hazard mitigation during the 2022-2027 planning cycle. For example, the town will

incorporate the mitigation actions outlined in this plan into the town plan during the next plan update process in 2026. The town plan update will be led by the Planning Commission, who will review this plan and determine those mitigation actions/strategies/goals that should be included in the town plan.

Table 4.33: Action Plan for Implementation and Integration, Town of Charlotte

Existing Plan or Procedure	Description of How Mitigation will be Incorporated or Integrated
Integrate goals into local Comprehensive Plan	Continue to coordinate with Planning and Zoning and other applicable departments to incorporate current and emerging risks and actions into planning efforts.
Review/update land development regulations for consistency with mitigation goals	Continue coordination with Planning and Zoning regarding future land use projects.
Review/update building/zoning codes for consistency with mitigation goal	Work with Planning and Zoning regarding county zoning ordinances and consistency with mitigation goals.
Maintain regulatory requirements of floodplain management program (NFIP)	Support Floodplain Manager who is responsible for floodplain management.
Enhance floodplain management through Community Rating System (CRS)	Work with Floodplain Manager and Public Works on reviews of floodplain management and mapping.
Review/Update economic development plan and policies for consistency with mitigation goals	Work with local Economic Development Authority to ensure consistency in plans.
Continue public engagement in mitigation planning	Continue to promote awareness of hazards and incorporate public feedback into planning processes.
Identify opportunities for mitigation education and outreach	Identify opportunities to conduct community outreach to promote the importance of mitigation projects.
Review/update stormwater plans and procedures for consistency with mitigation goals	Work with Public Works and Road Department to discuss plans and procedures on a more frequent basis.
Maintain ongoing enforcement of existing policies	Support municipal Departments with any applicable enforcement policies.
Monitor funding opportunities	Office of Emergency Management will continue to monitor funding sources and coordinate with Departments on projects that support mitigation actions.
Incorporate goals and objectives into day-to-day government functions	Municipal Departments will incorporate the concept of mitigation into day-to-day government functions, including continual monitoring of the action items identified in the 2022 update.
Incorporate goals into day-to-day development policies, reviews & priorities	Continue work with Planning and Zoning to incorporate mitigation into day-to-day activities.

4.9 ANNEX MAINTENANCE PROCEDURES

The method and schedule for maintaining, evaluating, and updating the *MJAHMP* is described in **Section 7, Base Plan**. The Town of Charlotte will maintain its participation in the Hazard Mitigation

Plan Update Committee (AHMPUC) throughout the planning cycle, consistent with its role and responsibilities. The Town of Charlotte has designated the Town Planner as lead responsible for all Plan Maintenance related activities.

Table 4.34: Plan Maintenance Responsibilities for the *Chittenden County, Vermont Multi-Jurisdictional All-Hazards Mitigation Plan, Base Plan, Town of Charlotte*

Monitoring the Plan	<ul style="list-style-type: none"> • Participate in the monitoring process as requested by the CCRPC staff • Assist in collecting and analyzing data • Assist in disseminating reports to stakeholders and the public • Maintain records and documentation of all jurisdictional monitoring activities • Promote the mitigation planning process with the public and solicit public input.
Evaluating the Plan	<ul style="list-style-type: none"> • Participate in the evaluation process as requested by the CCRPC staff • Assist in collecting and analyzing data • Assist in disseminating reports to stakeholders and the public • Maintain records and documentation of all jurisdictional monitoring activities • Promote the mitigation planning process with the public and solicit public input
Updating the Plan	<ul style="list-style-type: none"> • Represent the jurisdiction and participate in the planning cycle, including plan review, revision, and update process • Collect and report data to the Update Coordinator • Maintain records and documentation of all jurisdictional plan review and revision activities • Promote the mitigation planning process with stakeholders and the public and solicit public input

Revisions to the Jurisdiction Annex

The municipalities of Chittenden County will coordinate with the CCRPC for changes or updates to its jurisdictional annexes. Local participating jurisdictions have the authority to approve/adopt changes to their own Action Plans for Implementation without approval from the CCRPC or the Committee; however, the Committee and CCRPC should be advised of all changes as a courtesy and in consideration of potential changes or modifications to the regional *MJAHMP* that may conflict with the proposed annex changes. The CCRPC will be responsible for verifying that the proposed change will not affect the jurisdiction's compliance with current State and Federal mitigation planning requirements.

Municipalities may make administrative changes or updates to their mitigation actions and Action Plans for Implementation in their jurisdiction annexes at any time in coordination with the CCRPC staff.

A municipality may choose not to re-adopt the updated *MJAHMP* and its respective jurisdiction annex; however, it should be stated that the jurisdiction will no longer be eligible for FEMA hazard mitigation grants. A municipality may choose to develop, adopt, and submit its own Local All-Hazards Mitigation Plan to FEMA Region I, consistent with the requirements of the Disaster Mitigation Act of 2000 and regulations contained in 44 CFR Part 201.6 in order to maintain eligibility.

The relative strength and depth of this method and schedule for monitoring and evaluating the plan is contingent upon funding from Emergency Management Planning grants, Hazard Mitigation Assistance grants, or similar sources. Adherence to the monitoring, evaluation, and update process schedule will ensure that the Plan is kept current throughout its five-year cycle.

Table 4.35: Jurisdiction Annex Maintenance Procedure, Town of Charlotte

Activity	Procedure and schedule	Outcome
Monitoring the Annex	<ol style="list-style-type: none"> 1. Schedule the annual plan review with jurisdiction planning team. 2. Review the status of all mitigation actions, using the <i>Mitigation Action Implementation Worksheet</i> (Section 7, Attachment B, Base Plan). 	Produce an annual report that includes the following: <ul style="list-style-type: none"> • Status update of all mitigation actions • Summary of any changes in hazard risk or vulnerabilities and capabilities • Summary of activities conducted for the Action Plan for Implementation and Integration
Evaluating the Annex	<ol style="list-style-type: none"> 3. Schedule the annual plan evaluation with jurisdiction planning team. 4. Evaluate the current hazard risks and vulnerabilities, and hazard mitigation capabilities using the <i>Planning Considerations Worksheet</i>, (Section 7, Attachment C, Base Plan). 	Submit the annual report to the <i>MJAHMP</i> AHMPUC Point of Contact
Updating the Annex	<ol style="list-style-type: none"> 1. Coordinate with the AHMPUC to identify the method and schedule for the five-year update of the <i>MJAHMP</i>. 2. Participate in the planning process. 3. Provide input related to the plan components. 4. Following FEMA designation of Approvable Pending Adoption (APA), adopt the updated plan. 	Adoption of the FEMA-approved plan every five years will maintain the jurisdiction's eligibility for federal post-disaster funding.

4.10 ANNEX ADOPTION

The Town of Charlotte Jurisdiction Annex will be adopted by the municipality's governing body concurrently with the *2022 Chittenden County Multi-Jurisdictional All Hazards Mitigation Plan*.

Following adoption, a copy of the Adoption Resolution will be maintained in this annex as [Attachment A](#), and a copy will be forwarded to Vermont Emergency Management (VEM) to submit to FEMA for final approval of the plan. The plan will expire five years from the date of FEMA's final approval letter.

4.11 ATTACHMENTS

ATTACHMENT 1: Adoption Resolution

ATTACHMENT 2: Planning Worksheets and Documentation

ATTACHMENT 3: Documentation of Public Participation

ATTACHMENT 4: Mitigation Actions

ATTACHMENT 1: Adoption Resolution

CERTIFICATE OF ADOPTION October 24,
2022

TOWN OF CHARLOTTE, Vermont Selectboard

A RESOLUTION ADOPTING THE 2022 Chittenden County, Vermont Multi-Jurisdictional Hazard
Mitigation Plan

WHEREAS, the Town of Charlotte has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the 2022 Chittenden County, Vermont Multi-Jurisdictional 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 Charlotte has developed and received conditional approval from Vermont Emergency Management (VEM) for its 2022 Chittenden County, Vermont Multi-Jurisdictional 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 Charlotte; and


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

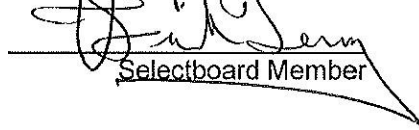
WHEREAS, adoption of this Plan will make the Town of Charlotte eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by Town of Charlotte Selectboard:

1. The 2022 Chittenden County, Vermont Local Hazard Mitigation Plan is hereby adopted as an official plan of the Town of Charlotte;
2. The respective officials identified in the mitigation action plan of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution; and
4. An annual report on the process of the implementation elements of the Plan will be presented to the Selectboard by the Emergency Management Director or Coordinator.

IN WITNESS WHEREOF, the undersigned have affixed their signature and the corporate seal of the Town of Charlotte



Selectboard Chair


Selectboard Member

ATTEST



Town Clerk

this 24th day of October, 2022.

ATTACHMENT 2: Planning Worksheets and Documentation

Natural Hazards Risk Estimation Matrix										
Charlotte		Dam/Levee Failure	Extreme Temperatures	Flooding	Fluvial Erosion	Human Infectious Disease	Invasive Species	Severe Rainstorm	Severe Winter Storm	Wildfire
Area Impacted										
Key:	0= No developed area impacted						0			0
	1= Less than 25% of developed area impacted		1	1					1	
	2= Less than 50% of developed area impacted				2					
	3= Less than 75% of developed area impacted							3		
	4= Over 75% of developed area impacted									
Consequences										
Health & Safety Consequences										
Key:	0= No health and safety impact			0	0					0
	1= Few injuries or illnesses		1				1	1	1	
	2= Few fatalities or illnesses									
	3= Numerous fatalities									
Property Damage										
Key:	0= No property damage						0			
	1= Few properties destroyed or damaged		1	1	1			1	1	1
	2= Few destroyed but many damaged									
	3= Few damaged and many destroyed									
	4= Many properties destroyed and damaged									
Environmental Damage										
Key:	0= Little or no environmental damage						0			
	1= Resources damaged with short-term recovery		1		1			1	1	1

	2= Resources damaged with long-term recovery			2						
	3= Resources destroyed beyond recovery									
Economic Disruption										
Key:	0= No economic impact									
	1= Low direct and/or indirect costs		1	1	1			1	1	
	2= High direct and low indirect costs						2		2	
	3= Low direct and high indirect costs									
	4= High direct and high indirect costs									
Sum of Area & Consequences Scores			4	5	5		3	7	6	3
Probability of Occurrence										
Key:	1= Unknown but rare occurrence									
	2= Unknown but anticipate an occurrence						2			
	3= 100 years or less occurrence									
	4= 25 years or less occurrence		4	4	4				4	4
	5= Once a year or more occurrence							5		
Total Risk Rating										
	Total Risk Rating=		16	20	20		6	35	24	12
	Sum of Area & Consequences Scores									
	x Probability of Occurrence									
Low =	Hazard Risk Level 0-18									
Medium =	Hazard Risk Level 19-37									
High =	Hazard Risk Level 38-60									

Technical Hazards												
Charlotte		Hazardous Materials Incident	Major Transportation Incident	Multi-Structure Fire	Natural Gas Service Loss	Other Fuel Service Loss	Pollution (algal bloom, etc.)	Power Loss	Sewer Service Loss	Telecommunications Failure	Water Pollution (algal bloom, etc.)	Water Supply Loss
		Area Impacted										

Key:	0= No developed area impacted				0							0
	1= Less than 25% of developed area impacted		1	1		1			1			
	2= Less than 50% of developed area impacted	2									2	
	3= Less than 75% of developed area impacted							3		3		
	4= Over 75% of developed area impacted											
Consequences												
Health & Safety Consequences												
Key:	0= No health and safety impact				0							
	1= Few injuries or illnesses			1		1		1	1	1	1	1
	2= Few fatalities or illnesses	2	2									
	3= Numerous fatalities											
Property Damage												
Key:	0= No property damage				0					0		0
	1= Few properties destroyed or damaged	2	1	1		1		1	1			
	2= Few destroyed but many damaged										2	
	3= Few damaged and many destroyed											
	4= Many properties destroyed and damaged											
Environmental Damage												
Key:	0= Little or no environmental damage		0		0	0		0		0		0
	1= Resources damaged with short-term recovery			1					1			
	2= Resources damaged with long-term recovery	2									2	
	3= Resources destroyed beyond recovery											
Economic Disruption												
Key:	0= No economic impact				0							
	1= Low direct and/or indirect costs			1		1			1			
	2= High direct and low indirect costs	2						2		2	2	2
	3= Low direct and high indirect costs		3									
	4= High direct and high indirect costs											
Sum of Area & Consequences Scores												
		10	8	5	0	3		7	5	6	9	3
Probability of Occurrence												
Key:	1= Unknown but rare occurrence				1	1						
	2= Unknown but anticipate an occurrence								2			2
	3= 100 years or less occurrence		3	3								
	4= 25 years or less occurrence	4								4		
	5= Once a year or more occurrence							5			4	

Total Risk Rating													
	Total Risk Rating=	40	15	24	0	3		35	10	24	36	6	
	Sum of Area & Consequences Scores												
	x Probability of Occurrence												
Low =		Hazard Risk Level 0-18											
Medium =		Hazard Risk Level 19-37											
High =		Hazard Risk Level 38-60											

Societal Hazards							
Charlotte		Civil Disturbance	Crime	Economic Recession	Epidemic	Key Employer Loss	Terrorism
Area Impacted							
Key:	0= No developed area impacted						
	1= Less than 25% of developed area impacted	1	1			1	1
	2= Less than 50% of developed area impacted			2	2		
	3= Less than 75% of developed area impacted						
	4= Over 75% of developed area impacted						
Consequences							
Health & Safety Consequences							
Key:	0= No health and safety impact					0	
	1= Few injuries or illnesses	1	1	1			
	2= Few fatalities or illnesses				2		2
	3= Numerous fatalities						
Property Damage							
Key:	0= No property damage			0	0	0	
	1= Few properties destroyed or damaged	1	1				1
	2= Few destroyed but many damaged						
	3= Few damaged and many destroyed						
	4= Many properties destroyed and damaged						
Environmental Damage							

Key:	0= Little or no environmental damage	0	0		0	0	0
	1= Resources damaged with short-term recovery			1			
	2= Resources damaged with long-term recovery						
	3= Resources destroyed beyond recovery						
Economic Disruption							
Key:	0= No economic impact						
	1= Low direct and/or indirect costs	1	1	1			
	2= High direct and low indirect costs				2	2	
	3= Low direct and high indirect costs						2
	4= High direct and high indirect costs						
Sum of Area & Consequences Scores		4	4	5	6	3	6
Probability of Occurrence							
Key:	1= Unknown but rare occurrence	1					1
	2= Unknown but anticipate an occurrence						
	3= 100 years or less occurrence				3		
	4= 25 years or less occurrence			4		4	
	5= Once a year or more occurrence		5				
Total Risk Rating							
	Total Risk Rating=	4	20	20	18	12	6
	Sum of Area & Consequences Scores						
	x Probability of Occurrence						
Low =	Hazard Risk Level 0-18						
Medium =	Hazard Risk Level 19-37						
High =	Hazard Risk Level 38-60						

Jurisdiction Charlotte Date: 11.10.2021

Participants: Name: Larry Lewack Position/Title: Town Planner Department/Agency: Town of Charlotte

WORKSHEET: CAPABILITY ASSESSMENT

Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impact of hazards. Please indicate which of the following your jurisdiction has in place.

Plans	<ul style="list-style-type: none"> • Yes or No? • Year 	<ul style="list-style-type: none"> • Does the plan address hazards? • Does the plan identify projects to include in the mitigation strategy? • Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y - 2019	<ul style="list-style-type: none"> • Yes • Not much • No
Capital Improvements Plan	No	Charlotte does not have a Capital Improvements plan in place.
Economic Development Plan	No	Charlotte does not have a municipal Economic Development plan in place.
Impact fees for new development	No	Charlotte does not levy impact fees for new development.
Local Emergency Operations Plan	Yes 2021	<ul style="list-style-type: none"> • Yes • ? • Yes
Continuity of Operations Plan	No	
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other special plans (e.g., brownfields redevelopment, disaster recovery, Local Waterfront Redevelopment Plan, climate change adaptation, etc.)	No	
Building Code, Permitting, and Inspection	Yes or No?	Are codes adequately enforced?
Building Code	No	
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO rating	?	(in process)
Site Plan review requirements	Yes	(varies; monitoring of issued zoning permits following approval)
Land Use Planning and Ordinances	Yes or No?	<ul style="list-style-type: none"> • Is the ordinance an effective measure for reducing hazard impacts? • Is the ordinance adequately administered and enforced?

Zoning ordinance	Yes	<ul style="list-style-type: none"> Perhaps Yes
Subdivision ordinance	Yes	<ul style="list-style-type: none"> Perhaps Yes
Floodplain ordinance	? (part of land use regs)	<ul style="list-style-type: none"> Perhaps Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		(Stormwater plans and steep slope restrictions are addressed in Land Use regulations) These are adequately enforced. Fire danger is not addressed in the regulations or elsewhere.
Flood insurance rate maps	Yes	Chittenden County DFIRM maps were updated a few years ago, covering Charlotte. Our online map viewer flags flood zones & town staff enforces flood hazard zoning restrictions via permitting.
Acquisition of land for open space and public recreation uses	Yes	<ul style="list-style-type: none"> (uncertain if this has an impact on hazards) Yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
<p>Ideally, Planning Commission would initiate a Capital Improvements Plan that identified vulnerabilities and needed improvements in town roads, bridges, culverts and facilities, then bring it to the Select board for approval. Once adopted, that plan could serve as a template for priorities for infrastructure funding, supplemented by state & federal funds as they become available. That Plan would also provide a legal basis for levying impact fees for new developments above a certain size, should the Select board authorize that via an ordinance.</p> <p>Standards for Roads & Driveways (1997) needs to be updated to reflect current fire protection and emergency access needs for new development projects, so these can be required in connection with permitting for such projects.</p>		

Administrative and Technical

Identify whether your community has the following administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. If your jurisdiction does not have local staff resources, please indicate if these are available through agreement with other entities, or at the county level to provide the services or technical assistance.

Staff/Personnel Resources	Have Capability Y/N	Department/ Agency and Position	Effective Coordination ?	Adequate Staffing?	Integrated into Mitigation Planning?
A. Planner(s) or engineer(s) with knowledge of land development and land management practices	Y	Town Planner	Y	Y	Somewhat
B. Engineer/professionals trained in construction practices related to buildings and/or infrastructure	Y	Zoning Administrator	Y	Y	Not so much

C. Planners/Engineer(s) with an understanding of natural and/or manmade hazards	N	CCRPC	Y	Y	Yes
D. Floodplain manager	N	VT ANR	Y	Y	No
E. Surveyor(s)	N	--	--	--	--
F. Staff with education or expertise to assess the community's vulnerability to hazards	N	CCRPC	--	--	--
G. Personnel skilled in GIS and/or HAZUS	N	CCRPC	--	--	--
H. Scientist familiar with hazards of the community	N	--	--	--	--
I. Emergency manager	Y	Volunteer	Y	Y	Y
J. Grant writer(s)	Y	Town Planner	Y	Y	Y
k. Warning systems or services (automated callout, sirens, etc.)	N	--	--	--	--

How can these capabilities be expanded and improved to reduce risk?

Having volunteers serve as emergency managers leaves the town vulnerable to turn-over & potential need to onboard new folks into the role at a higher frequency than if paid staff were carrying this work.

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in the past and for what type of activities/	Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N		
Authority to levy taxes for specific purposes	N		
Fees for water, sewer, gas or electric services	Y	Town-operated community wastewater system serves a small # of properties in the West Village; charge user fees for access & use	N
Impact fees for new development	N		
Storm water utility fee	N		
Incur debt through general obligation bonds and/or special tax bonds	Y	Purchase ambulance, fire truck for fire & rescue services; library addition	Conserve land via fee-simple acquisition or purchase conservation easements
Incur debt through private activities	N		

Community Development Block Grant	Y	Affordable housing	Possibly
Other federal funding programs	Y	ARPA, IIJA	Possibly
State funding programs	Y	Disaster recovery, transportation, state planning grants	Possibly
Public/Private partnership funding sources	Y	Conservation fund, trail fund, Affordable Housing Trust Fund, Rutter (tree replacement) Fund	Possibly
How can these capabilities be expanded and improved to reduce risk?			
ARPA and IIJA funding present some opportunities for infrastructure investments to improve resiliency of town roads and culverts (for example), but these funds have not yet been allocated. (see above comments re: capital budget, as a vehicle for sustainable funding for scoping & financing capital improvements)			

Education and Outreach

Identify education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Conservation Commission advocates for protection of wetlands, habitats, conservation of open lands Energy Committee advocates for energy conservation & home upgrades for thermal efficiency; Energy Shelf
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education, household recycling, etc.)	Y	Charlotte Library, Charlotte Energy Committee, Charlotte Community Partners Emergency Management Coordinators outreach to community via Front Porch Forum, posters displayed around town, presentations in the community, and via a page on the town website.
Natural disaster or safety related school programs	?	Likely a component of Charlotte Central School curriculum
StormReady certification	N	

Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	Charlotte Community Partners and the Ready Together program; yes
Other		
How can these capabilities be expanded and improved to reduce risk?		
Some effort to engage the town's volunteer communities to step up their awareness of best practices in hazard mitigation & enroll them in specific activities to strengthen the town's outreach on these issues & the town's capacity to respond effectively to future emergencies.		

National Flood Insurance Program (NFIP) Survey Form

Jurisdiction: Charlotte Floodplain/NFIP Administrator Kyle Medash *

Phone: (802) 490-6154 Date: 11.3.2021

Email: Kyle.Medash@vermont.gov

Jurisdiction Participants: Larry Lewack, Town Planner *VT regional NFIP Coordinator

Please provide the information below to document your community's participation in and continued compliance with the NFIP, as well as to identify areas for improvement that could be potential mitigation actions. Indicate the source of information, if different from the one included.

NFIP Topic	Source of Information	Comments
Insurance Summary		
How many NFIP policies are in the community? What is the total premium and coverage?	State NFIP Coordinator or FEMA NFIP Specialist	See tables 4.30 & 4.31, above
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	FEMA NFIP or Insurance Specialist	See tables 4.30 & 4.31, above
How many structures are exposed to flood risk within the community?	Community Floodplain Administrator (FPA)	See tables 4.30 & 4.31, above, and list on p. 32
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and FEMA Insurance Specialist	n/a
Staff Resources		

Is the Community FPA or NFIP Coordinator certified?	Community FPA	No
Is floodplain management an auxiliary function?	Community FPA	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Community FPA	Permit review, GIS, compliance inspections
What are the barriers to running an effective NFIP program in the community, if any?	Community FPA	Lack of specific trained expertise at town level
Compliance History		
Is the community in good standing with NFIP?	State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
Are there any outstanding compliance issues (i.e., current violations)?	State NFIP Coordinator, FEMA NFIP Specialist,	(Unknown)
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	State NFIP Coordinator, FEMA NFIP Specialist,	(Unknown)

Safe Growth (Optional)

This worksheet identifies potential gaps in your community's growth guidance instruments and improvements that could be made to reduce vulnerability to future development.

Comprehensive Plan ****	Yes	No
Land Use		
1. Does the future land-use map clearly identify natural hazard areas?		x
2. Do the land-use policies discourage development or redevelopment within natural hazard areas?	x	
3. Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	x	
Transportation		
1. Does the transportation plan limit access to hazard areas?		x

2. Is transportation policy used to guide growth to safe locations?		x
3. Are movement systems designed to function under disaster conditions (e.g., evacuation)?	x	
Environmental Management		
1. Are environmental systems that protect development from hazards identified and mapped?	x	
2. Do environmental policies maintain and restore protective ecosystems?	x	
3. Do environmental policies provide incentives to development that is located outside protective ecosystems?		x
Public Safety		
1. Are the goals and policies of the comprehensive plan related to those of the FEMA-approved Local Hazard Mitigation Plan?	x	
2. Is safety explicitly included in the plan's growth and development policies?		x
3. Does the monitoring and implementation section of the plan cover safe growth objectives?		x
Zoning Ordinance	Yes	No
1. Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?	x	
2. Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	x	
3. Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?	x	

4. Does the ordinance prohibit development within, or fining of, wetlands, floodways, and floodplains?	x	
Subdivision Regulations	Yes	No
1. Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	x	
2. Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	x	
3. Do the regulations allow density transfer where hazard areas exist?	x	
Capital Improvement Program and Infrastructure Policies – (n/a - there is no capital improvement plan)	Yes	No
1. Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?		
2. Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?		
3. Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA-approved Local Hazard Mitigation Plan?		
Other – (#s 1-3 do not apply; awaiting answer to #4)	Yes	No
1. Do small area or corridor plans recognize the need to avoid or mitigate natural hazards?		x
2. Does the building code contain provision to strengthen or elevate construction to withstand hazard forces? <i>(Charlotte does not use or enforce building codes)</i>		x
3. Do economic development or redevelopment strategies include provisions for mitigation of natural hazards?		x

4. Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?	x	

ATTACHMENT 3: Documentation of Public Participation

Published

County Hazard Mitigation Plan Survey

Five Sisters – No. 6205 • Emma Vaughn • Communications Manager, Chittenden County Regional Planning Commission

Posted to: Centennial, Downtown, ONE Central, ONE East, ONE West, Appletree Point, Crescent Woods, Ethan Allen, Far North End, Lakewood, Village Green, Birchcliff, Five Sisters, Hill Section, King Maple, Lakeside, Oakledge, Redstone Quarry, South Union, The Addition, Charlotte, Hinesburg, Shelburne, Bay Creek, Clay Point, Colchester Village, Colchester West, Malletts Bay, Milton, Butlers Corner, Countryside, Essex Center, Essex West, Fairview Farms, Five Corners North, Five Corners South, Rural Essex, The Fort, Jericho, Underhill, Westford, Bolton, Huntington, Richmond, Chamberlin, East Terrace, Eastwoods, Kennedy, Mayfair Park, Queen City Park, SWSB, Southeast Quadrant, The Orchards, Brennan Woods, Williston, Winooski **show less**
Oct 4, 2021

Announcement

Hazard mitigation planning is a process that identifies hazards and their risks to your community and assesses the vulnerability of people, property, the environment, and the economy to one or more hazards. The end result is a comprehensive mitigation strategy that presents recommended sustained actions to reduce disaster-related damages and minimizes long-term community risk to the hazards.

In June 2021, Chittenden County municipalities initiated a collaborative planning effort to develop the 2022 update of the Chittenden County Multi-Jurisdictional Hazard Mitigation Plan. The benefits derived from the planning process, and the recommended mitigation actions that will ultimately be implemented, will significantly improve community resilience and sustainability.

Over the next several months staff of IEM, an international disaster and crisis management firm, will be working with emergency management, planning and public works staff of your local municipality to update your municipality's local Hazard Mitigation Plan.

Your knowledge on local hazards is critical to good planning: Participate in our online survey!

- Take the survey: <https://www.surveymonkey.com/r/KLB6RMX> to provide your opinion on local hazard events and their impact on you, your family, and the community. The survey will be open from October 1 through October 30.
- Contact your local city or town officials to learn how to provide comment on the draft municipal Local Hazard Mitigation Plan to ensure it reflects your experience and concerns.

Contact:

Dan Albrecht, CCRPC Senior Planner
dalbrecht@ccrpcvt.org | (802) 391-6809

or

Leroy Thompson, IEM Senior Planner
leroy.thompson@ieminc.com | 850-570-9867

Chittenden County Multi-Jurisdictional Hazard Mitigation Plan website:

<https://www.ccrpcvt.org/our-work/emergency-management/hazard-mitigation-plan/>

THE CHARLOTTE NEWS • OCTOBER 21, 2021 • 7

Town

Hazard mitigation planning for Chittenden County

Larry Lewack
CHARLOTTE TOWN PLANNER

This is your community's plan!

To have value, the plan must represent the current needs and values of the community and be useful for officials, stakeholders and citizens. Consider the critical importance of mitigation to:

- protect public safety and prevent loss of life and injury;
- lessen impact to existing and future development;
- prevent damage to a community's unique cultural, historical and environmental assets.

Disasters can happen anytime, anywhere and any place.

They cause loss of life, damage buildings and infrastructure, and have devastating consequences on a community's economic, social and environmental well-being.

Hazard mitigation planning is a process that identifies hazards and their risks to your community and assesses the vulnerability of people, property, the environment and the economy to one or more hazards. The end result is a comprehensive mitigation strategy that presents recommended sustained actions to reduce disaster-related damages and minimizes long-term community risk to the hazards.

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- Contact your local city or town officials to learn how to provide comment on the draft municipal Local Hazard Mitigation Plan to ensure it reflects your experience and concerns.

If you have questions, contact Dan Albrecht, CCRPC Senior Planner at dalbrecht@ccrpcvt.org or 802-861-0133 or Leroy Thompson, IEM Senior Planner at leroy.thompson@ieminc.com or 850-570-9867.

To view the current mitigation plan for your community please visit: ccrpcvt.org/our-work/emergency-management/hazard-mitigation-plan/

Attachment 4: Mitigation Actions

(S) Social	
Definition	Considerations
The public must support the overall mitigation implementation strategy and specific mitigation actions. The mitigation action is evaluated in terms of community acceptance and impact on the population.	<ul style="list-style-type: none"> • Community acceptance: will the action disrupt housing or cause the relocation of people? Is the action compatible with present and future community values? • Impact on population: will the proposed action adversely affect one segment of the population?
(T) Technical	
Definition	Considerations
It is important to determine if the proposed action is technically feasible, will help to reduce losses in the long term, and has minimal secondary impacts. This category evaluates whether the action is a whole or partial solution, or not a solution at all.	<ul style="list-style-type: none"> • Technical feasibility: how effective is the action in avoiding or reducing future losses? • Long-term solution: does the action solve the problem or only a symptom? • Secondary impacts: will the action create more problems than it solves?
A. Administrative	
Definition	Considerations
This category examines the anticipated staffing, funding, time, and maintenance requirements for the mitigation action to determine if the jurisdiction has the personnel and administrative capabilities to implement the action or whether outside help will be necessary.	<ul style="list-style-type: none"> • Staffing: does the jurisdiction have the capability (staff, technical experts, and training) to implement the action? • Funding allocated: does the jurisdiction have the funding to implement the action or can it readily be obtained? • Time: can the action be accomplished in a timely manner? • Maintenance/Operations: can the community provide the necessary maintenance? It is important to remember that most federal grants will not provide funding for maintenance.
(P) Political	
Definition	Considerations
This category considers the level of political support for the mitigation action.	<ul style="list-style-type: none"> • Political support: is there political support to implement and maintain this action? Have political leaders participated in the planning process so far? • Local champion or proponent: is there a respected community member willing to help see the action to completion? • Public and stakeholder support: is there enough public support to ensure the success of the action? Have all stakeholders been offered an opportunity to participate in the planning process?
(L) Legal	
Definition	Considerations
Whether the jurisdiction has the legal authority to implement the action or whether the jurisdiction must pass new laws or regulations is important in	<ul style="list-style-type: none"> • Commonwealth authority: does the Commonwealth have authority to implement the action?

determining how the mitigation action can be best carried out.	<ul style="list-style-type: none"> • Existing local authority: are proper laws, ordinances, and resolutions in place to implement the action? • Potential legal challenge: is there a technical, scientific, or legal basis for the mitigation action (i.e., does the mitigation actions “fit” the hazard setting)? Are there any potential legal consequences? Is the action likely to be challenged by stakeholders who may be negatively affected?
(E) Economic	
Definition	Considerations
Economic considerations must include evaluation of the present economic base and projected growth. Cost-effective mitigation actions that can be funded in current or upcoming budget cycles are more likely to be implemented than actions requiring general obligation bonds or other instruments that would incur long-term debt to a community.	<ul style="list-style-type: none"> • Benefits of action: what financial benefits will the action provide? • Cost of action: does the cost seem reasonable for the size of the problem and the likely benefits? What burden will be placed on the tax base or local economy to implement this action? • Contribution to economic goals: does the action contribute to community economic goals, such as capital improvements or economic development? • Outside funding required: are there currently sources of funding that can be used to implement the action? Should the action be considered “tabled” for implementation until outside sources of funding are available?
(E) Environmental	
Definition	Considerations
The impact on the environment is an important consideration because of public desire for sustainable and environmentally healthy communities. Also, statutory considerations, such as the National Environmental Policy Act (NEPA), need to be kept in mind when using federal funds.	<ul style="list-style-type: none"> • Impact on land/water bodies: how will this action impact land/water? • Impact on endangered species: how will this action impact endangered species? • Impact on hazardous materials and waste sites: how will this action impact hazardous materials and waste sites? • Consistency with community environmental goals: is this action consistent with community environmental goals? • Consistency with federal laws: is the action consistent with federal laws, such as NEPA?

Project Description			Project Benefits								
A	B	C	1	2	3	4	5	7	8	9	
Project #	Mitigation Action	Hazard/Project Type*	Social (S)	Technical (T)	Administrative (A)	Political (P)	Legal (L)	Economic (E)	Environmental (E)	TOTAL SCORE	Priority
1											
2											
3											