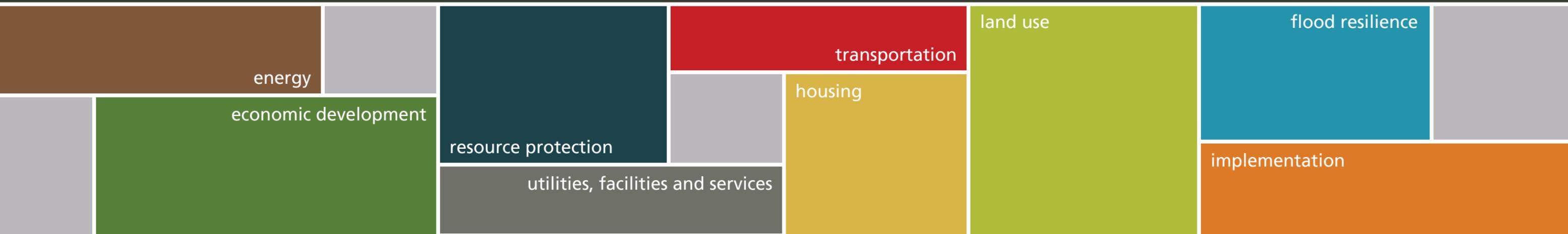




# NORTHFIELD TOWN PLAN 2020-2028



The Municipal Planning Grant Program, administered by the Vermont Department of Housing and Community Development, is credited with funding the Town Plan update.

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## VISION

We will strive to maintain Northfield's small-town character while promoting economic development and village revitalization. We will concentrate growth in our downtown and village areas while protecting the rural character of the town. We will keep the highest level of residential density in our downtown and village areas, while still recognizing and protecting property owners' ability to continue to develop and subdivide property in the rural areas of the community in accordance with local ordinances and state and federal laws.

We treasure and will protect the beauty and integrity of our back roads, covered bridges, forests, mountains and streams. We wish to support our rural traditions and local food production.

We are proud to host Norwich University, the oldest private military college in the country, and will work with them to promote our mutual interests.

We will pursue universal broadband access, sidewalks and paths, public transportation, renewable energy generation and weatherization projects to reduce our carbon footprint and improve the quality of life in Northfield. We will work to link Northfield Village and Northfield Falls with corridors and paths.

We will pursue housing diversity to attract and retain a broad range of residents. We support our local school system and will seek to expand community activities and involvement. We value transparency and will seek to expand participation in local governance.



# 1. INTRODUCTION

## 1A. Purpose

The Northfield Town Plan establishes the town's objectives, policies, recommendations and actions for guiding future land use and development in the community consistent with the community's vision. The plan allows decisions to be made by considering the future of the town as a whole. Through planning, the town can better manage the cost of public services and ensure that public investments benefit local residents and businesses.

This plan will guide Northfield as it strives to provide and maintain up-to-date infrastructure, attract residents and businesses, and protect natural resources and rural character. This plan outlines ways to maintain, improve and revitalize Northfield so that it can be a great place to live and work now and into the future.

The primary purpose of this plan is to establish and communicate public policy. When guided by this plan, local decision-making should be transparent and predictable. As a policy document, the plan emphasizes those policies, programs and actions that a small-town government can reasonably pursue either directly through the authority granted to municipalities by the state or as an active partner with citizen volunteers, organizations, neighboring communities, state agencies or other levels of government.

The plan also serves as a foundation for Northfield's land use and development regulations. Those regulations must implement the objectives, policies, recommendations and actions found throughout this plan.

## 1B. Authority to Plan

The Vermont Planning and Development Act ([24 V.S.A. Chapter 117](#)) grants municipalities the authority to prepare and implement a comprehensive plan. It establishes minimum requirements for what must be included in such plans, and requires plans to be consistent with the state's planning goals. Town plans also must be compatible with the regional plan. Once adopted, town plans remain in effect for eight years. Having a current, adopted town plan is required for Northfield to apply for grants and other assistance to fund improvements.

## 1C. Planning Process

This 2019 Town Plan is an update of a plan adopted in 2014. The Planning Commission conducted public meetings and two community surveys while working to prepare this 2019 town plan that confirmed

ongoing support for the overall vision and goals expressed in prior plans. As a result, this 2019 plan represents a significant change to the format of the plan, but not a substantial change in that overall vision and goals.

The Vermont Planning and Development Act establishes the process by which town plans must be adopted, which includes public hearings by both the Planning Commission and Selectboard. That process was followed to re-adopt this 2019 plan.

## 1D. Using the Plan

The Northfield Town Plan provides a framework for implementing the community's goals and objectives through capital budgeting and public investments, the town's land use and development regulations, participation in various state programs, and other implementation measures within the purview of town government. In addition to guiding local decision-making, the plan is considered by regional and state agencies as they plan, develop and fund programs, provide services, locate facilities, and enact regulations. It is also used in state regulatory proceedings such as Act 250 and Section 248 permitting processes to determine whether proposed development is consistent with community goals and standards.

When using this plan for a regulatory purpose, the goals, objectives, policies, recommendations and actions found throughout must be considered in context as part of a whole rather than as individual statements meant to stand alone. Northfield, like all communities, has competing objectives that must be balanced on a case-by-case basis, using this plan as a guide for those decisions.

This plan is organized into nine thematic chapters and concludes with an implementation program. Each thematic chapter includes a series of objectives and policies. The implementation program includes actions.

- ▶ **Objectives** are attainable targets for accomplishing one or more goals. They should be specific and measurable so that the community can determine when they have been met.
- ▶ **Policies** are definite courses of action to attain (or contribute to attaining) one or more objectives. They are intended to guide all relevant decision-making by town government, and in those circumstances where the plan is intended to influence regional or state decision-making.
- ▶ **Actions** are the next steps – concrete activities or programs intended to attain (or contribute to attaining) one or more objectives that town government will implement.

Goals are listed on [page 2](#) rather than in each chapter as they are frequently supported by objectives in more than one chapter. This plan bases its goals largely on the state planning goals listed in the Vermont Planning and Development Act. To receive regional approval under Vermont law, town plans are required to be consistent with state's planning goals. To be 'consistent with a goal' requires that one or more objectives identified in this plan will result in Northfield making substantial progress towards attaining the stated goal.

Given that this plan establishes policy for the Northfield town government, the state planning goals need to be considered and understood within the framework of the authorities granted to municipalities by the state. Town government cannot on its own make substantial progress towards some of the goals because it lacks the authority necessary to do so. For example, the state has delegated authority for public education to school districts and supervisory unions, not town governments. In such cases, this plan supports efforts by others to make substantial progress towards the goal and ensures that the Town of Northfield does not use its authority to impede that progress.

## 1E. Other Plans and Studies

This plan references a number of prior planning studies and other plans, both municipal and regional, as well as a wealth of data provided by organizations and agencies at the state or federal level as listed below. When other plans, studies or data sources are referenced in this plan, those documents or resources should be considered in their original and full context.

2019

[Main Street Stormwater Separation and CSO Abatement Preliminary Engineering Report](#)  
Dufresne Group Consulting Engineers

[Northfield Town Forest Stewardship Plan](#)

Arrowwood Environmental

2017

[Basin 8 - Winooski River Watershed Water Quality and Aquatic Habitat Assessment Report](#)  
VT Agency of Natural Resources Watershed Management Division

[Energy Data Maps – Northfield](#)

Central Vermont Regional Planning Commission

[Northfield Hazard Mitigation Plan](#)

Central Vermont Regional Planning Commission

2016

[Northfield Area-Wide Plan](#)

Stone Environmental

2015

[Northfield Urban Forest Management Plan](#)

VT Urban & Community Forestry Program

2014

[Vermont Downtown Action Team \(VDAT\) Report for Northfield](#)  
VT Department of Housing and Community Development

[Northfield Public Tree Inventory Report](#)

Land Stewardship Program

[Dog River Natural Resource Inventory in Northfield](#)

University of Vermont LANDS Program

2011

[Village of Northfield Stormwater Mapping](#)

Central Vermont Regional Planning Commission

2012

[Winooski River Basin Water Quality Management Plan](#)

VT Agency of Natural Resources Watershed Management Division

2009

[Dog River Corridor Plan: Roxbury, Northfield, Berlin & Montpelier, VT](#)

Bear Creek Environmental, LLC

2008

[Town of Northfield Stormwater Drainage Study](#)

DuBois & King, Inc.

## GOALS

- 1 To plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside.
- 2 To provide a strong and diverse economy that provides satisfying and rewarding job opportunities and that maintains high environmental standards, and to expand economic opportunities.
- 3 To broaden access to educational and vocational training opportunities sufficient to ensure the full realization of the abilities of all residents.
- 4 To provide for safe, convenient, economic and energy efficient transportation systems that respect the integrity of the natural environment, including public transit options and paths for pedestrians and bicyclers.
- 5 To identify, protect, and preserve important natural and historic features.
- 6 To maintain and improve the quality of air, water, wildlife, forests, and other land resources.
- 7 To make efficient use of energy, provide for the development of renewable energy resources, and reduce emissions of greenhouse gases.
- 8 To maintain and enhance recreational opportunities for residents and visitors.
- 9 To encourage and strengthen agricultural and forest industries.
- 10 To provide for the wise and efficient use of Vermont's natural resources and to facilitate the appropriate extraction of earth resources and the proper restoration and preservation of the aesthetic qualities of the area.
- 11 To ensure the availability of safe and affordable housing in Northfield.
- 12 To encourage transparency and expand participation in local government.
- 13 To plan for, finance and provide an efficient system of public facilities and services to meet future needs.
- 14 To ensure the availability of safe and affordable child care and to integrate child care issues into the planning process, including child care financing, infrastructure, business assistance for child care providers, and child care work force development.
- 15 To encourage flood resilient communities.

## OBJECTIVES

- 1 Revitalize the villages and guide most growth into the areas designated for commercial, industrial, institutional, mixed-use and village residential uses on the Future Land Use Map.
- 2 Extend and improve municipal infrastructure and private utilities (water, sewer, stormwater, fiber, etc.) as necessary to accommodate the planned land use pattern and densities in the areas designated for commercial, industrial, institutional, mixed-use and village residential uses on the Future Land Use Map.
- 3 Revitalize Northfield’s downtown business district and other existing commercial/industrial areas in and between the villages to improve aesthetics, access and economic competitiveness.
- 4 Preserve and enhance the historic character, pattern and scale of the built environment in Northfield Village and Northfield Falls.
- 5 Construct, improve and maintain safe pedestrian and bicycle routes in and between Northfield Village and Northfield Falls that connect downtown, schools, parks and recreation areas, community facilities, stores and services, major employers and neighborhoods.
- 6 Celebrate Norwich University – a major landowner, employer and defining landmark – and establish a stronger partnership between the university and the community.
- 7 Preserve rural character, open space and working lands in the areas of town beyond the villages.
- 8 Prevent adverse environmental impacts resulting from irresponsible land use and development practices.
- 9 Maintain a balanced tax base and a fair PILOT (payment in lieu of taxes) from Norwich University in order to generate the revenue necessary to provide municipal services without overburdening residential property owners.

## POLICIES

- 1 Implement the recommendations for maintaining, evolving and transforming land use set forth in the [Future Land Use Recommendations section on page 8](#) of this plan.
- 2 Implement the policies for resource protection set forth in [Chapter 3. Resource Protection \(page 15\)](#) of this plan.
- 3 Work with Norwich University to resolve shared concerns and further common goals.
- 4 Seek PILOTs for Norwich University and other tax-exempt institutions that are commensurate with their demand on town services.

## 2. LAND USE

### 2A. Current Land Use

#### Introduction

Northfield’s current land use pattern is illustrated in [Figure 1 \(page 4\)](#). Most development is focused in Northfield Village and Northfield Falls – along the Route 12 and rail corridor in the Dog River valley. Forested hillsides and ridgelines dominate the landscape in most areas of town. Small pockets of active or former agricultural fields and pastures are scattered throughout town with larger concentrations off Union Brook Road, Bean Road and West Hill Road.

The town’s basic land use pattern has been in place for more than 100 years and change to that pattern has been incremental. Since the 1960s, commercial and industrial development has occurred along Route 12 between Northfield Village and Northfield Falls and to a lesser degree south of the village along the state highway corridors. Downtown commercial activity has experienced cycles of contraction and growth. Once organized around mills and industry, Northfield Village and Northfield Falls have become predominately residential villages with many residents commuting out of Northfield. Recent years have seen some commercial and industrial growth, including the expansion of Cabot Hosiery into the former Nantana Mill.

Norwich University is a defining feature of the community. The military college began expanding in the late 1940s following the end of World War II. In the 1970s, the institution began to diversify – admitting women and civilian students, and broadening its academic programs. Norwich invested in building renovations and new construction, including two dormitories, beginning in the late-1990s and continuing through 2014 leading up to the university’s 200th anniversary in 2019. As of 2019, there were approximately 2,500 Norwich students attending classes in Northfield with another 1,500 students enrolled in online programs. Current trends suggest that expansion of university enrollment and academic programs may occur, but a significant portion of that growth may be online.

Northfield has experienced some low-density, dispersed subdivision and home construction in rural areas, which occurred in tandem with the loss of dairy farms, but most of the rural land remains in large parcels. While a more recent trend towards diversified or value-added agricultural enterprises has started to revitalize the agricultural economy, many landowners are keeping fields and pastures open as much for aesthetic as productive values. Farming is more likely to be a secondary income source or lifestyle choice than a primary occupation. Similarly, most forest land in Northfield is not intensively managed

for timber production, but is harvested only as needed to meet the minimum requirements for participation in the Current Use program.

#### Key Findings

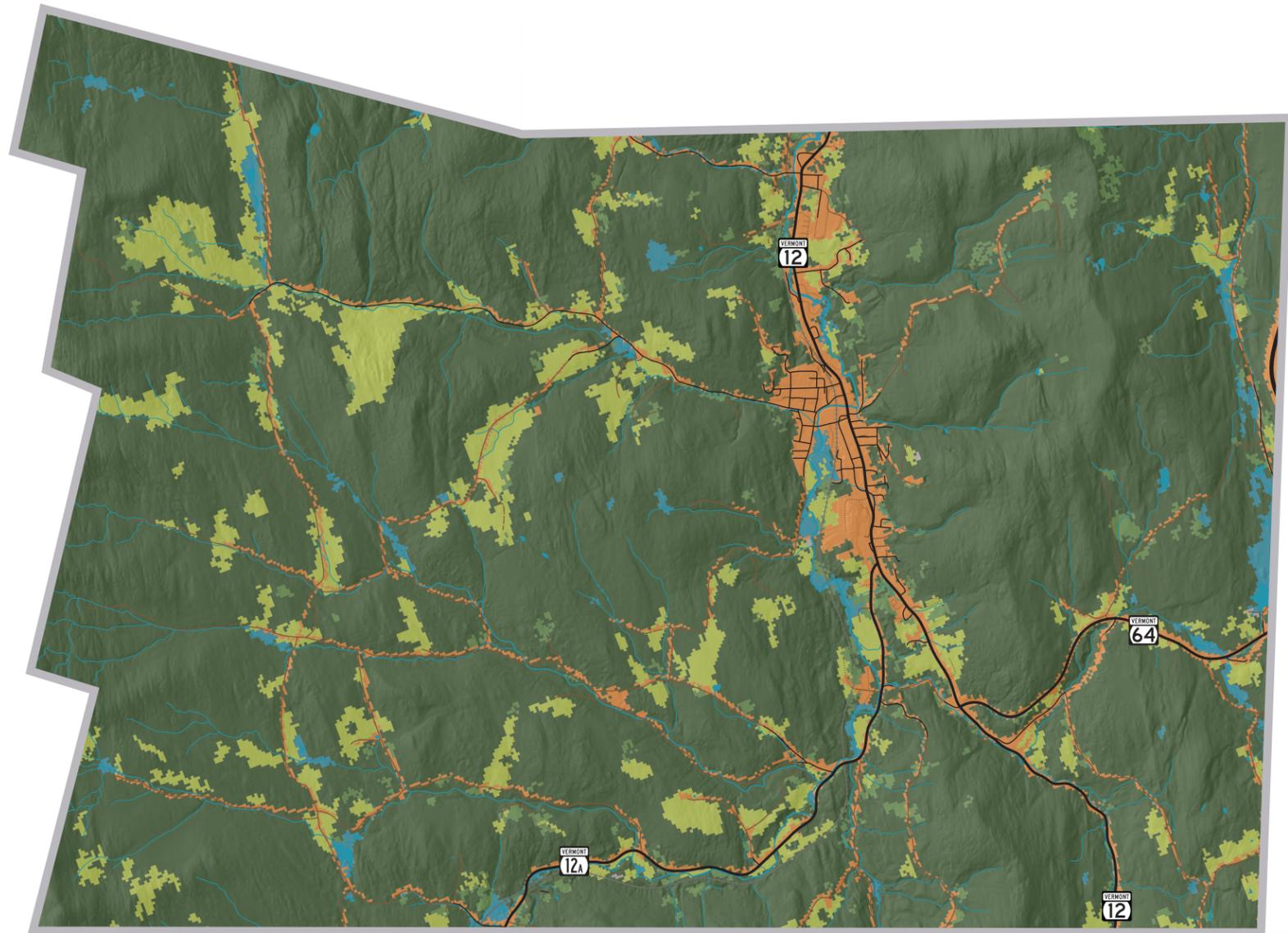
This plan assesses the current land use pattern with regards to: resource protection; transportation infrastructure; utilities, facilities and services; energy; housing; economic development; and flood resilience. The analysis showed that:

- ▶ **Resource Protection.** The overall land use policies and recommendations of this plan strongly support resource protection. Much of the rural land in Northfield has multiple natural resource values. These resources, while known to exist, have not been comprehensively identified, assessed and prioritized. Some of the highest value resource lands are owned by the town or by Norwich University, which offers a degree of protection. This plan recommends that the town continue its efforts to improve the effectiveness of policies and incentives that would help to protect the natural and historic resources in the town of Northfield.
- ▶ **Transportation.** Transportation improvements are needed to further the land use goals and objectives of this plan. Given the low-density rural development pattern, most Northfield residents are reliant on private vehicle use as their primary mode of transportation. Outside Northfield Village, Northfield Falls and the Route 12 corridor, Northfield is not served by public transit and the community lacks infrastructure such as park-and-ride lots and bike paths that would facilitate alternative modes of transportation. A significant amount of land in town is currently not served by publicly-maintained roads or is served by roads with limited capacity to accommodate additional traffic due to their design or condition. It is not fiscally sound for the town to increase its road maintenance costs by accepting or upgrading roads serving remote, low-density areas of town. Such expansions would also fragment priority forest blocks and have the potential for adverse impacts on wildlife and water quality. This plan focuses on improving existing infrastructure, creating a multi-use path between Northfield Village and Northfield Falls, and promoting other transportation alternatives.
- ▶ **Utilities, Facilities and Services.** Northfield’s community facilities and services are capable of supporting the rate of growth and development recommended in this plan. Northfield’s school has capacity for additional students and is considered an asset to attracting young families to town. Northfield Village is served by water and sewer systems that have some capacity for growth. Extending sewer to Northfield Falls would further the land use goals and objectives of this plan, as well as economic development and housing goals and objectives, but may require plant upgrades. There is a

need to improve stormwater management associated with both public roads and private development. Northfield residents and businesses would benefit significantly from improved telecommunications services, both broadband internet and cell phone, particularly in the more rural areas of town. Providing infrastructure allows for compact development in and between the village areas, providing a viable alternative to scattered, low-density development that fragments and degrades natural resources and open space. Expanding broadband internet would allow more people to work from home and reduce transportation energy use. This plan calls for guiding growth to those areas currently served by infrastructure and improving/extending that infrastructure as necessary to accommodate growth.

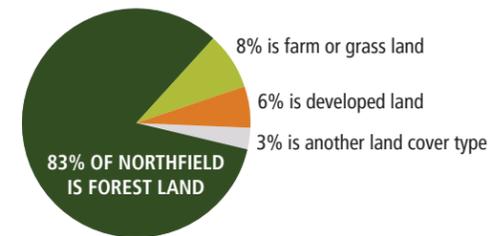
- ▶ **Energy.** The rural settlement pattern outside Northfield Village, Northfield Falls and the Route 12 corridor poses significant challenges to meeting the energy goals and objectives of this plan, particularly with regards to energy used for transportation. The age of the town’s housing stock suggests that there is a need for energy efficiency improvements. A majority of Northfield residents clearly do not support utility-scale wind power and many do not support utility-scale solar power generation being located in town. Many residents place a high value on resource protection and are concerned about the environmental impacts of utility-scale power generation. Therefore, it is likely that Northfield will continue to rely heavily on energy generated outside the community to meet its needs for the foreseeable future – particularly if the transportation sector converts to electricity. This plan supports the work of the Energy Committee to promote energy efficiency, conservation and renewables, and it establishes land use policies to encourage efficient, compact development patterns that facilitate reduced energy consumption.
- ▶ **Housing.** This plan does not envision much change in the slow rate of housing development during this 8-year planning period given local and regional economic conditions. Continued efforts will be needed to effectively implement policies that would guide new housing into existing settlement areas and away from remote areas of town, which furthers the energy and resource protection goals of this plan. There is limited potential for significantly increasing the amount of housing in Northfield Village without changing the built form and historic character in a manner not compatible with this plan given flood hazards and the availability of suitable land for higher-density residential development or infill. The provision of municipal sewer service to Northfield Falls will be necessary to support any meaningful increase in the amount of housing there. It would be beneficial to focus on improving the quality and diversity of the community’s housing stock, which would support the economic development, energy and resource protection goals and objectives of this plan. This plan supports new and rehabilitated housing in downtown and village areas.
- ▶ **Economic Development.** Northfield is focusing its economic development efforts on downtown revitalization, seeking full use and occupancy of existing commercial and industrial properties, and supporting the growth of existing businesses like Cabot Hosiery. Norwich University

Figure 1. **Current Land Cover Map**



**KEY**

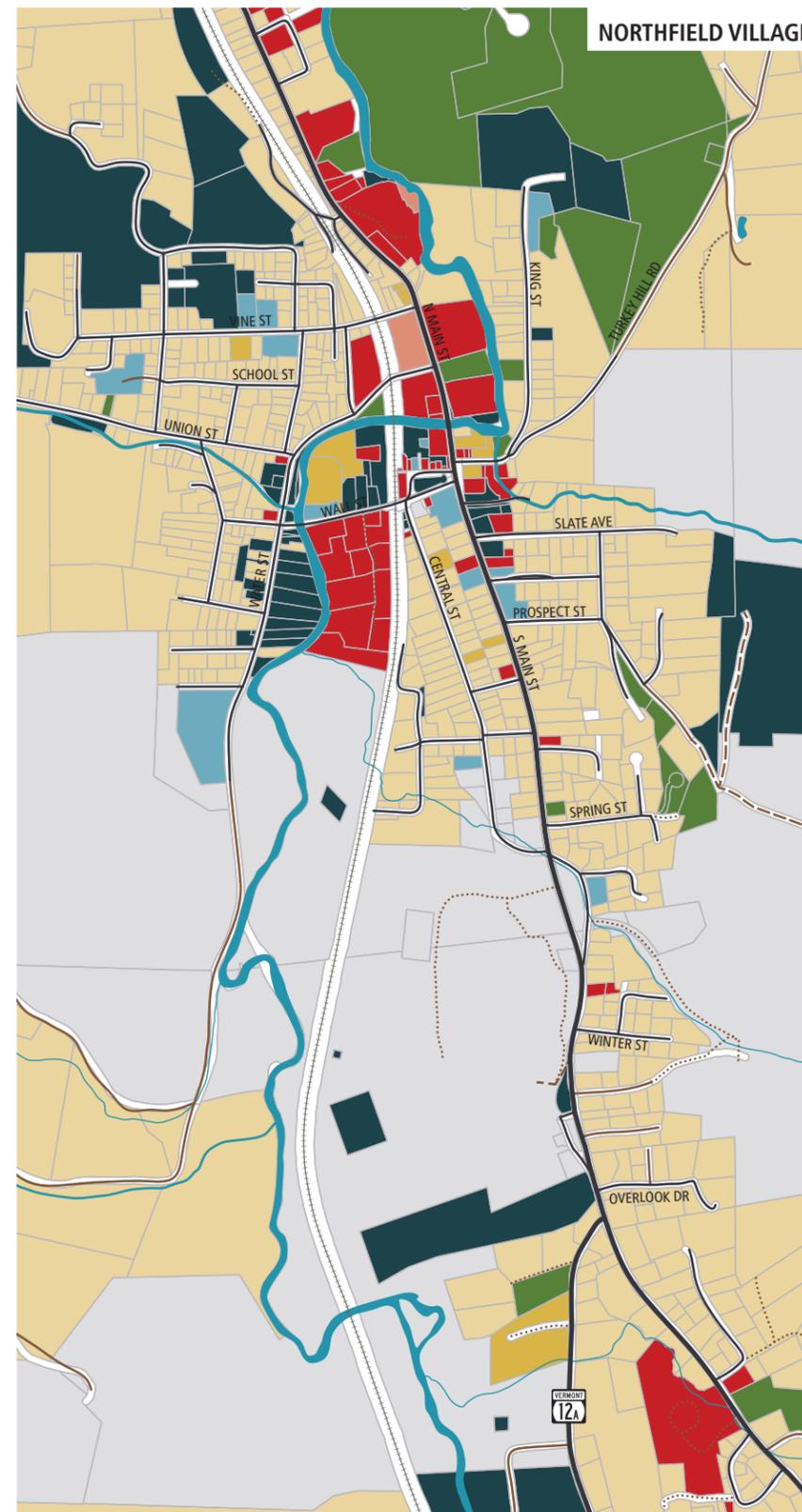
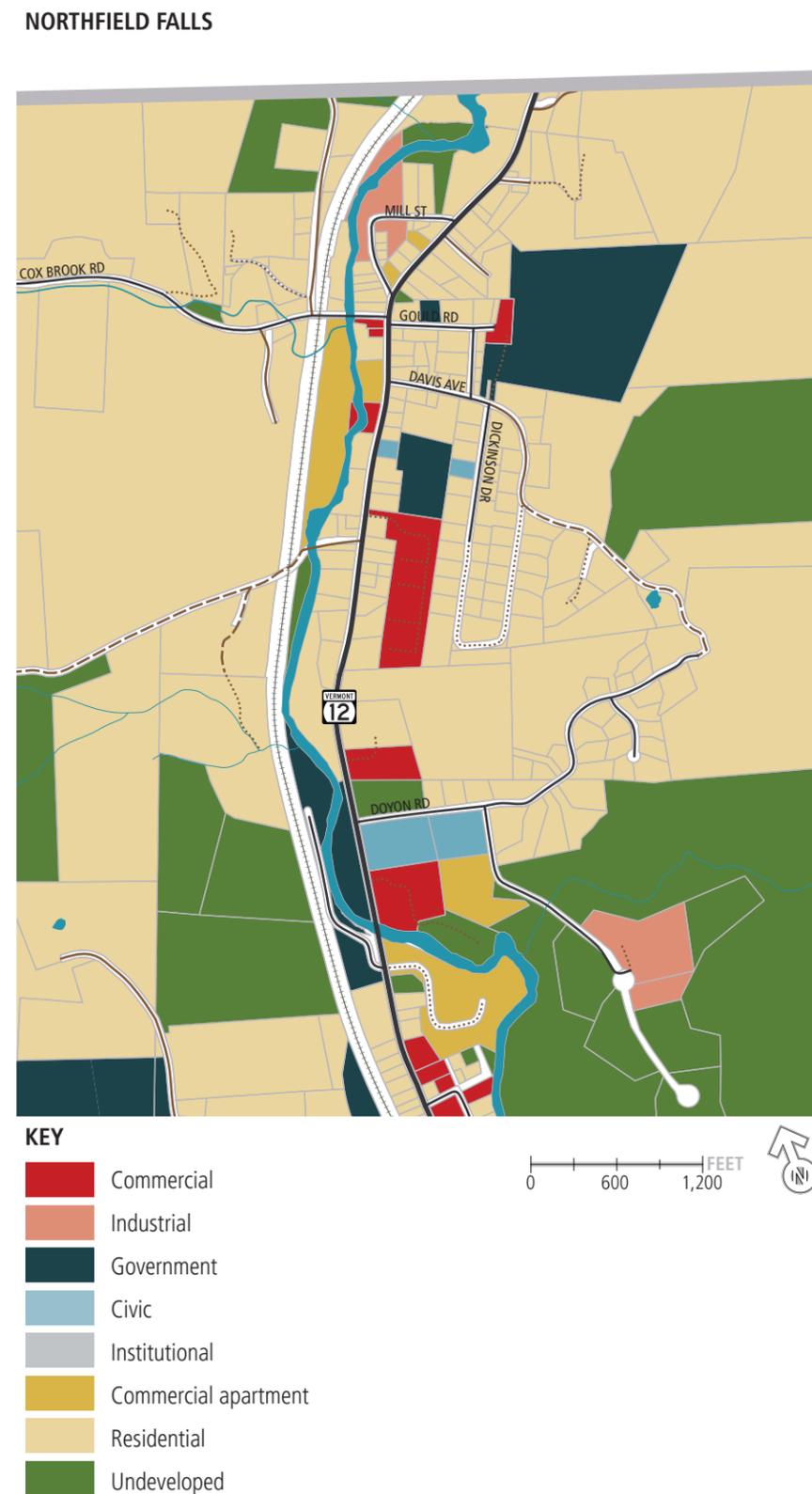
|  |   |
|--|---|
|  Developed land       |  Forest land                         |
|  Farm and grass land  |  Barren land (exposed rock or earth) |
|  Scrub and shrub land |  Water and wet land                  |



**SOURCES**  
2011 National Land Cover, VCGI



Figure 2. **Current Village Land Use Map**



will continue to be a significant driver of the local economy, by providing employment opportunities and a critical customer base for local businesses. Expanding tourism and recreation in Northfield would also help support local businesses, and provide new opportunities for owners to generate economic benefits from forest land. Focusing economic activity in existing settlements also furthers the energy and resource protection goals and objectives of this plan.

- ▶ **Flood Resilience.** Northfield Village and Northfield Falls are exposed to flood and erosion risks that will become more extreme in future decades as a result of climate change. Future land use and development decisions need to respond appropriately to those hazards to minimize future damage or loss. Flood resilience needs to be considered in the upland areas as well to ensure that land development does not contribute to downstream flooding. This plan calls for maintaining or establishing riparian buffers along streams for their flood attenuation, stream bank stabilization, water quality and wildlife habitat benefits. It supports the concept of using land within the floodplain and river corridor along the Dog River in and between Northfield Village and Northfield Falls as public parks connected by a multi-use path or greenway.

**Assessment of Current Land Use**

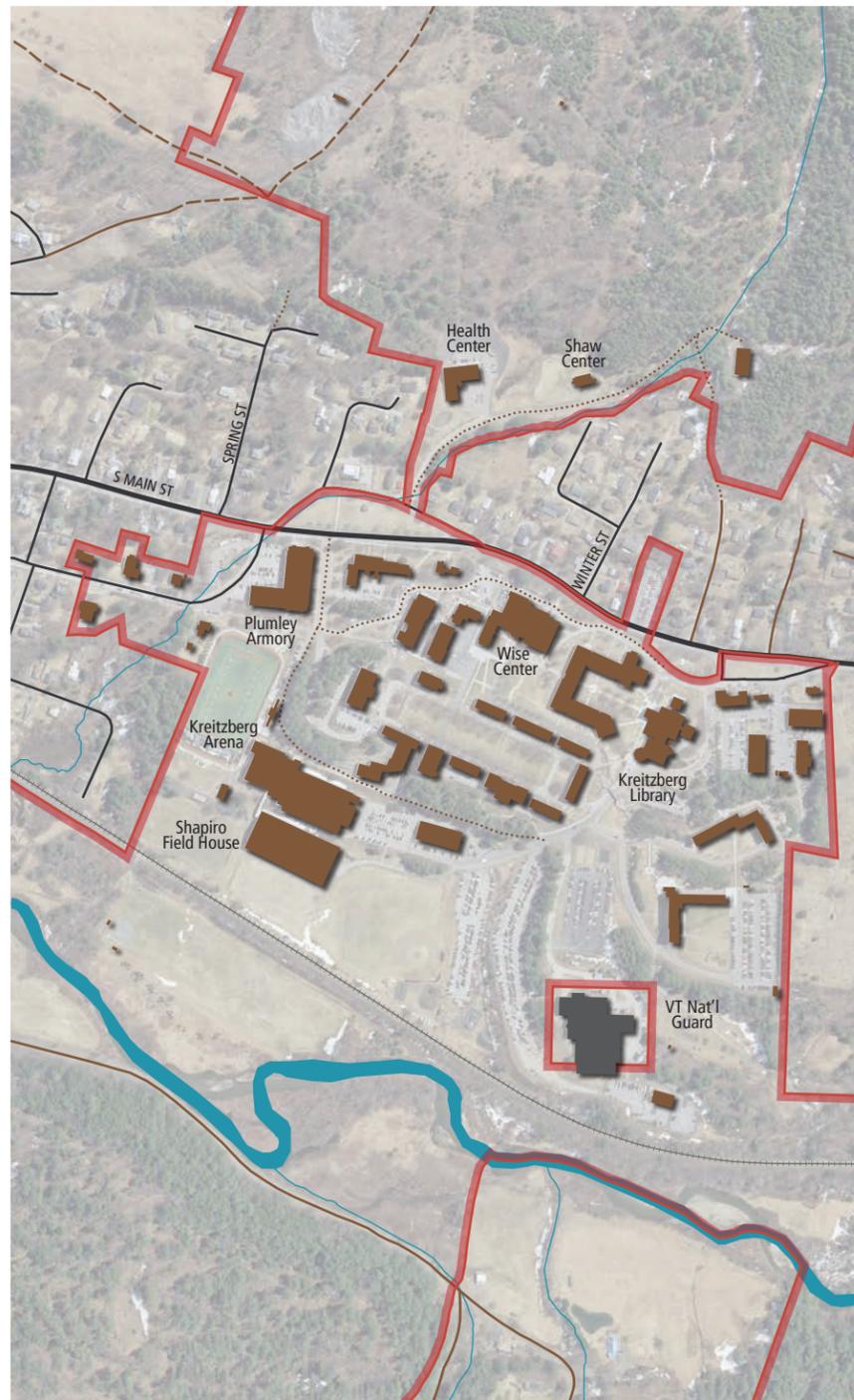
**Commercial and Industrial.** Commercial and industrial uses are concentrated primarily along the Route 12 corridor. Commercial and industrial properties (including commercial apartments with 5 or more units and mobile home parks) account for about 2% of the land area and 11% of the tax base in Northfield. Commercial and industrial uses with the highest assessed value include the Trijang Buddhist Institute, Northfield Savings Bank, Tops Market shopping plaza, Cabot Hosiery and Dollar General. [Chapter 8. Economic Development \(page 47\)](#) provides more information about commerce and industry in Northfield.

**Residential.** Residential development is focused in Northfield Village and Northfield Falls. The remainder of housing is dispersed throughout the rural areas of town as shown on [Figure 41 \(page 44\)](#). Residential properties (including seasonal homes) account for 69% of the land area and 84% of the tax base in Northfield. [Chapter 7. Housing \(page 43\)](#) provides more information about Northfield’s housing stock.

Much of the land classified as residential is undeveloped forest land. Of the approximately 19,800 acres in residential lots listed on the 2017 Grand List, 15,600 acres were part of a parcel that was more than 25 acres in size (162 parcels) and about 63% of those large parcels were enrolled in the Current Use Program.

While large residential parcels account for a significant amount of acreage, most Northfield residents live on a lot that is 2 acres or

Figure 3. Norwich University Map

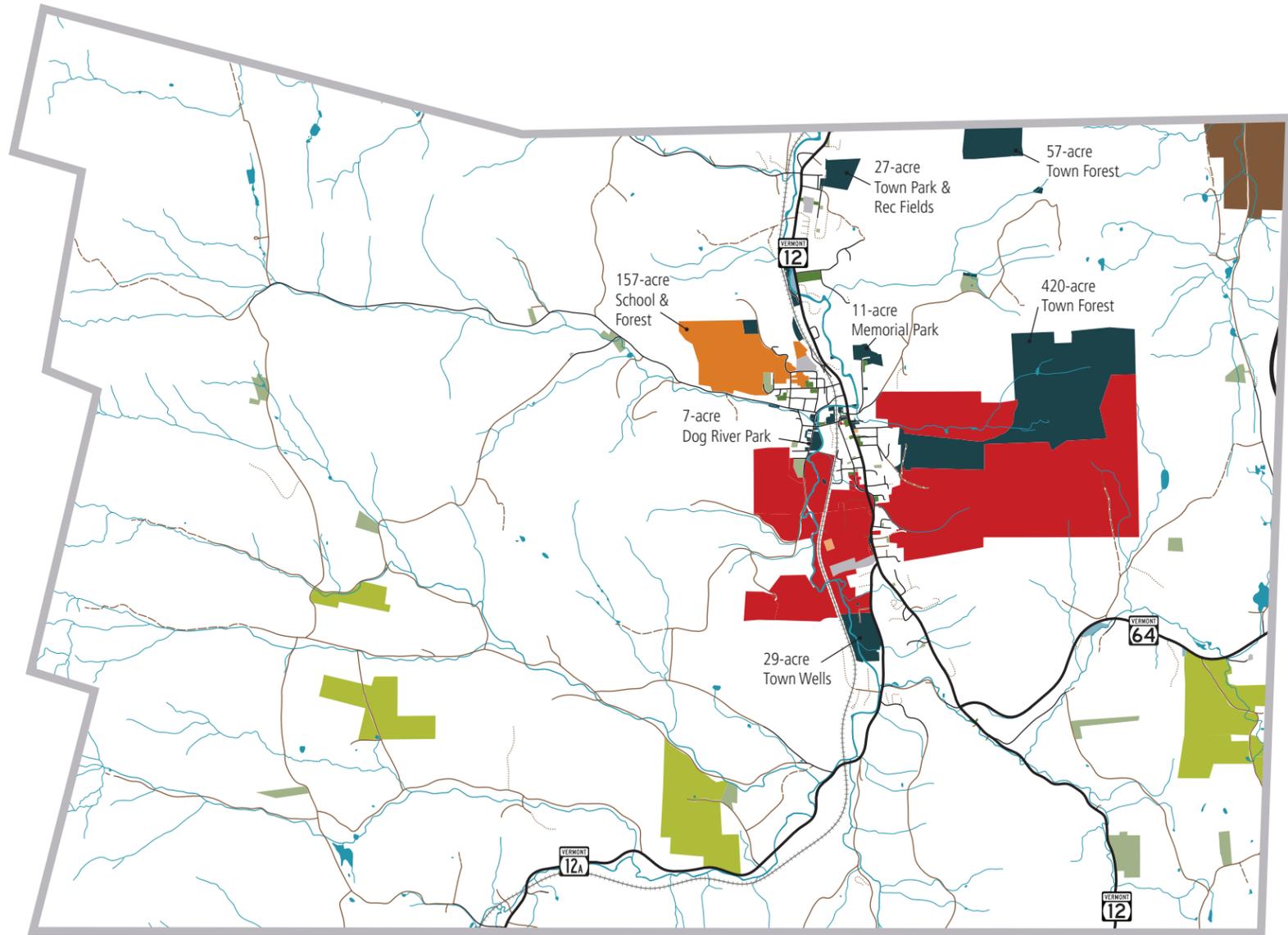


Norwich University owns approximately 1,250 acres in Northfield. The main campus occupies about 100 acres between South Main Street and the railroad. The university's lands include large parcels to the east and west of the campus.

**KEY**  
 Norwich University Land



Figure 4. Public, Conserved, Institutional and Other Protected Lands Map

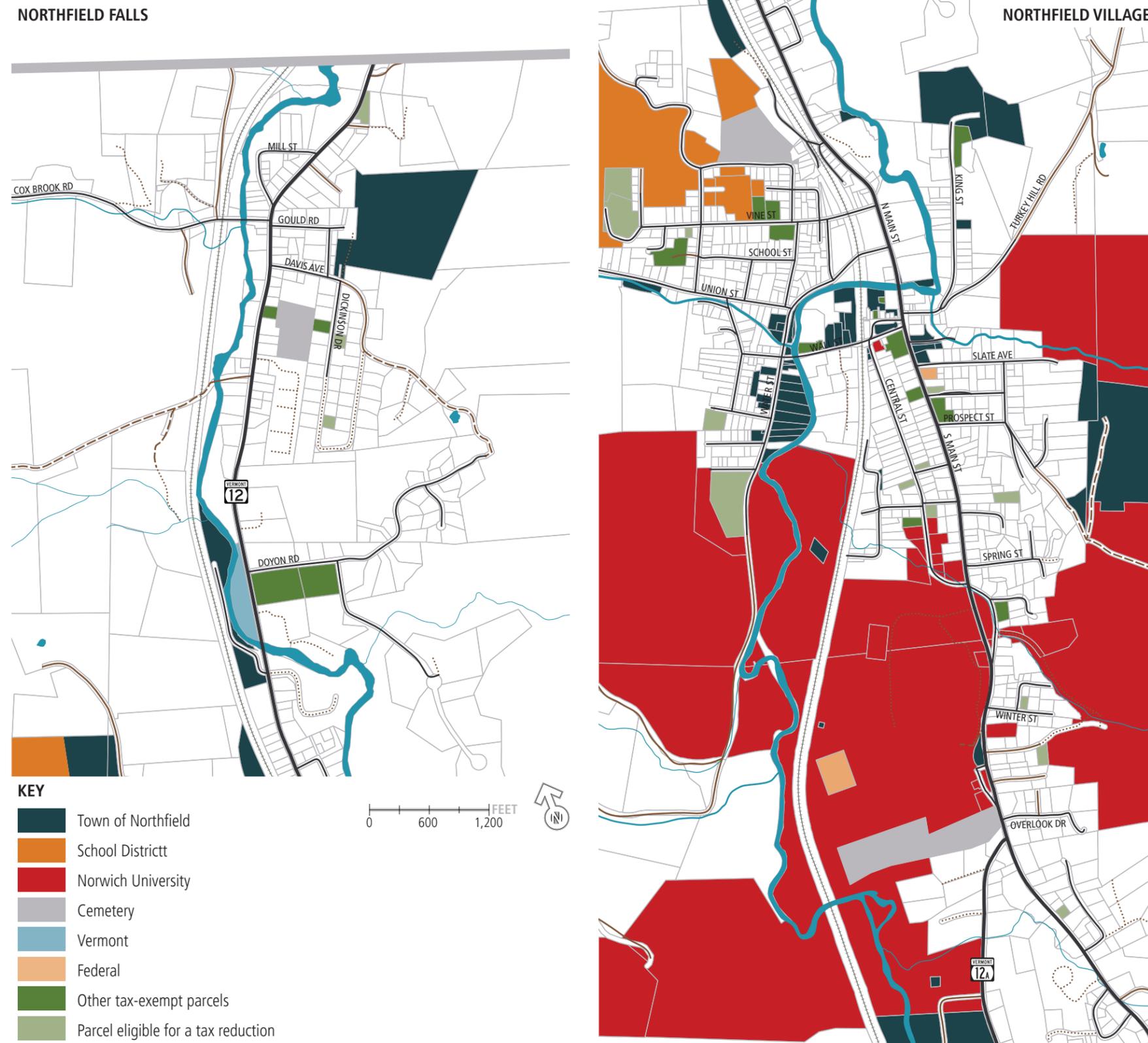


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|  |  |   |
|--|--|---|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #003366; margin-right: 5px;"></span> Town of Northfield | <span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; margin-right: 5px;"></span> State of Vermont     | <span style="display: inline-block; width: 15px; height: 10px; background-color: #006400; margin-right: 5px;"></span> Other Tax-Exempt Parcels            |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #FF8C00; margin-right: 5px;"></span> School District    | <span style="display: inline-block; width: 15px; height: 10px; background-color: #D2B48C; margin-right: 5px;"></span> Federal              | <span style="display: inline-block; width: 15px; height: 10px; background-color: #90EE90; margin-right: 5px;"></span> Parcel eligible for a Tax Reduction |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #FF0000; margin-right: 5px;"></span> Norwich University | <span style="display: inline-block; width: 15px; height: 10px; background-color: #8B4513; margin-right: 5px;"></span> City of Montpelier   |   |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #A9A9A9; margin-right: 5px;"></span> Cemetery           | <span style="display: inline-block; width: 15px; height: 10px; background-color: #9ACD32; margin-right: 5px;"></span> Private Conservation |   |



Figure 5. Civic and Institutional Lands Village Map



smaller. There were 832 such small residential lots on the 2017 Grand List, accounting for about 450 acres of land and 42% of the tax base.

**Civic and Institutional.** Approximately 750 acres of land were used for a civic purpose according to Northfield’s 2017 grand list, 550 acres of which were town-owned land. Other civic land uses include the school, social or fraternal organizations, religious institutions, and health and human service providers. These properties are either tax exempt or pay reduced property taxes (real and personal property used for charitable purposes is exempt from local property taxes under state law).

Norwich University owned 1,237 acres of land in Northfield as of 2017 as shown on [Figure 5 \(page 7\)](#). The full (replacement) value of Norwich University’s real property was \$421.3 million, which represented 51.4% of the total value of real property on Northfield’s grand list. However, only \$5.2 million of the total property value was taxable (1.2% of the full value). Norwich University paid about \$44,500 in municipal taxes in 2017, which represented 1.6% of total municipal taxes in Northfield. About \$30,000 in revenue came from 11 of the university’s properties that are taxed at 100% of their value.

Four other parcels of university land are taxed, but the buildings on them are not. Forest land on these four parcels is enrolled in the Current Use Program. The university paid about \$14,500 in taxes on those properties in 2017 and the town received about \$6,500 from the state to make up the lost municipal tax revenue on the land in Current Use. Norwich University also made a “gift” of \$80,000 to the town in 2017 (an amount that increased to \$200,000 in 2018 as part of a new 5-year voluntary arrangement between the town and the university).

**Working, Conservation, Open Space and Undeveloped Land.** While Northfield’s 2017 grand list did not include any parcels categorized as farms or woodlands (most rural lands were either in the residential or undeveloped use categories), approximately 16,000 acres of land in town were enrolled in Current Use as shown on [Figure 20 \(page 22\)](#). [Chapter 8. Economic Development \(page 47\)](#) provides more information about Northfield’s agricultural and forestry sectors.

There was no significant commercial earth resource extraction occurring in Northfield as of 2019. There are a number of former slate and granite quarries in town, including within the Town Forest, that are of geological, historical and cultural interest.

The town, school district and university all have major landholdings reserved for forest uses including timber harvesting, public recreation and conservation as shown on [Figure 4 \(page 6\)](#). In addition to the roughly 1,400 acres of open space lands owned by those three entities, there are about 550 acres of private conservation lands in Northfield.

The Town of Northfield has two tracts of Town Forest totaling more than 650 acres – the former Cheney farm and Paine Mountain parcels to the east of Northfield Village, and Dustin’s Pasture to the northeast of Northfield Falls that straddles the Northfield-Berlin town line. The [2019 Northfield Town Forest Stewardship Plan](#) inventories and assesses the resources on the Cheney Farm-Paine Mountain parcels, and makes recommendations for the future management of those lands. That plan is incorporated into this plan by reference. The Cheney Farm-Paine Mountain Town Forest abuts Norwich University’s landholdings on Paine Mountain creating a contiguous 1,200-acre block of forest land with an interconnected multi-use trail system open for public recreational use (ATV-use is prohibited). The Cheney Farm property was originally purchased by the Village of Northfield and the Village Water Department as a community water supply source. It currently serves as a partial backup water supply for the Town and will continue to do so.

## 2B. Future Land Use

### Land Capability

A fundamental principle of land use planning is to guide development towards the land best suited to accommodate the proposed use and away from unsuitable land. Some of the factors affecting land capability include:

- ▶ Steep slopes are poorly suited for development. As shown in [Figure 25 \(page 25\)](#), large areas of Northfield are characterized by steep slopes.
- ▶ Development in the rural areas of Northfield outside the service areas of the municipal sewer systems will be dependent on on-site septic systems for wastewater disposal. As shown in [Figure 26 \(page 26\)](#), much of the land to the west of Route 12 is moderately suited for on-site septic systems while the land to the east of Route 12 is marginally suited or not suited for soil-based systems.
- ▶ Riparian areas, including floodplains and river corridors, pose hazards for development as discussed in [Chapter 9. Flood Resilience \(page 49\)](#). Historically, development in Northfield has been located close to rivers and streams. Looking to the future, this plan recommends siting development further away from surface waters.
- ▶ Large areas of Northfield are remote and not currently accessible from maintained public roads. The cost of providing infrastructure and services to development in these areas would be significantly higher than for those located in and near the

villages or along main roads. Extending roads into currently inaccessible areas would fragment priority forest blocks and increase impervious surface coverage along with the potential for erosion, sedimentation and downstream flooding.

### Future Land Use Map

The Future Land Use Map, [Figure 6 \(page 9\)](#), is intended to illustrate Northfield’s desired future land use pattern, which can be broadly summarized as:

- ▶ Maintaining the lands within and between Northfield Village and Northfield Falls as the principal location for community growth and development including ongoing downtown revitalization efforts, residential infill and mixed-use redevelopment that is compatible with the historic scale and character of the villages;
- ▶ Recognizing Norwich University as a driver of Northfield’s economy and its ability to shape the community’s current and future character;
- ▶ Continuing to build-out industrial and commercial uses in the areas designated for business on [Figure 6 \(page 9\)](#) to expand the employment and tax base in Northfield;
- ▶ Guiding development to land already or intended to be served by infrastructure (roads, water, sewer, electricity, communications), capable of accommodating development based on site conditions such as slope and soils, and not subject to natural constraints such as floodplains, wetlands or other significant environmental factors.
- ▶ Preserving the rural character and scenic back roads of Northfield outside existing settlements, and supporting use of rural land primarily for agriculture, forestry, recreation and conservation uses;
- ▶ Avoiding further extension of roads and services into remote areas and minimizing fragmentation of priority forest blocks as shown on [Figure 18 \(page 21\)](#); and
- ▶ Protecting and improving water quality, and reducing flood hazards, by maintaining or establishing riparian buffers along streams and rivers throughout town.

More specific guidance on the desired future land use for each future land use classification is presented in the [Future Land Use Recommendations section on page 8](#). In addition to those land use recommendations and this plan’s goals, objectives, policies and actions, the town’s land use regulations should be consulted and considered

whenever future land use in Northfield will be affected by a regulatory, judicial or legislative decision.

### Future Land Use Recommendations

The land use recommendations in [Figure 9 \(page 12\)](#) use the maintain-evolve-transform approach:

- ▶ Recommendations to maintain are intended to preserve or strengthen the element described with limited change from the existing or historic condition.
- ▶ Recommendations to evolve are intended to promote incremental change that builds on an existing strength or asset.
- ▶ Recommendations to transform are intended to lead to substantial change, including new development or land uses, that will alter the future character of an area.

The recommendations provide a general outline of the overall pattern of land use and development desired in Northfield, but are not intended to be regulatory. They are intended to be implemented primarily through the town’s land use regulations and public improvement/infrastructure projects, which will more specifically regulate and guide future development.

### Village Center Designations

Northfield obtained a village center designation for Northfield Village in 2010. That designation was most recently updated in 2015 and will need to be renewed in 2023. Northfield obtained a village center designation for Northfield Falls in 2017, which will need to be renewed in 2025. The boundaries of the designated village centers are shown on [Figure 8 \(page 11\)](#).

Village center designation supports the town’s land use policies related to maintaining the historic scale and pattern of development, encouraging private investment in historic buildings, and promoting infill and improving the walkability in the village. State designation offers both the town and property owners within the designated area benefits including:

- ▶ Owners of income-producing buildings can access tax credits for eligible improvements.
- ▶ Land in or within ¼ mile of the village center could be eligible for the state’s Neighborhood Development Area program.
- ▶ The town is more competitive when seeking state grant funding for projects in the village center.

As of 2018, only one property in the village centers had taken advantage of the tax credits for improvements. In 2015, Northfield Pharmacy on

Depot Square received approximately \$13,000 in tax credits towards the installation of an ADA-accessible ramp.

Northfield or a landowner could pursue Neighborhood Development Area designation for a portion of the land in the village centers and within 1/4 mile of those centers. As shown in [Figure 8 \(page 11\)](#), a significant amount of the potentially eligible land is not suitable or available for residential development including floodplains, river corridors, the railroad, planned commercial/industrial areas, cemeteries, and public and university-owned lands. The remaining land is largely developed into residential neighborhoods.

The town or a landowner could seek NDA designation for land further outside the village center by demonstrating that there are constraints (natural or existing development) within the 1/4 mile area that limit the feasibility/desirability of residential development and that the proposal is a logical extension of an existing compact settlement pattern. [Figure 8 \(page 11\)](#) indicates land the town believes should be eligible for Neighborhood Development Area designation despite being more than 1/4 mile from one of the designated village centers. Both villages are historically linear in their built pattern – a response to the linear nature of the river valley in which they are located and the steepness of the terrain beyond. That linear development pattern is further reinforced by the transportation (road and rail) network. In Northfield Village, the edges are also defined by large public and university landholdings (land not available for residential development).

This plan does not recommend the land to the west of the river (beyond the existing developed neighborhoods) in either Northfield Falls or Northfield Village for higher-density residential development despite its proximity because the width of the floodplain/river corridor and limited river crossings create public safety, transportation and other challenges to integrating any new development into the existing built form. This plan envisions:

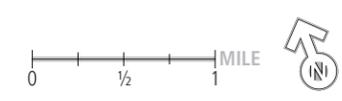
- ▶ A continuation of the existing settlement pattern to the south on the east side of Route 12 in Northfield Falls. If sewer infrastructure were extended to Northfield Falls, it would be from the south (Northfield village) and would not likely be taken across the Dog River to the west due to the cost and permitting challenges.
- ▶ Relatively small-scale residential development that would be compatible with the historic building form and pattern in Northfield Village east and south of the campus within areas that can be served by municipal infrastructure, as well as some opportunity for higher-density mixed-use and apartment buildings downtown (essentially within the village center).

Northfield Village could potentially be eligible for downtown designation. If Northfield were to obtain a downtown designation for

Figure 6. **Future Land Use Map**



| KEY  |  |   |
|--|--|---|
| <span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></span> Downtown Business    | <span style="display: inline-block; width: 15px; height: 15px; background-color: #f4a460; border: 1px solid black;"></span> High Density Residential     | <span style="display: inline-block; width: 15px; height: 15px; background-color: #c8e6c9; border: 1px solid black;"></span> Rural Moderate      |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #e57373; border: 1px solid black;"></span> General Business | <span style="display: inline-block; width: 15px; height: 15px; background-color: #fff9c4; border: 1px solid black;"></span> Moderate Density Residential | <span style="display: inline-block; width: 15px; height: 15px; background-color: #a5d6a7; border: 1px solid black;"></span> Rural Low           |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #ff9800; border: 1px solid black;"></span> Mixed Use        | <span style="display: inline-block; width: 15px; height: 15px; background-color: #004d40; border: 1px solid black;"></span> Civic                        | <span style="display: inline-block; width: 15px; height: 15px; background-color: #43a047; border: 1px solid black;"></span> Resource Protection |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #9e9e9e; border: 1px solid black;"></span> Institutional    |  |   |



Northfield Village, the town and property owners would have access to additional benefits including:

- ▶ The municipality would have access to funding from the Downtown Transportation Fund and priority consideration for many state grant programs.
- ▶ The municipality would have greater authority to set speed limits and install wayfinding signage within the designated area.
- ▶ The municipality could create a business improvement (special assessment) district within the designated area to fund capital improvements in the downtown.
- ▶ Land within the downtown would be exempt from Act 250 fees and some projects would be exempt from Act 250 review or have reduced criteria.
- ▶ Land within 1/2 mile of the designated downtown would be eligible for Neighborhood Development Area designation.

To be eligible for a downtown designation, Northfield would have to:

- ▶ Adopt regulations for the downtown that through design review, historic district, local Act 250 review or equivalent means adequately regulate the physical form and scale of development;
- ▶ Adopt a capital budget and program for providing infrastructure within the downtown and commit reserve water and wastewater capacity to support downtown development;
- ▶ Form a downtown organization that met state requirements;
- ▶ Provide a community reinvestment agreement demonstrating commitment to downtown revitalization efforts by town government and property/business owners in the district; and
- ▶ Make a financial commitment such as a special assessment or business improvement district, local options tax, tax stabilization program, or support for the downtown organization.

### Forest Blocks and Habitat Connectors

Municipal plans are required by state statute to identify forest blocks and habitat connectors and to plan for land development in those areas to minimize forest fragmentation and promote forest health and ecological function. The Vermont Agency of Natural Resources has mapped and assessed the habitat value of forest blocks in Northfield.

The Town of Northfield considers the mapped forest blocks that are 500 acres or more in area as shown on [Figure 17 \(page 21\)](#) to be priorities for protection through this plan and any implementing regulations. The impact of proposed development on forest blocks may be considered during state regulatory processes. Due to the scale of the state forest block mapping, the boundaries of priority forest blocks

Figure 7. Future Land Use Map Village Detail

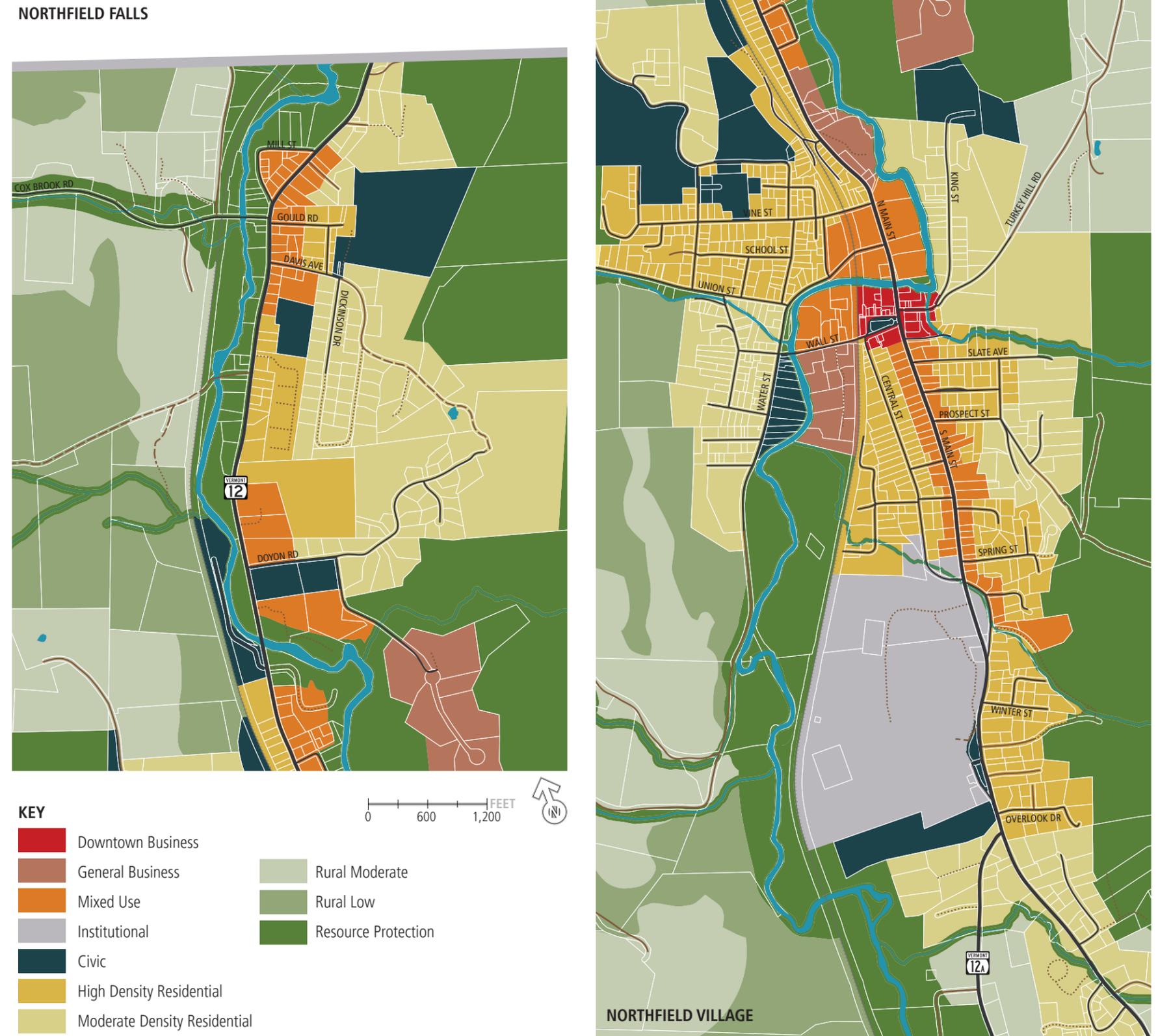
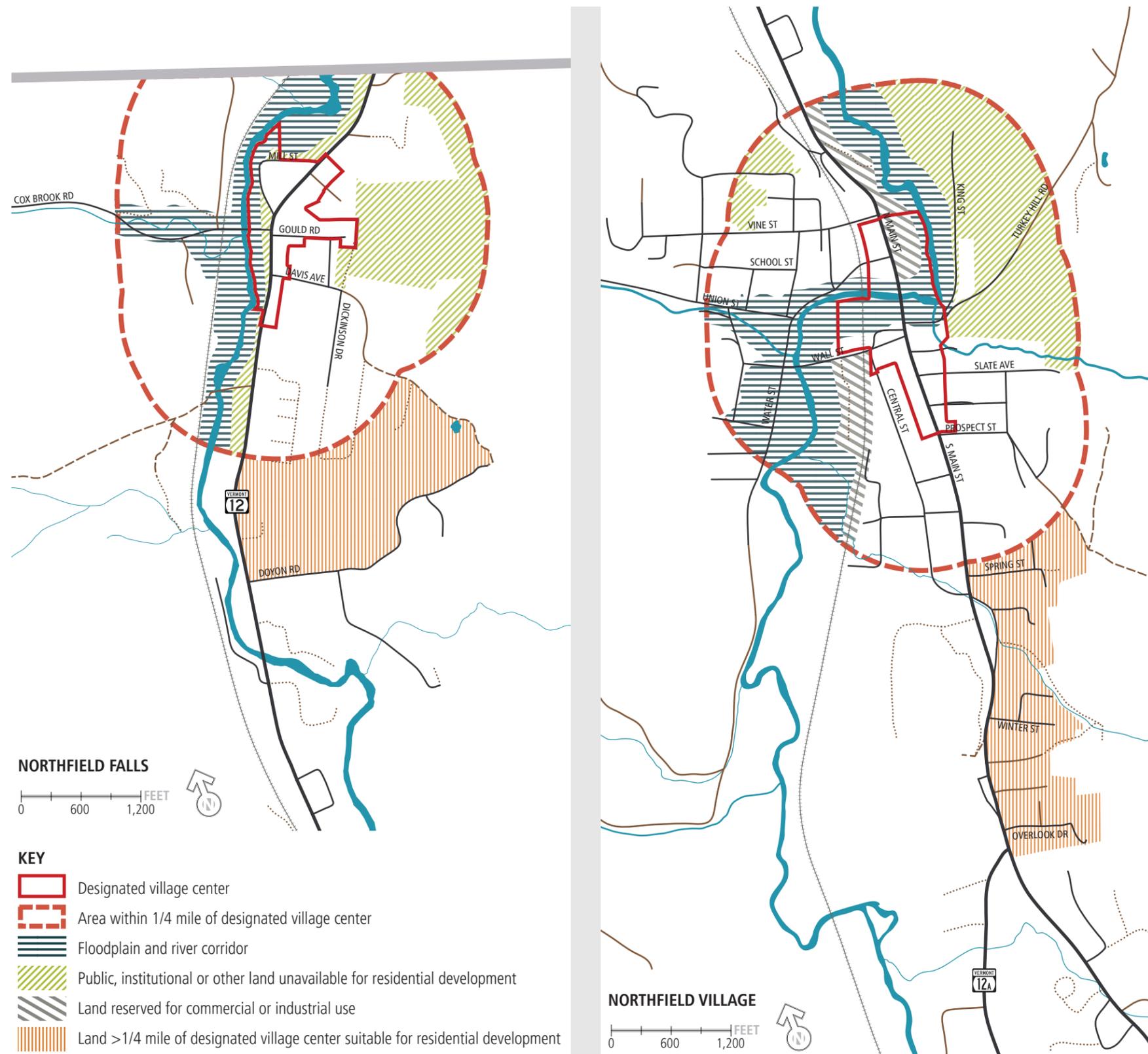


Figure 8. Village Centers Map



should be more precisely delineated based on a site-level assessment before being used for regulatory purposes by the town or state.

The mapped priority forest blocks largely align with the areas in the Resource Protection and Rural Low future land use classifications on the Future Land Use Map, [Figure 6 \(page 9\)](#). Much of the land in the mapped forest blocks was enrolled in the Current Use Program as of 2017 as shown on [Figure 20 \(page 22\)](#).

The vast amount of contiguous forest and the very low rate of development in Northfield suggest that there is no need for heightened concern about undue adverse impacts to the town's forest resources in the foreseeable future. The changes to the town's land use regulations recommended in [Figure 9 \(page 12\)](#) would further reduce the likelihood of any significant impacts on priority forest blocks from future development.

### Compatibility

Northfield is part of the Central Vermont region. Its land use and development trends are both influenced by and affect the land use and development trends of neighboring municipalities. Many planning issues such as transportation improvements along the major highway corridors - traffic calming, access management, transit and bike/ped improvements - will need to be addressed at the regional level. Other planning issues such as flooding or water quality can only be mitigated or improved through coordinated action within a watershed.

**Neighboring Municipalities.** Northfield shares a border with seven other municipalities. The level of connectivity and continuity of land use and development patterns between Northfield and its neighbors responds largely to the terrain as much of the land along the town border is mountainous and remote. Northfield's future land use plan is largely compatible with plans in neighboring towns as demonstrated below:

- ▶ **Berlin.** The economies, transportation networks and land use patterns in Berlin and Northfield are strongly interconnected. Residents regularly travel back and forth between the communities for work, shopping and services. The 2018 Berlin Plan designates the land along the Route 12 corridor for moderate to low density rural land uses, and low to very low density rural land uses along the remainder of the shared border.
- ▶ **Brookfield.** The shared boundary between Northfield and Brookfield is tiny with a single back road linking the towns. The 2016 Brookfield Town Plan classifies the land along the shared border for future agricultural and residential use.
- ▶ **Moretown.** The land between Northfield and Moretown is rural with no distinctive physical features or changes in land use to mark the border. The transportation network, and lot and

land use pattern flows seamlessly across the border. The 2016 Moretown Town Plan places the land along the shared border in the Cox Brook planning area and calls for little change to the existing land use pattern.

- ▶ **Roxbury.** Northfield and Roxbury share a long border. Similar to the town line with Moretown, there is little to differentiate the land use pattern between the municipalities. The 2014 Roxbury Town Plan classifies the land along the shared border for future agricultural and residential use.
- ▶ **Waitsfield.** Northfield and Waitsfield share a long border along the ridge of the Northfield Range, but access between the communities is limited to a single Class 4 road. What the towns do share is a more than 20,000 acre contiguous priority forest block that connects the Mad River and Dog River watersheds. The 2017 Waitsfield Plan places all the land along the shared border in the Forest Reserve planning area with the intent of protecting natural resources and limiting development in high elevation areas.
- ▶ **Warren.** The shared border between Northfield and Warren along the ridge of the Northfield Range is small with no direct transportation connections between the communities. The 2019 Warren Town Plan classifies the land along the border for forest and conservation purposes.
- ▶ **Williamstown.** Northfield and Williamstown are largely cut-off from one another by the Interstate 89 corridor. The only transportation connection is Route 64. The 2016 Williamstown Town Plan designates the land along Route 64 as an interstate interchange area but provides little guidance on appropriate land use and development in that corridor. The remainder of the shared border is designated for agricultural and residential use.

**Central Vermont Region.** The overall land use and development pattern called for in this plan is largely consistent with the pattern envisioned in the Central Vermont Regional Plan’s future land use policies and



Figure 9. Future Land Use Recommendations

| LAND USE PLANNING AREA DESCRIPTION  | RECOMMENDATIONS TO MAINTAIN-TRANSFORM-EVOLVE   |
|---|--|
| <p><b>Downtown Business.</b> These are the downtown commercial blocks in Northfield Village. Organized around the green, the built form is defined primarily by block buildings built up to the edge of the sidewalk with storefronts on the ground level and office or residential space above. Due to fires in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, the downtown business district lost some of its historic form when destroyed or damaged buildings were replaced with single-story construction.</p> <p>This planning area is the smallest in town at 8 acres, but is the most intensely developed. Density is high overall in the area but may vary from parcel-to-parcel based on the built form and use of building space.</p> | <ol style="list-style-type: none"> <li>1. <b>MAINTAIN</b> the downtown business area as the defining center of Northfield.</li> <li>2. <b>MAINTAIN</b> and strengthen the traditional downtown built form with multi-story block buildings defining a street edge through revisions to the land use regulations to ensure future development is compatible in form and scale with the existing built form and through streetscape improvements as recommended in the <a href="#">Vermont Downtown Action Team (VDAT) report</a>.</li> <li>3. <b>MAINTAIN</b> and improve the economic vitality of downtown by retaining and attracting small-scale retail, service, dining and entertainment establishments, and streamline the permitting process for downtown businesses.</li> <li>4. <b>EVOLVE</b> the mix of uses downtown by increasing the amount of upper floor housing.</li> <li>5. <b>EVOLVE</b> the built form through infill development with multi-story, mixed-use buildings; more efficient use of land; and improved walkability with sidewalks, crosswalks, streetscaping and greenspace.</li> <li>6. <b>TRANSFORM</b> public infrastructure downtown to improve walkability, flood resilience and stormwater management through means such as implementing the recommendations of the <a href="#">VDAT report</a>.</li> </ol> |
| <p><b>General Business.</b> There are three areas in Northfield planned for more intensive commercial or industrial use: south of Wall Street between the river and railroad; the former Nantanna Mill site north of the village; and the business park located on Whetstone Drive currently occupied by Cabot Hosiery (but with significant potential for additional development).</p> <p>This planning area is more than 50 acres in area with ample opportunity for additional development and more intensive utilization of existing sites and buildings. Density may vary based on the site needs and functional characteristics of a specific business.</p>   | <ol style="list-style-type: none"> <li>1. <b>MAINTAIN</b> the general business areas for industrial and primarily non-retail commercial uses that due to scale or impacts are not well suited to locate downtown or in mixed use neighborhoods.</li> <li>2. <b>MAINTAIN</b> and improve the infrastructure serving these business areas in order to facilitate business retention and expansion.</li> <li>3. <b>EVOLVE</b> the general business areas to maximize their use and occupancy by identifying and removing regulatory barriers to new business and business expansion.</li> </ol>   |
| <p><b>Mixed Use.</b> The mixed use area includes the neighborhoods along Main Street and Wall Street just beyond the downtown business district in Northfield Village, as well as lands along Route 12 between Northfield Village and Northfield Falls that are currently highway commercial in their development pattern, and the center of Northfield Falls.</p> <p>This planning area includes about 100 acres, most of which is developed but has potential for more intensive use or redevelopment. Density is high overall in the area but may vary based on the built form and needs/characteristics of the specific use(s) on a parcel.</p>   | <ol style="list-style-type: none"> <li>1. <b>MAINTAIN</b> the primarily residential scale and built form of the mixed use neighborhoods in Northfield Village through revisions to the land use regulations to ensure future development is compatible in form and scale with the existing built form and through streetscape improvements as recommended in the VDAT report.</li> <li>2. <b>EVOLVE</b> the development pattern, character and built form of the commercial development on Route 12 north of the village to become a pedestrian-friendly commercial node with distinctive architecture, attractive landscaping, well-designed signs, and other quality site design features.</li> <li>3. <b>EVOLVE</b> the Route 12 corridor between Northfield Village and Northfield Falls to incorporate a park-and-ride and transit stop.</li> <li>4. <b>TRANSFORM</b> Route 12 into a complete street so that people can safely walk or bike between Northfield Falls and Northfield Village.</li> <li>5. <b>TRANSFORM</b> Northfield Falls into a revitalized mixed-use center organized around a core of small-scale neighborhood commercial and mixed use buildings located primarily on the east side of Route 12 to mitigate flood and erosion hazards.</li> </ol>   |
| <p><b>High Density Residential.</b> The high density residential area includes the traditional neighborhoods in Northfield Village that are served by public water and sewer. These neighborhoods feature a grid street network with small lots and shallow setbacks and a mix of single- and multi-family buildings.</p> <p>This planning area is more than 200 acres in area. There is potential for small-scale infill that would provide more housing without significantly changing the built form of the neighborhood. Overall density on a block may vary in range of the number of dwelling units per acre based on proximity to downtown/mixed use areas.</p>  | <ol style="list-style-type: none"> <li>1. <b>MAINTAIN</b>, preserve and enhance the historic character, pattern, scale and built form of the residential neighborhoods in Northfield Village through revisions to the land use regulations to ensure future development is compatible with the existing built form.</li> <li>2. <b>EVOLVE</b> the mix of housing by allowing a range of housing types and residential densities that are compatible with the existing built form.</li> </ol>   |

| LAND USE PLANNING AREA DESCRIPTION   | RECOMMENDATIONS TO MAINTAIN-TRANSFORM-EVOLVE   |
|--|--|
| <p><b>Moderate Density Residential.</b> The moderate density residential area includes neighborhoods along Route 12, in Northfield Center and Northfield Falls, and in Northfield Village further out from downtown. These areas feature a less regular street network (often responding to terrain) with moderate sized lots, more greenspace and predominately single-family homes.</p> <p>This planning area includes nearly 400 acres with ample opportunity for additional housing where infrastructure can be provided. Overall density on a block or in a neighborhood may vary in range of the number of dwelling units per acre based on proximity to downtown/ mixed use areas, availability of infrastructure and natural resource constraints.</p> | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> the traditional scale and built form of the residential neighborhoods through revisions to the land use regulations to ensure future development is compatible in form and scale with the existing built form.</li> <li><b>2. EVOLVE</b> the mix of housing by considering a range of housing types and residential densities that are compatible with the existing built form.</li> <li><b>3. TRANSFORM</b> the infrastructure and services in Northfield Falls to promote opportunities for increased development in and near the village center.</li> </ol>   |
| <p><b>Rural Moderate.</b> The rural moderate area includes about 6,400 acres outside the village centers currently developed at an average density of 1 dwelling per 14 acres. This land is suited for low density rural residential housing due to proximity to existing road network, soils with moderate to marginal suitability for on-site septic, and few to moderate natural resource constraints. To protect rural character and working lands, a large percentage of the land should remain used for agriculture, forestry, outdoor recreation and open space. Housing types and lot sizes may vary, but development should be low density in this land use planning area.</p>  | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> and discourage fragmentation or conversion of productive farm and forest land.</li> <li><b>2. MAINTAIN</b> the rural character and a low-density development pattern.</li> <li><b>3. MAINTAIN</b> the existing pattern and density of rural residential development.</li> <li><b>4. MAINTAIN</b> opportunity for rural housing in areas already served by public infrastructure.</li> </ol>  |
| <p><b>Rural Low.</b> The rural low area includes about 5,300 acres outside the village centers currently developed at an average density of 1 dwelling per 61 acres. This land is not well suited for residential development due to distance to maintained road network, poor soils for on-site septic and significant natural resource constraints. These lands are and should remain dedicated primarily to agriculture, forestry, outdoor recreation and open space uses. Housing types and lot sizes may vary, but development should be very low density in this land use planning area.</p>   | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> forest cover in the upland portions of the watershed to protect wildlife habitat, water quality and scenic character.</li> <li><b>2. MAINTAIN</b> and discourage fragmentation of large tracts of farm and forest land.</li> <li><b>3. MAINTAIN</b> forest cover, rural character and a very low-density development pattern.</li> <li><b>4. MAINTAIN</b> existing public rights-of-way but avoid expanding the amount of publicly maintained road in remote areas.</li> </ol>   |
| <p><b>Resource Protection.</b> The resource protection area includes about 15,900 acres currently developed at an average density of 1 dwelling per 100 acres. To protect natural resources and working lands, this land is envisioned to remain essentially undeveloped and dedicated to agriculture, forestry, outdoor recreation and open space uses. Includes public lands (town and school forests), institutional lands (Norwich University forest lands), conserved lands and lands with severe natural resource constraints such as flood and erosion hazard areas, wetlands and source water protection areas.</p>  | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> existing public rights-of-way but avoid expanding the amount of publicly maintained road in remote areas.</li> <li><b>2. MAINTAIN</b> and expand recreational trail networks.</li> <li><b>3. MAINTAIN</b> riparian buffers and forest cover in upland portions of the town’s watersheds to protect water quality and attenuate downstream flooding and erosion hazards.</li> <li><b>4. MAINTAIN</b> town forest lands for the <a href="#">statutory purposes</a> of conservation, recreation, education, water quality, forestry and wildlife habitat.</li> <li><b>5. EVOLVE</b> the siting and design of existing development within the flood hazard area to reduce potential risk to life and property, and improve resiliency.</li> <li><b>6. EVOLVE</b> the land use and vegetative cover along the Dog River and its tributaries to provide improved riparian buffers, stabilize the streambanks, filter run-off and remove invasive species.</li> </ol> |
| <p><b>Institutional.</b> The institutional area includes the lands owned by Norwich University currently developed as a college campus with a mix of educational, residential, administrative and sports facilities.</p>   | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> the Norwich University campus and facilitate ongoing improvements and development that support their mission.</li> </ol>   |
| <p><b>Civic.</b> Public and quasi-public lands that are developed for civic purposes such as government facilities, schools, museums, cemeteries and parks.</p>  | <ol style="list-style-type: none"> <li><b>1. MAINTAIN</b> the public facilities and services necessary to support economic development and ensure quality of life for residents.</li> <li><b>2. EVOLVE</b> public lands within the floodplain and river corridor into a greenway park.</li> </ol>  |

map. The 2018 Central Vermont Regional Plan designates most of Northfield Village and Northfield Falls as town centers and the Whetstone Drive business park (site of Cabot Hosiery) as industrial. The remainder of town is classified as rural or resource lands.

The extents of the Northfield Village and Northfield Falls town center areas on the Regional Land Use Map are not consistent with those shown on the Future Land Use Map, [Figure 6 \(page 9\)](#), in this plan. The areas included on the Future Land Use Map in this plan more accurately capture the existing settlement pattern and areas served by public infrastructure in Northfield Village and Northfield Falls. The Future Land Use Map in this plan also recognizes that the Route 12 corridor connecting the two centers is not rural, but is – and has historically been – developed with a mix of residential, commercial and industrial uses. This plan calls upon Central Vermont Regional Planning Commission to revise the land use classifications and boundaries on their Future Land Use Map to more closely reflect those of the town’s during the next revision to the Regional Plan.





## OBJECTIVES

- 1 Identify, protect and preserve important natural features of Northfield's landscape that help define the community's identity and sense of place.
- 2 Preserve and enhance the historic character, pattern and scale of the built environment in Northfield Village and Northfield Falls.
- 3 Preserve rural character, open space and working lands in the areas of town beyond the villages.
- 4 Ensure that conserved lands and/or lands under long-term stewardship encompass a diversity of landforms.
- 5 Protect priority forest blocks and other habitat necessary for native animal and plant species to thrive and meet all their survival requirements.
- 6 Prevent adverse environmental impacts resulting from irresponsible land use and development practices.

## POLICIES

- 1 Support the appropriate use and conservation of public and institutionally-owned forest lands, including expanding public recreation uses that do not adversely impact natural resource values and sustainable forestry and timber harvesting practices.
- 2 Regulate development in source water protection areas to avoid contamination of community or municipal water supplies.
- 3 Ensure that stormwater run-off from developed land is managed at the source so it will not place an undue burden on public infrastructure, increase flood hazards or reduce water quality.
- 4 Require property owners who are proposing to create or increase impervious surface to maintain or improve (where stormwater problems already exist) pre-development runoff conditions.
- 5 Implement road construction standards and maintenance practices that minimize erosion, sedimentation, opening of the tree canopy and other adverse impacts to natural resources.
- 6 Guide development away from flood and erosion hazard areas, encourage flood-proofing of existing structures at risk of flooding, and pursue buy-outs of properties destroyed or repeatedly damaged by flooding.
- 7 Guide development away from surface waters, and maintain or establish riparian buffers.
- 8 Support the state's program for acquiring conservation easements within river corridors.
- 9 Support stream restoration and other stream alteration projects that further the resource protection and flood resilience goals and policies of this plan, and discourage stream alterations, including armoring and damming, that would adversely impact natural resource values.
- 10 Guide development away from priority forest blocks, and discourage fragmentation or subdivision of land within those blocks that would adversely impact natural resource values.

*Continues on next page.*

## 3. RESOURCE PROTECTION

### 3A. Natural Resources

#### Surface Waters and Riparian Areas

The Dog River is a significant feature of Northfield's landscape as shown on [Figure 16 \(page 20\)](#). Most of the land in town is part of the Dog River watershed and the entire town is within the larger Winooski River watershed. The Dog River watershed includes two sub-watersheds – the Dog River Headwaters watershed is composed of the uplands where the river originates and is fed from a series of small brooks and streams. More information about the Dog River and the Winooski River is available from:

- ▶ [2009 Dog River Corridor Plan](#)
- ▶ [2012 Winooski River Basin Water Quality Management Plan](#)
- ▶ [2017 Basin 8 -Winooski River Watershed Water Quality and Aquatic Habitat Assessment Report](#)

The Dog River watershed is comprised of many small streams and brooks in Northfield. These include headwater streams that originate and flow primarily through forested upland areas. Small streams and brooks are highly sensitive to changes in land cover and use within their watersheds. As of 2019, all surface waters in Northfield met or exceeded state water quality standards. Friends of the Winooski River coordinate a volunteer-based water quality monitoring program in the Dog River watershed (which the Northfield Conservation Commission participates in) and they regularly publish the results on their [website](#). The Dog River is recognized as one of the best trout fishing streams in Vermont and is a popular destination for those who enjoy fly fishing.

Maintaining or establishing upland forest cover and riparian buffers along stream banks can be an effective means to minimize downstream flooding, erosion and sedimentation, which results in reduced water quality as further discussed in [Figure 15 \(page 20\)](#). Given that forest covers more than 80% of town, most of Northfield's tributary streams currently have adequate riparian buffers. This riparian vegetation maintains the water quality and temperature necessary to support a trout population in the Dog River and its tributaries. There is a need for re-establishment of riparian buffers along the Dog River itself, and those portions of the tributary streams that do not flow through forested land. As of 2019, Northfield's zoning and subdivision regulations did not include any standards that would ensure that existing buffers will remain in place or that new buffers will be established when land is developed.

Appropriately managing stormwater runoff is essential to protecting water quality, as well as mitigating flood hazards. As discussed in both [Chapter 5. Utilities, Facilities and Services \(page 33\)](#) and [Chapter 9. Flood Resilience \(page 49\)](#), stormwater management will be an important issue in Northfield during this planning period. This plan recommends that Northfield's zoning regulations be revised to ensure that stormwater from new impervious surfaces is properly managed, particularly on small development sites that are not subject to state permitting.

#### Groundwater

The state has not yet mapped Northfield's groundwater resources. Such mapping would be valuable because all town residents rely on groundwater as their potable water supply whether from the municipal system or private wells, as discussed in [Public Utilities \(page 34\)](#). The municipal wells each have a mapped source protection area that encompasses their recharge area as shown on [Figure 16 \(page 20\)](#). As of 2019, Northfield's zoning regulations did not provide any special protection for those source water protection areas to regulate land uses that have the potential to contaminate the water supply. This plan recommends that the town adopt a source water protection overlay district for the municipal and other public water supplies.

#### Wetlands and Vernal Pools

Wetlands and vernal pools are a critical component of the natural environment. They can reduce the impact of floods, filter and absorb pollutants, improve water quality, recharge groundwater supplies, and provide habitat for a diversity of plants and animals.

The Vermont Agency of Natural Resources has mapped approximately 330 acres of Class 2 and 100 acres of Class 3 wetlands and 34 vernal pools in Northfield as shown on [Figure 16 \(page 20\)](#). Property owners can determine whether there is a state-mapped wetland (or other mapped natural resources) on their property by using ANR's online [Natural Resource Atlas](#). State wetland regulations apply to all Class 1 or 2 wetlands and vernal pools irrespective of whether they are currently included on the Vermont Significant Wetlands Inventory map. The state Wetland Rules do not apply to Class 3 wetlands, but municipalities may choose to protect these resources at the local level.

There are more than 1,300 additional acres in town with hydric soils according to the NRCS County Soil Survey as shown on [Figure 16 \(page 20\)](#) – an indicator that there may be wetlands in those areas that have yet to be identified. Most of the Class 2 wetlands shown

- 11 Avoid upgrade or extension of existing roads (public or private) within priority forest blocks.
- 12 Require development and subdivision practices that avoid, minimize or mitigate (in order of preference) adverse impacts on significant wildlife habitat, priority forest blocks and connecting corridors.
- 13 Guide development away from land above 1,800 feet in elevation, and ensure that any upland development is sited and designed to avoid or minimize disturbance of or adverse impact to steep slopes, shallow soils, headwater streams and groundwater recharge areas.
- 14 Guide development away from visually-prominent locations on ridgelines and hills as viewed from public vantage points.
- 15 Guide development away from primary agricultural soils, and encourage conservation of those soils for current and future agricultural use.
- 16 Guide development away from steep slopes, and require appropriate erosion control and stormwater management practices to protect water quality and avoid increased downstream flooding.
- 17 Encourage use of conservation subdivision design and low-impact development practices in the rural areas of town in order to protect and conserve natural resources, open space and rural character.
- 18 Encourage and support continued permanent conservation of farmland, forest land and natural areas beyond the villages.
- 19 Prioritize land conservation projects involving property that is contiguous to existing public, institutional and conserved lands in Northfield and adjoining municipalities.
- 20 Encourage Norwich University to coordinate its conservation and land stewardship efforts on Paine Mountain with those of the town for its land on the mountain, and with the goals and policies of this plan.
- 21 Protect the Northfield Town Forest on Paine Mountain from development other than that associated with the current uses of conservation, recreation, education, water quality and supply, forestry, and wildlife habitat.
- 22 Allow for responsible and sustainable resource extraction, timber harvesting, on-farm businesses, outdoor recreation, renewable energy generation and other resource-based activities that allow rural property owners to derive economic value from the land to the extent that they avoid, minimize or mitigate (in order of preference) adverse impact to natural resource values.



on the Vermont Significant Wetlands Inventory map have not been reviewed or updated for more than 30 years, and the mapping of Class 3 wetlands and vernal pools is not comprehensive. It is very likely that additional vernal pools exist in the hollows and depressions of the town's forested hillsides (most of the vernal pools mapped to-date are clustered on several properties that have been studied by natural resource specialists).

Northfield defers to state regulation of development within wetlands. As of 2019, Northfield's zoning and subdivision regulations did not include any wetland protection standards. The state's Wetland Rules protect significant wetlands (Class 1 or 2), vernal pools and a buffer zone directly adjacent to them (50' for Class 2 wetlands and 100' or more for vernal pools). Any activity within a significant wetland, vernal pool or buffer requires a state permit, which is only issued if the Agency of Natural Resources determines that the activity will have no undue adverse impacts on wetland or habitat functions. Wetlands, including Class 3, may also be subject to federal regulation. More information is available from ANR's [Wetlands Program](#).

### **Rare, Threatened or Endangered Species**

Vermont's Protection of Endangered Species law prohibits the taking, possessing, or transporting of rare, threatened and endangered (RTE) plants and animals. Vermont Department of Fish and Wildlife reviews development subject to state permitting for impacts on RTE species and significant natural communities. Applicants may be required to complete an environmental assessment on a proposed development site as part of the state review and permitting process. The state maintains a [Natural Heritage Inventory](#) documenting plant and animal species that are rare, threatened or endangered in Vermont and significant natural communities, which is used for planning, conservation and regulatory purposes.

Only a small number of RTE plant and animal species or significant natural communities have been documented in Northfield as shown on [Figure 17 \(page 21\)](#) because there has not been a comprehensive natural resource inventory conducted in town. It is likely that RTE resources exist in many areas of town, particularly the upland forests and in riparian areas, but have yet to be identified and mapped. For example, there are extensive areas mapped as RTE species locations and significant natural communities on the western slopes of the Northfield Range in Waitsfield (inventoried by the town), while on the eastern side in Northfield there are none mapped.

### **Wildlife Habitat and Travel Corridors**

The Vermont Agency of Natural Resources considers deer wintering areas, wetlands, RTE habitat and black bear habitat to be "significant

wildlife habitat" and state permitting through Act 250 provides some protection for those resources. [Figure 16 \(page 20\)](#) and [Figure 17 \(page 21\)](#) show areas mapped as significant wildlife habitat (note that the state had not mapped any bear habitat in town as of 2019).

The Vermont Agency of Natural Resources uses deer wintering areas as an analogue for broader wildlife habitat protection with the understanding that protecting deer wintering areas will benefit many other forest-dwelling species. The state has mapped deer wintering areas in Northfield as shown on [Figure 17 \(page 21\)](#). The Department of Fish and Wildlife will review proposed development subject to state permitting for impacts on deer wintering areas and may require conservation or mitigation so that there will be no net loss of habitat. The state first delineated deer wintering areas in the late 1970s based on input from wildlife biologists and game wardens, and then updated those maps in the late 2000s based on aerial photography from the 1990s. The location of deer wintering areas shifts over time and the accuracy of the mapped data should be field verified.

Northfield is a rural town with more than 80% forest cover, so much of the land in town is likely providing wildlife habitat. [Figure 17 \(page 21\)](#) presents the best available assessment of the highest value forest blocks, significant wildlife habitat and travel corridors in Northfield based on the natural resource data available from the state. It must be recognized, however, that much of the data used to generate those map layers is now more than 20 years old and was produced at a scale acceptable for state or regional planning, but not accurate enough for site level planning or regulatory purposes. More information is needed to accurately determine the value and importance of significant wildlife habitat and travel corridors in Northfield and effectively protect priority resources through conservation programs and policies.

As of 2019, Northfield's zoning and subdivision regulations did not include any habitat protection standards. Changes to those regulations will be needed to implement this plan and ensure that future development avoids, minimizes or mitigates adverse impacts on significant wildlife habitat and travel corridors.

### **Climate Change**

Climate change will increasingly impact Northfield's natural environment. Already there is evidence of plants leafing and flowering earlier than in previous decades. As average temperatures rise, the distribution and composition of tree species will continue to shift northward. As the forest habitat changes, some plant and animal species will not be able to adapt and will die out, while new plant and animal species will appear. The need for species to be able to migrate to find suitable habitat in response to climate change is another reason to protect the significant wildlife habitat and travel corridors that exist in Northfield now. Conserving a variety of natural community types

and landscape features will increase the likelihood of sustaining a diversity of plant and animal species in future decades.

## Invasive Species

Invasive species are plants, animals, fungus or bacteria that are not native to the region and have negative impacts on environmental, human or economic health. Invasive species often out-compete native plants and animals, resulting in reduced biodiversity and monocultures. Invasive species of particular concern in Northfield include deer ticks, Japanese knotweed, Asian longhorned beetle, emerald ash borer and hemlock woolly adelgid. The Northfield Conservation Commission has been working to mitigate the impacts of invasive species in town.

## Agricultural and Forestry Soils

Development that is subject to Act 250 is required to avoid or mitigate impacts on primary agricultural and productive forestry soils. This includes agricultural soils classified as being prime or of statewide importance on the NRCS soil survey as shown on [Figure 20 \(page 22\)](#). The productive forest soils shown on [Figure 20 \(page 22\)](#) indicate that the natural condition of the land has potential for commercial forestry or other specialized forest uses, but further assessment is needed to determine whether the soils would qualify for protection under Act 250.

There are about 4,500 acres of primary agricultural and an additional 3,450 acres of productive forest soils in Northfield. Most of the agricultural and forest soils found on the Dog River valley floor are developed (both Northfield Village and Northfield Falls are located on primary agricultural soils, for example). About 3,000 acres of primary agricultural or productive forest soils are on land enrolled in the Current Use Program (see [page 22](#)).

As of 2019, Northfield's zoning and subdivision regulations did not include any standards to guide development away from agricultural or forestry soils or to minimize fragmentation of productive farm or forest lands. Changes to those regulations will be needed to implement this plan through practices such as conservation subdivision and low-impact development in rural areas of town.

## Earth Resources

While quarrying was once an important local industry, there is no longer any commercial extraction of earth resources (stone, gravel, sand, etc.) occurring in Northfield. It is extremely unlikely that any new earth resource extraction operations at a commercial scale would

be proposed given the limited quantities of such resources in town and the characteristics of the resource extraction industry today.

Extraction of sand and gravel for local uses, such as construction and road maintenance, may be feasible. Locally sourced materials are generally less expensive and have a lower carbon footprint because they do not need to be transported as far. This plan calls for such resource extraction to occur in a responsible manner that minimizes and mitigates environmental impacts, and appropriately reclaims the land once extraction is complete.

## Brownfields and Hazardous Sites

Brownfields are previously developed sites that are or have the potential to be contaminated with hazardous materials. The possible legal liability for pre-existing environmental contamination is an impediment to redeveloping brownfields. Owners of contaminated property may be legally liable for cleanup regardless of whether or not they caused the contamination. Northfield has a 2016 [Area-Wide Plan](#) that analyzed environmental conditions on vacant and underutilized sites in the downtown area, which is adopted into this plan by reference. There are programs in place to assist municipalities and property owners with cleaning-up brownfields. More information is available from ANR's [Brownfields Program](#).

The Vermont Agency of Natural Resources also maintains a [spill database](#) that provides the public with information about releases of hazardous materials, potential contamination and remediation actions. Northfield averages a few minor spills a year, most commonly of home heating or vehicle fuel. As of April 2019, the state's [Hazardous Site List](#) included 12 active sites in Northfield that were being remediated and/or monitored.

Northfield hosts a number of businesses that store hazardous materials (materials that have properties or contain chemicals which make them dangerous or capable of having harmful effects on public health or on the environment) on-site for their own use or for sale. Hazardous materials are transported through town by rail or truck. See Northfield's [Hazard Mitigation Plan](#) for further information. As of 2019, Northfield's zoning regulations did not include any performance standards related to storage of hazardous materials.

The Moot Wood Turning property on Mill Street was the only site listed on the state's brownfields list in Northfield as of 2019; the asbestos contamination on that site was remediated in 2009. The Area-Wide Plan identified 23 downtown parcels with potential to be brownfields (based on known prior uses of the properties), but no further environmental assessment had been undertaken as of 2019 that confirmed the existence of contamination on any of the identified parcels. The Bean Chevrolet site identified in that plan is a priority

Figure 10. Northfield Town Forest Trail Map

The trail map below is available for [download](#).

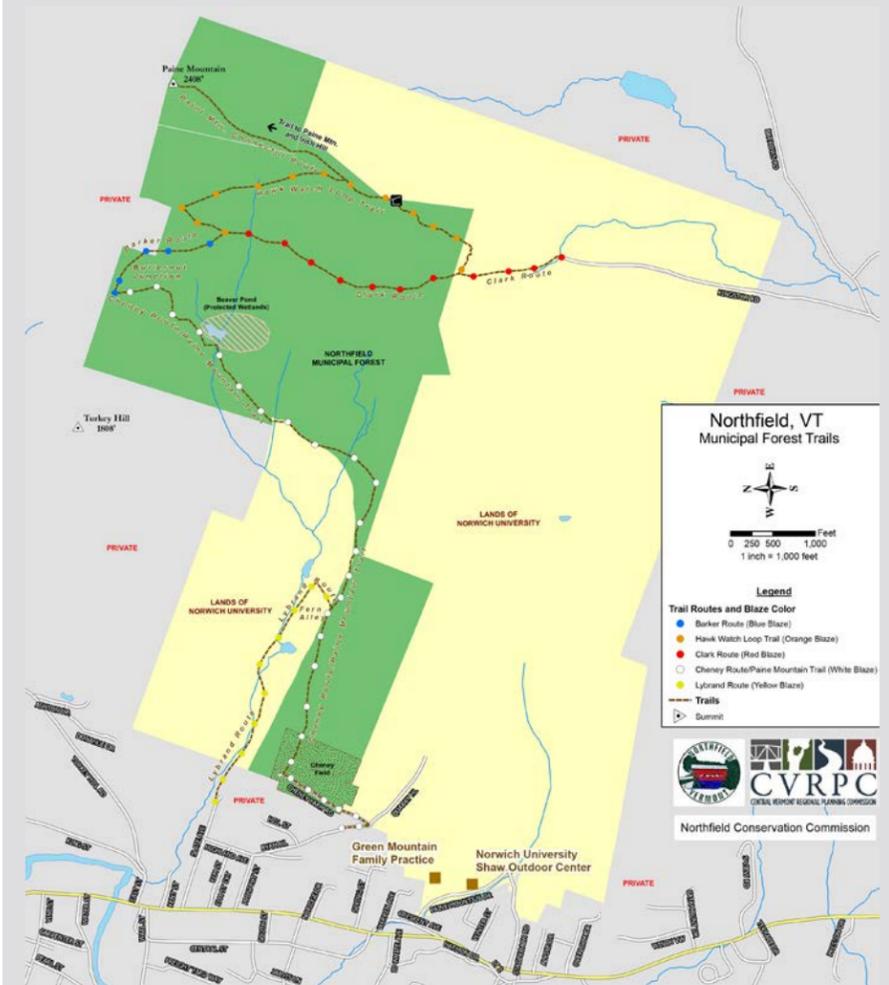


Figure 11. Conservation Easements

A conservation easement is a voluntary agreement between a landowner and a land trust or government agency that limits the type or amount of development on one or more parcels of land. An easement specifies the restrictions placed on the conserved property and the activities that are allowed. Landowners continue to own, manage and pay taxes on the land. They can sell or transfer the property, but the conservation easement remains on the land permanently. Easements can help protect and preserve working lands and open space, and generally allow the land to be used for farming, forestry, recreation, or education purposes. Property owners may sell or donate a conservation easement on their property. There may be income and/or property tax benefits for the landowner when land is conserved with an easement. A number of organizations are working to conserve land in Northfield such as the [Vermont Land Trust](#), the [Nature Conservancy](#) and the [New England Forestry Foundation](#). For more information, contact the [Northfield Conservation Commission](#).

### Figure 12. National Register Historic Structures

The Mayo Building is a historic commercial building on Main Street in Northfield Village. Built in 1902, it is an example of Classical Revival architecture with a flat roof, brick exterior, and granite trim. At four stories, it is the tallest building in downtown.

The Central Vermont Railway Depot is a historic former train station at Depot Square in Northfield Village. Built in 1852, it is believed to be the oldest surviving railroad station in Vermont. It was once part of a relatively large complex of railroad and industrial buildings. It was significantly altered in the 1890s and again in the 1970s when the side wings were demolished.



Mayo Building

Central Vermont Railway Depot



for further study and remediation, if found to be necessary, due to its redevelopment potential.

### Natural Resource Mapping

Northfield has not undertaken a comprehensive natural resource inventory and therefore must rely on the best available natural resource data at the regional/watershed or state level for town planning purposes. It is important to recognize the limitations of the available data as accurate and comprehensive resource mapping is critical to effective and defensible resource protection policies and programs. Due to the variable degree of accuracy and scale of the various regional/watershed and statewide data sets, the natural resource mapping included in this plan is intended to be indicative only. Any mapped resources should be confirmed and more precisely delineated based on current field data before being applied to an individual property for regulatory purposes.

### 3B. Cultural Resources

#### Historic Resources

Seven structures in Northfield are listed on the National Register of Historic Places – the Central Vermont Railway Depot, the Mayo Building and five covered bridges. There are nearly 400 structures in Northfield listed either individually or as a contributing building within a historic district in the State Register of Historic Places as identified on [Figure 29 \(page 28\)](#). There are six State Register historic districts in Northfield – Northfield Falls, Depot Square, Vine Street, Water-Pleasant Street, South Main-Central Street, and Crescent Street as shown on [Figure 28 \(page 27\)](#).

The historic structures and districts in Northfield were listed on the State Register in 1990 based on inventories completed in the 1980s. If that inventory was updated, it is likely that some currently listed structures would be determined ineligible due to modifications made since the original inventory and other structures built in the mid-20th century would become eligible for listing (typically buildings must be 50 years old or more to be listed).

Being listed on either the State or National Register does not, in itself, impose any obligation on the property owner. It is only when development subject to state or federal permits, or undertaken with state or federal funding, is proposed that the state may require specific actions to preserve a historic resource. For example, development subject to Act 250 must demonstrate that there will be no undue adverse impact to historic resources. As of 2018, Northfield's zoning

regulations did not provide any protection for historic structures such as buildings or stonewalls.

Property owners can learn more about how best to preserve or rehabilitate a historic structure from the Secretary of the Interior's [Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings](#).

The [Northfield Historical Society](#), is also available to help residents preserve local historic resources. The Society is located in the Governor Charles Pain House at 75 South Main Street, and collects, preserves and interprets materials that relate to the town's history.

#### Archaeological Resources

Archaeological resources in Northfield include artifacts and sites providing evidence of more than 10,000 years of Paleo-Indian and Native American activity prior to European settlement, and the 250 years of agricultural or industrial activities that followed. The State Archaeologist at the [Vermont Division for Historic Preservation](#) can assist in determining whether there are any known archaeological resources or potential for archaeological resources in a given area. Proximity to surface waters, particularly major rivers and lakes, is a strong indicator of potential archaeological sensitivity.

Archaeological resources on private land belong to and are solely under the control of the property owner (this does not include burial sites, which are protected by state law). It is only when development subject to state or federal permits, or undertaken with state or federal funding, is proposed that the state may impose requirements to investigate, document and/or preserve archaeological resources on private land. As of 2018, Northfield's zoning regulations did not provide any protection for archaeological resources.

#### Cultural Resources

Cultural resources in Northfield include the Brown Public Library, the Governor Charles Paine House (Northfield Historical Society), and the Sullivan Museum and History Center at Norwich University. The library and Paine House buildings are owned and maintained by the town, but their operating budgets are raised through a combination of private fundraising, grant-writing and endowment income. Other arts and cultural organizations and programs in Northfield, such as [Paine Mountain Arts Council](#), exist through the efforts of community volunteers. Norwich University hosts lecture series and concerts, and other cultural offerings that benefit both students and the community.

## Scenic Resources

Northfield has not conducted a scenic resource or road inventory. Yet, it is evident from the public comments at meetings and surveys that residents value the community’s scenic character. ‘Beautiful’ was the third-most common word used to describe Northfield by community survey respondents in 2018 (see ). [Figure 21 \(page 23\)](#) identifies areas of town with potential to be highly visible from public roads.

Two prominent ridgelines frame Northfield – the ridgeline of the Northfield Range to the west and the ridgeline running from Irish Hill to Paine Mountain and then to Shaw Mountain to the east. These ridgelines are remote and not crossed by major roads. The higher elevation land on their slopes provide high value habitat, including for RTE species. The majority of town residents have consistently expressed a desire for these lands to remain largely undeveloped forest land and have been opposed to any large-scale ridgeline development, including utility-scale wind turbines.

## Recreational Resources

[Figure 4 \(page 6\)](#) identifies public and quasi-public lands available for recreational use in Northfield, including more than 1,400 acres of woodlands owned by the town, school district and university that are open for hiking and other outdoor recreation activities (see [page 7](#)). Town forest lands are further discussed in [Figure 10 \(page 17\)](#). The Northfield [Conservation Commission](#) manages the town forest lands.

The town, school district and university also maintain a number of developed sports facilities, parks and playgrounds. The newest of those is the Waterfront Park developed after Tropical Storm Irene in Northfield Village on flooded properties the town obtained through FEMA’s buyout program. The [Recreation Committee](#) manages the town’s recreation facilities.

Norwich University’s [Shaw Outdoor Center](#) at the base of Paine Mountain offers access to an extensive trail system for hiking, trail running, cross-country skiing, snowshoeing and mountain biking to students and the Northfield residents. Northfield residents can become members and access the gym facilities at Norwich University.

Many other private landowners in Northfield also allow people to access their property for recreational uses. Vermont law allows people to hunt and fish on private property without permission unless the land is legally posted. Permission is required before people may ride motorized vehicles or trap animals on private property. The state’s [Landowner Liability](#) law protects property owners who allow recreational use on their land without charging a fee from liability for

property damage or personal injury. Property owners are protected under this law irrespective of whether the land is posted.

Northfield’s Conservation Commission, the Northfield Community Development Network and others have recognized the abundance of outdoor recreation opportunities in Northfield and support efforts to link existing trail systems. Outdoor recreation opportunities contribute to the quality of life in Northfield and young families who have moved into town often cite access to recreation as one of their reasons for choosing the community. Outdoor recreation is also seen as a potential component of the town’s economic development strategy. Other residents see the potential for interconnected trail systems to bring more visitors to Northfield, which would help support downtown retailers and restaurants.



**Figure 13. Northfield Recreation Committee**

The [Northfield Recreation Committee](#) oversees the town’s recreation facilities and programs, organizes community events and activities, and undertakes fundraising and grant writing to support recreational opportunities in Northfield.

**Figure 14. Northfield Historical Society**

The [Northfield Historical Society](#) collects and preserves objects, photographs, manuscripts, scrapbooks, and other items that relate to the town’s history. The Historical Society is based at the former Governor Charles Paine House on South Main Street in Northfield Village where their historic materials are displayed and made available to researchers.



Figure 15. Riparian Buffers

A riparian buffer is a naturally vegetated strip of land along the edge of a stream or river bank. Preserving and establishing riparian buffers adjacent to surface waters is the most effective way to improve or maintain water quality. Riparian buffers, particularly forested buffers and those along small, upland streams, provide significant benefits. They:

- ▶ Reduce erosion;
- ▶ Filter sediment, nutrients and pollution;
- ▶ Shade and moderate water temperatures;
- ▶ Offer wildlife habitat and travel corridors; and
- ▶ Store runoff, replenish groundwater and reduce flooding.

While riparian buffers as narrow as 10 feet can improve water quality, a buffer 50 feet or more in width is needed to more fully provide all of the benefits listed above. Watch this [video](#) to learn more about how riparian buffers work to stabilize Vermont streams and reduce potential for flooding and erosion during severe storms.

Interested in establishing or improving riparian buffers on your property? Check out the following resources:

- ▶ [Northfield Conservation Commission](#)
- ▶ [Friends of the Winooski River](#)
- ▶ [Winooski Conservation District](#)
- ▶ [Vermont River Conservancy](#)
- ▶ [Conservation Reserve Enhancement Program](#)
- ▶ [Vermont Trees for Streams Resource Guide](#)

Figure 16. Water Resources Map



**KEY**

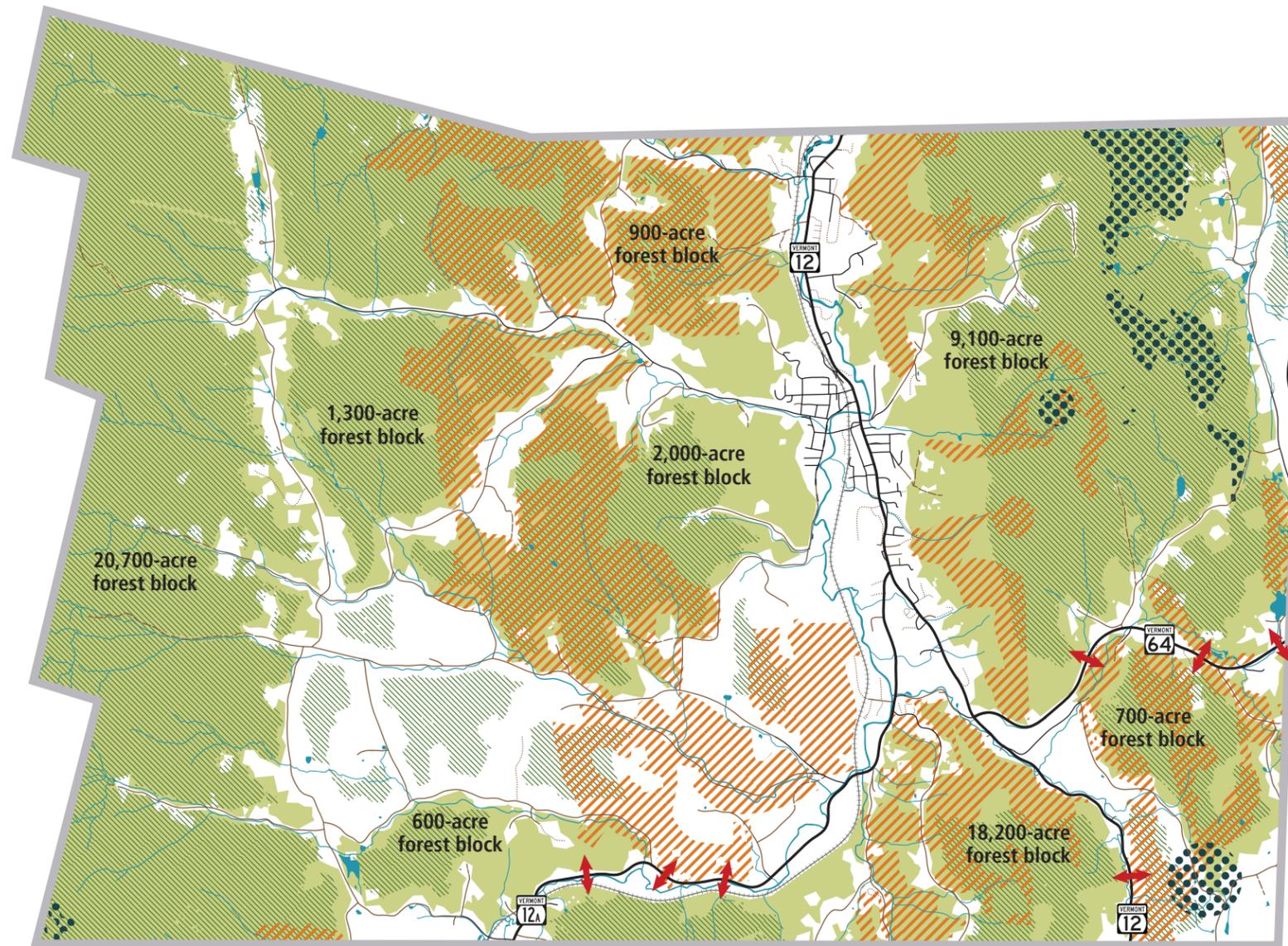
- |   |                                   |   |                        |
|---|-----------------------------------|---|------------------------|
|  | Class 2 wetlands                  |  | Known vernal pools     |
|  | Class 3 wetlands                  |  | Potential vernal pools |
|  | Potential wetlands (hydric soils) |  | Watershed boundary     |

**SOURCES**

- 2015 VSWI Wetlands, VTANR
- 2017 VT Vernal Pool Mapping, VTANR
- 2016 County Soil Survey, USDA NRCS
- 2013 Watershed Boundaries, USDA NRCS



Figure 17. Ecological Resources Map



**KEY**  
 Priority forest habitat block  
 Priority wildlife habitat  
 Priority wildlife crossings

Deer wintering areas  
 Rare, threatened or endangered species & significant natural communities

**SOURCES**  
 2006 Wildlife Linkage Habitat (value of 7.5 or greater)  
 2006 Wildlife Crossing Value (value of 7 or greater)  
 2011 Habitat Blocks and Wildlife Corridors, VTANR (forest blocks 500 acres or more)  
 2012 Deer Wintering Areas, VTANR  
 2019 Rare, Threatened & Endangered Species and Significant Natural Communities, VTANR



Figure 18. Forest Blocks

Maintaining large blocks of interior forest is a simple biodiversity conservation strategy that can help sustain viable populations of native plant and animal species for future generations. Interior forest blocks are particularly important for wide-ranging animals such as bobcat, marten and bear, which require large areas to survive. These blocks are big enough to:

- ▶ Withstand & recover from catastrophic events like storms or wildfires;
- ▶ Support breeding populations;
- ▶ Provide habitat for species sensitive to human disturbance; and
- ▶ Include a variety of landscape features and habitat types.

Forest blocks of 500 acres or more are needed to fully provide all of the benefits listed above. Forest covers 83% of Northfield and 87% of that forest land remains part of a large block (more than 500 acres in area) that is unfragmented or minimally impacted by roads, development and agriculture. 73% of forest remains part of a large parcel (more than 50 acres in area).

About 61% of the land in large forest blocks was enrolled in the Current Use Program in 2017, which requires the landowners to follow a forest management plan approved by the county forester and is intended to discourage development and fragmentation of forest land. To further protect forest land, the land use recommendations of this plan call for changes to the town's regulations to reduce densities in remote rural parts of town and require building envelopes for new rural parcels to ensure development will be sited to avoid or minimize forest fragmentation.

To learn more about conserving or managing forest on your property, check out the following resources:

- ▶ [Use Value Appraisal of Forestland](#) in Vermont brochure provides information about enrolling forest land in the Current Use Program.
- ▶ [Vermont Coverts](#) helps landowners meet forest management goals and enhance diverse wildlife habitat and healthy ecosystems.
- ▶ [Foresters for the Birds](#) helps landowners integrate the practices of timber and songbird habitat management.
- ▶ [Managing your Woodlands](#) (VT Dep't of Forests, Parks and Recreation)
- ▶ [Community Strategies for Vermont's Forests and Wildlife: A Guide to Local Action](#)
- ▶ A Landowner's Guide to Wildlife Habitat Management for Lands in Vermont (available for purchase from the [VT Dep't of Fish and Wildlife](#)).

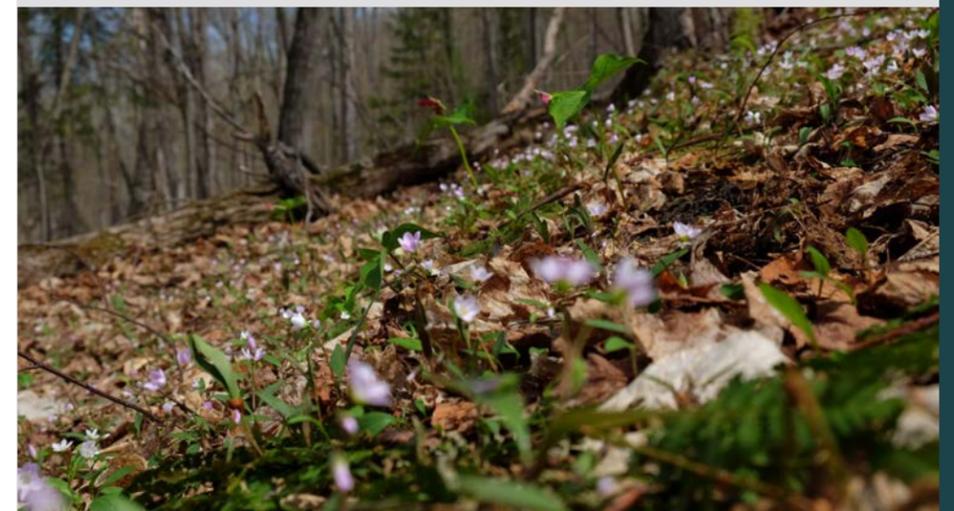


Figure 19. **Current Use Program**

Vermont’s Use Value Appraisal (UVA) Program, commonly known as ‘Current Use’ enables private landowners engaged in long-term forestry or agricultural practices to have their land appraised based on the property’s value of production of wood or agricultural products rather than its residential or commercial development value. If land is removed from the program and is developed, the landowner must pay a land use change tax. The goal of this program is to encourage owners to keep working land in productive use by reducing their tax burden. More information on the Current Use Program is available from:

- ▶ [Vermont Department of Forest, Parks and Recreation](#)
- ▶ [Vermont Agency of Agriculture](#)
- ▶ [Vermont Department of Taxes](#)

The Current Use Program has been in place since 1980 but enrollment continues to increase steadily following changes to education funding in the early 2000s that resulted in the establishment of the statewide education property tax. The total amount of land in Northfield enrolled in Current Use doubled between 2002 and 2018. About 16,000 acres of forest land and farm land in Northfield were enrolled in the state’s Current Use Program in 2018 (153 parcels comprising 56% of the town’s land area). Most of the land enrolled in Current Use was managed woodlands – only 1,300 acres were agricultural land.

Enrolled property owners in Northfield paid almost \$350,000 less in municipal and education property taxes, and the town received about \$130,000 to make up the municipal tax loss on land enrolled in Current Use in 2018. One-third of the land in Current Use was a part of a homestead (owner-occupied) property, while about 20% was held by an out-of-state landowner.

Total Acres in Northfield Enrolled in Current Use Program, 2002-2018

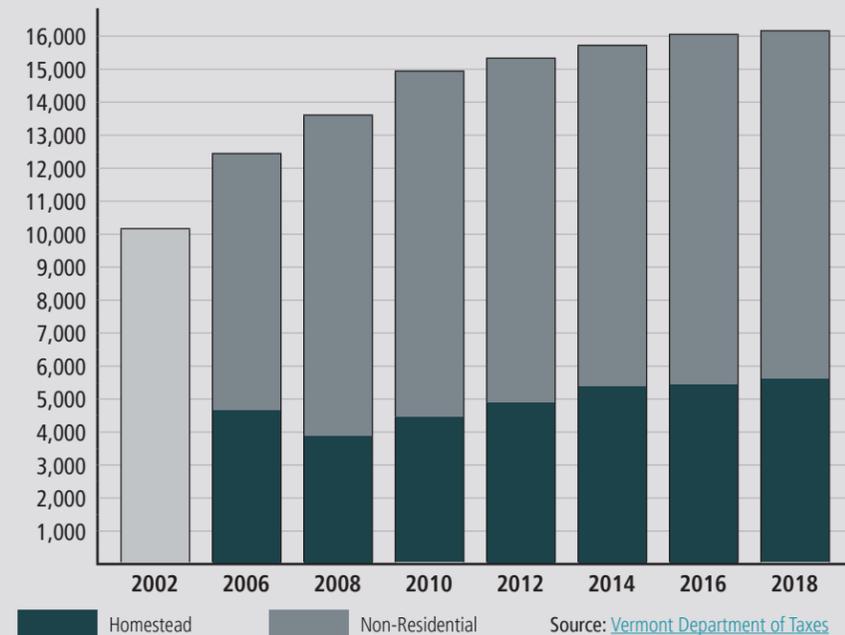


Figure 20. **Agriculture and Forestry Resources Map**

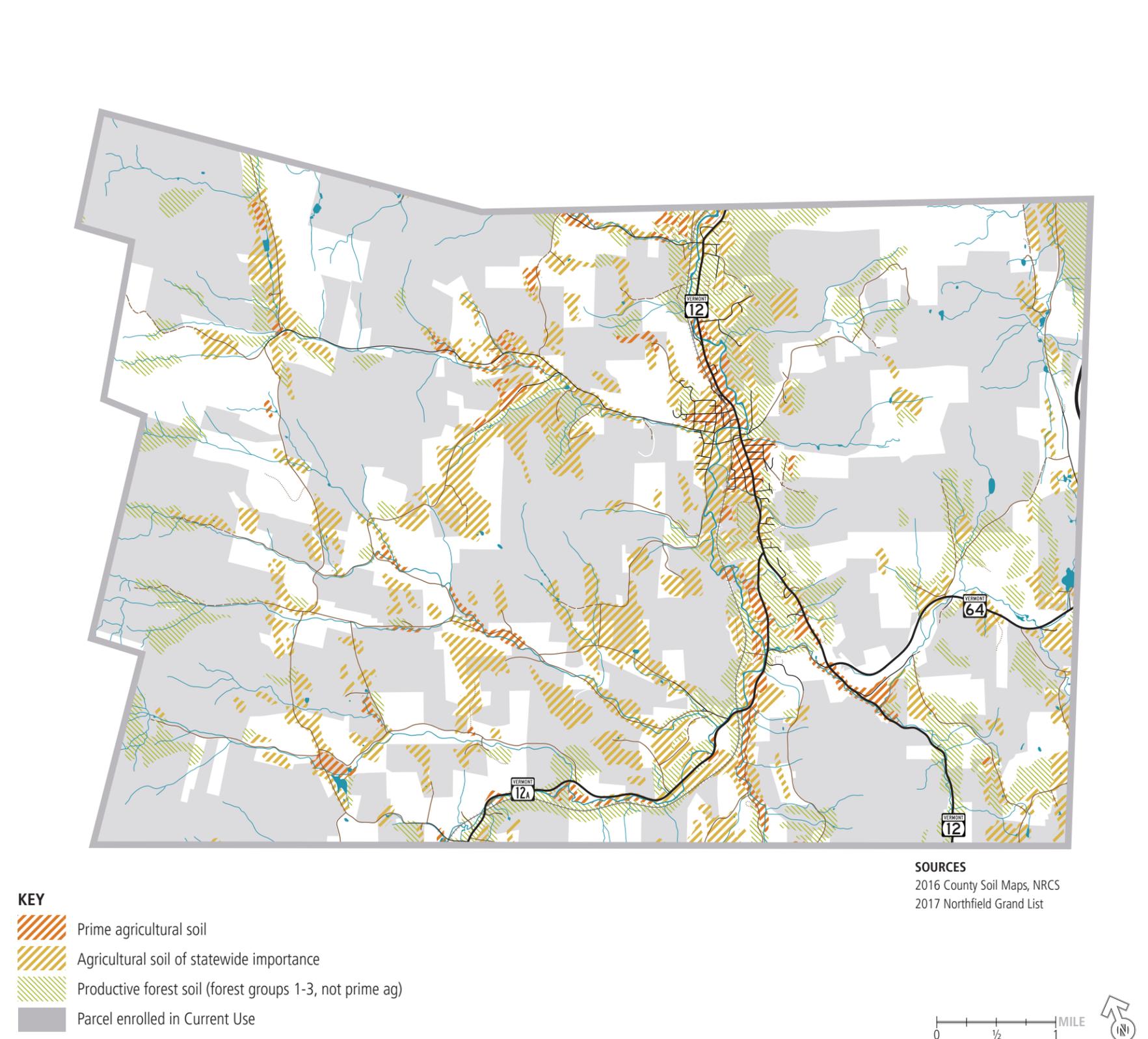
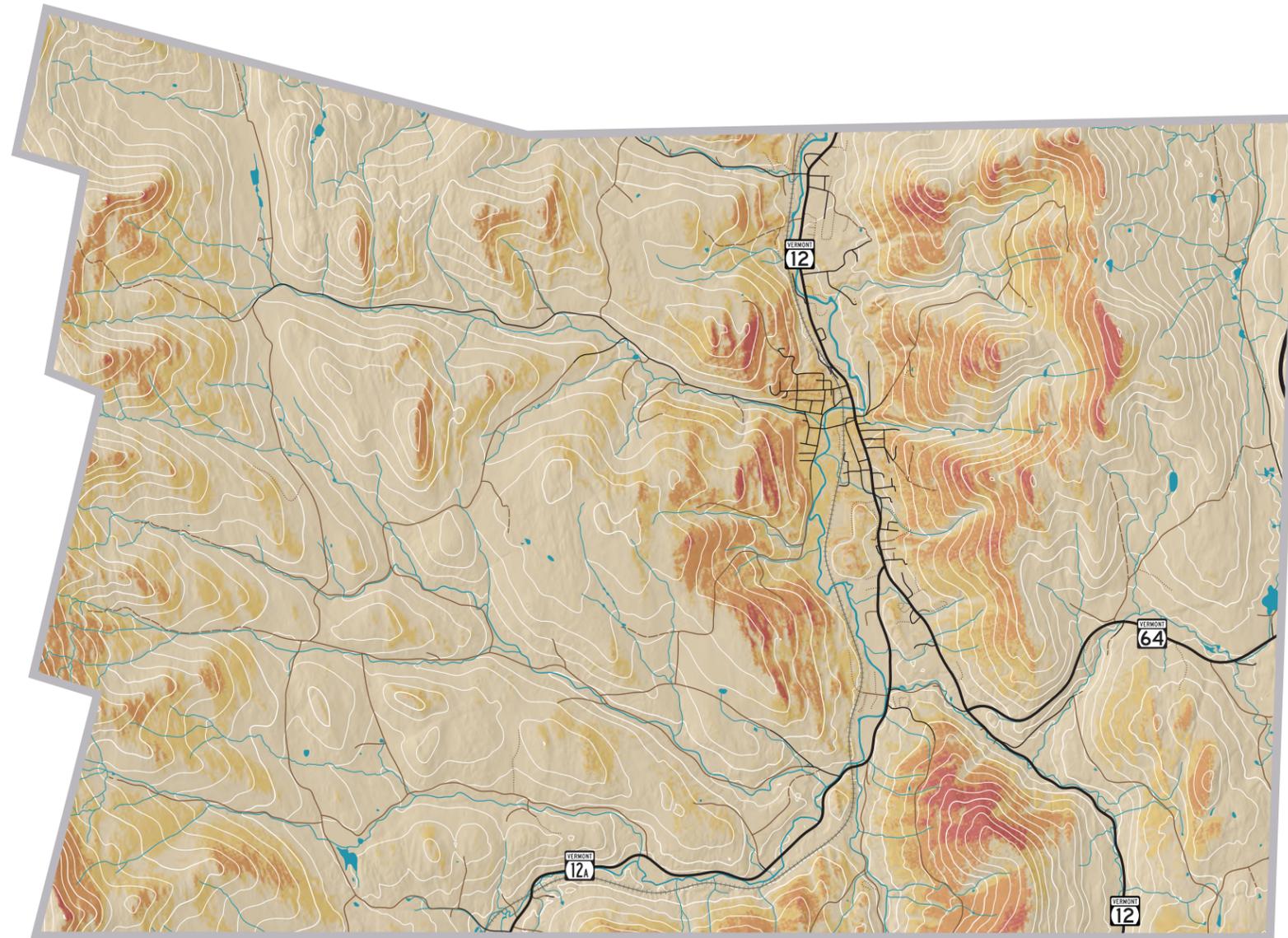


Figure 21. Viewshed Map



**KEY**

- no to limited potential for visibility
- some potential for visibility
- moderate potential for visibility
- high potential for visibility

**SOURCES**

2019 VT Lidar-Based Digital Elevation Model, VGGI

Viewshed analysis from a series of 392 vantage points distributed along public roads in Northfield. Highest visibility location was visible from 172 of those points. Locations with no to limited potential were visible from 20 or fewer points. Based on bare-earth conditions, which do not take tree cover or other view obstructions into consideration.



Figure 22. Northfield Conservation Commission

The [Northfield Conservation Commission](#) (NCC) serves in an advisory capacity to the Planning Commission and Selectboard. It promotes stewardship of natural and cultural resources in Northfield by:

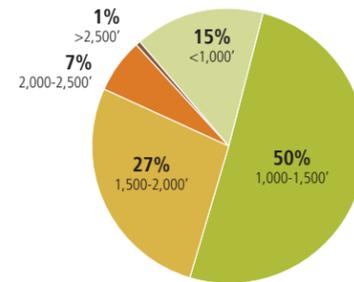
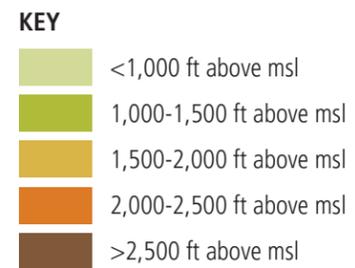
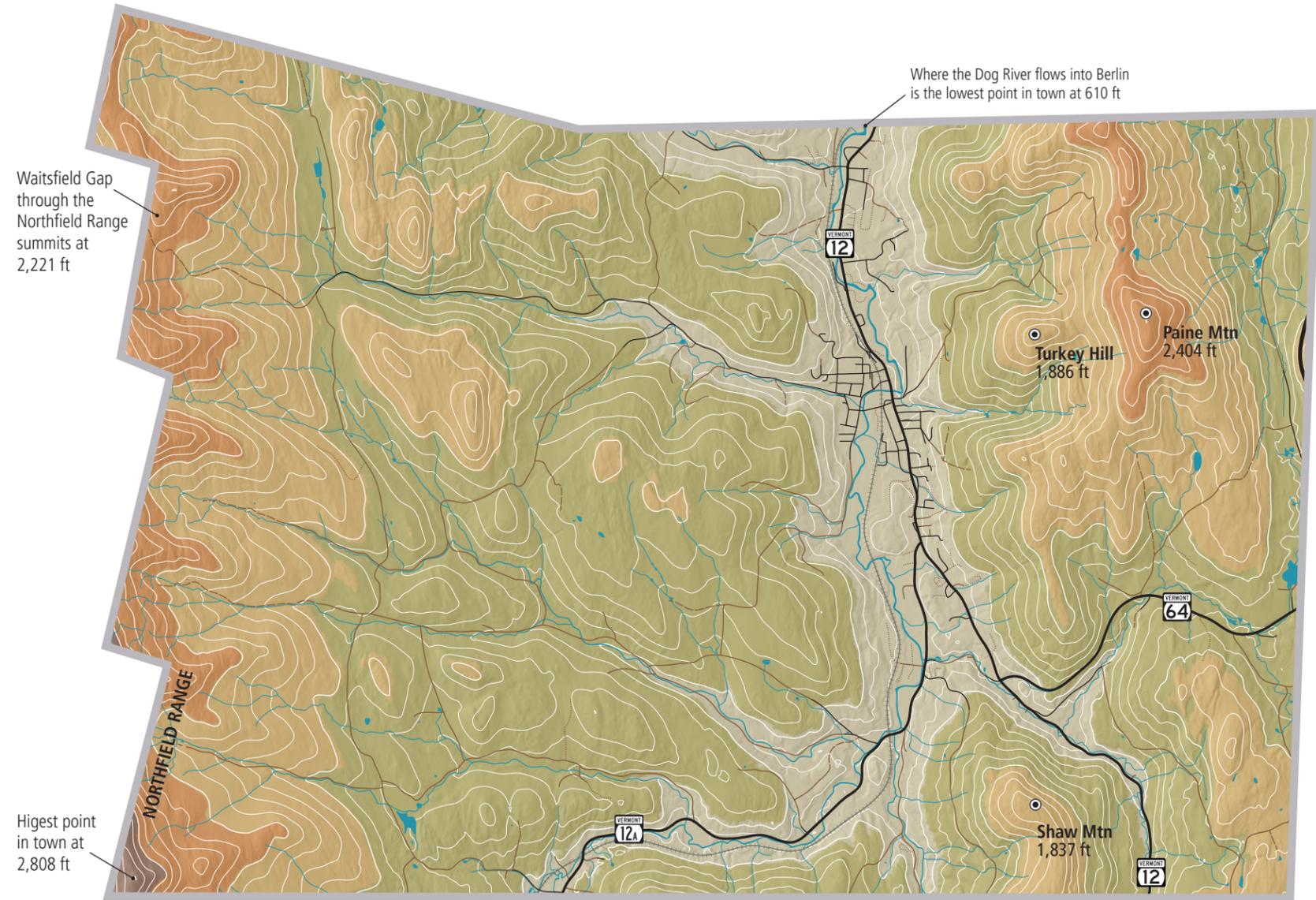
- ▶ Serving as an educational resource to identify and protect Northfield's natural resources;
- ▶ Supporting the Northfield Town Plan;
- ▶ Safeguarding the Dog River and associated tributaries;
- ▶ Promoting recreational activities that create a healthy and sustainable community for present and future generations; and
- ▶ Providing guidance to the municipality and private land owners for sustainable land use management applications.

Since its formation in 2007, the NCC has been very active in working to conserve town resources and protect the local environment including:

- ▶ Adding the summit of Paine Mountain to the Town Forest, increasing its conservation and recreation value.
- ▶ Ongoing management and protection of the Town Forests including Natural Resource Inventories and drafting the [2019 Northfield Town Forest Stewardship Plan](#) (see [page 8](#)).
- ▶ Protecting water quality by riparian plantings as discussed in [Figure 15](#) ([page 20](#)), trail work to reduce erosion, and other means.
- ▶ Undertaking [tree inventories](#) to complete a tree management plan, in order to prevent damage from pests, protect roadways, and maintain scenic road resources.



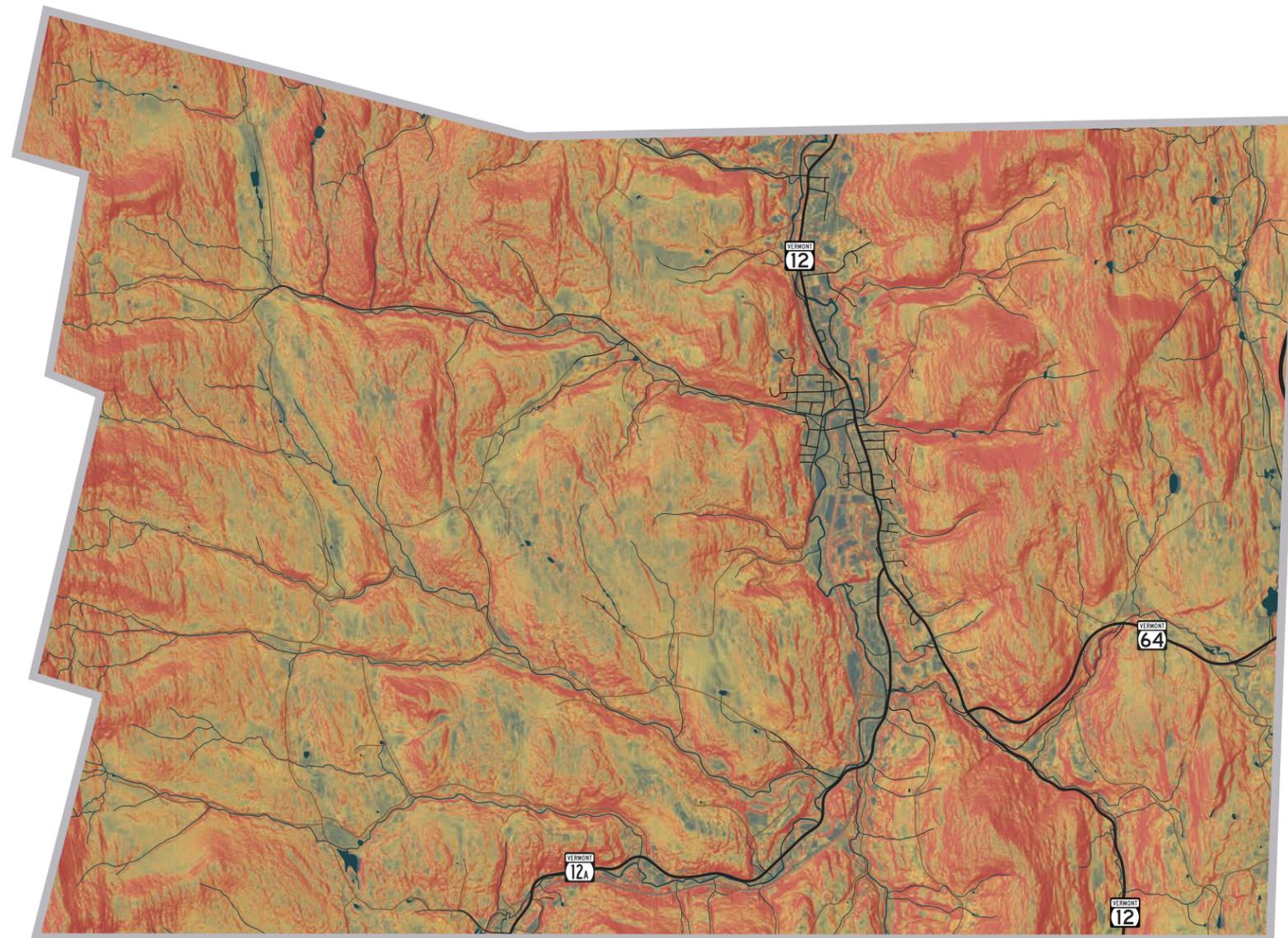
Figure 23. Elevation Map



**SOURCES**  
2019 VT Lidar-Based Digital Elevation Model, VGGI

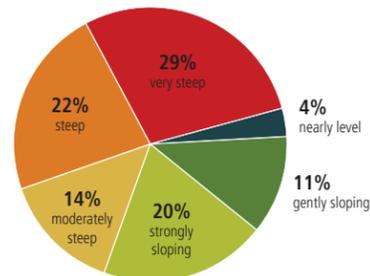


Figure 24. Slope Map



KEY

- Up to 3%, nearly level
- 3% to 8%, gently sloping
- 8% to 15%, strongly sloping
- 15% to 20%, moderately steep
- 20% to 30%, steep
- More than 30%, very steep



SOURCES  
2019 VT Lidar-Based Slope, VGI

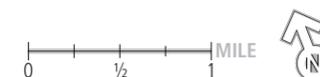


Figure 25. Steep Slopes

Slope needs to be considered when determining the suitability of land for future use or development. The USDA Natural Resource Conservation Service classifies slopes and their suitability for development as follows:

|             |  |
|-------------|--|
| up to 3%    | <b>Nearly Level</b><br>subject to flooding or poor drainage  |
| >3% to 8%   | <b>Gently Sloping</b><br>generally suitable for development  |
| >8% to 15%  | <b>Strongly Sloping</b><br>suitable for development with appropriate stormwater management practices |
| >15% to 20% | <b>Moderately Steep</b><br>may be developed with professional design and engineering                 |
| >20% to 30% | <b>Steep</b><br>poorly suited for development, minimize land clearing and disturbance                |
| >30%        | <b>Very Steep</b><br>not suitable for development, avoid land clearing and disturbance               |

Much of Northfield’s landscape is characterized by hilly or rugged terrain, which presents challenges for land development – more than half of the town’s land area is steep or very steep based on the USDA classification above.

Protecting steep slopes preserves the natural beauty and rural character intrinsic to many areas of town. [Figure 21 \(page 23\)](#) shows that much of the highly visible areas of town are sloping hillsides and their ridgelines.

Potential environmental impacts of clearing, disturbing and building on steep slopes can include increased erosion, landslides, sedimentation and flooding. It is more complicated to develop, install septic systems and build on steep slopes, resulting in higher development and housing costs.

Development on steep slopes, particularly in remote areas, is also more expensive for the town and others to service. It is more difficult for emergency, utility and service vehicles to access development on steep hillsides. Steep roads and driveways increase the likelihood of car accidents. Steep roads and driveways are more likely to suffer wash-outs or other damage during severe storms.

The land use recommendations of this plan include:

- ▶ Maintaining forest cover and a low density of development in areas characterized by steep to very steep slopes;
- ▶ Limiting forest clearing and soil disturbance associated with development on steep to very steep slopes;
- ▶ Setting maximum grades for new or extended roads and driveways, and prohibiting access to new development from Class 4 roads unless upgraded to meet Class 3 standards or better; and
- ▶ Requiring professionally prepared stormwater management plans for development on steep slopes.

Figure 26. **On-Site Wastewater and Potable Water Systems**

Outside those areas of Northfield served by municipal water and/or sewer systems as shown on [Figure 32 \(page 36\)](#), the ability of soils to treat wastewater, and the quality and quantity of groundwater also need to be considered when determining the suitability of land for future use or development. The siting of septic systems and wells, along with their required isolation distances, has a significant influence over rural development patterns and densities – and under current state rules, it likely limits development potential in many rural parts of Northfield to a greater degree than the town’s land use regulations.

The Vermont Agency of Natural Resources (ANR) has classified soil types by their suitability for on-site septic systems:

|                  |  |
|------------------|--|
| <b>Group I</b>   | <b>Well Suited</b><br>soils not constrained (expect good performance and low maintenance)                    |
| <b>Group II</b>  | <b>Moderately Suited</b><br>some constraints (slow permeability, depth to bedrock, slope, high water table)  |
| <b>Group III</b> | <b>Marginally Suited</b><br>severe constraints (special design, higher cost installation, extra maintenance) |
| <b>Group IV</b>  | <b>Not Suited</b><br>soils too wet, shallow, steep or lack permeability for septic systems                   |

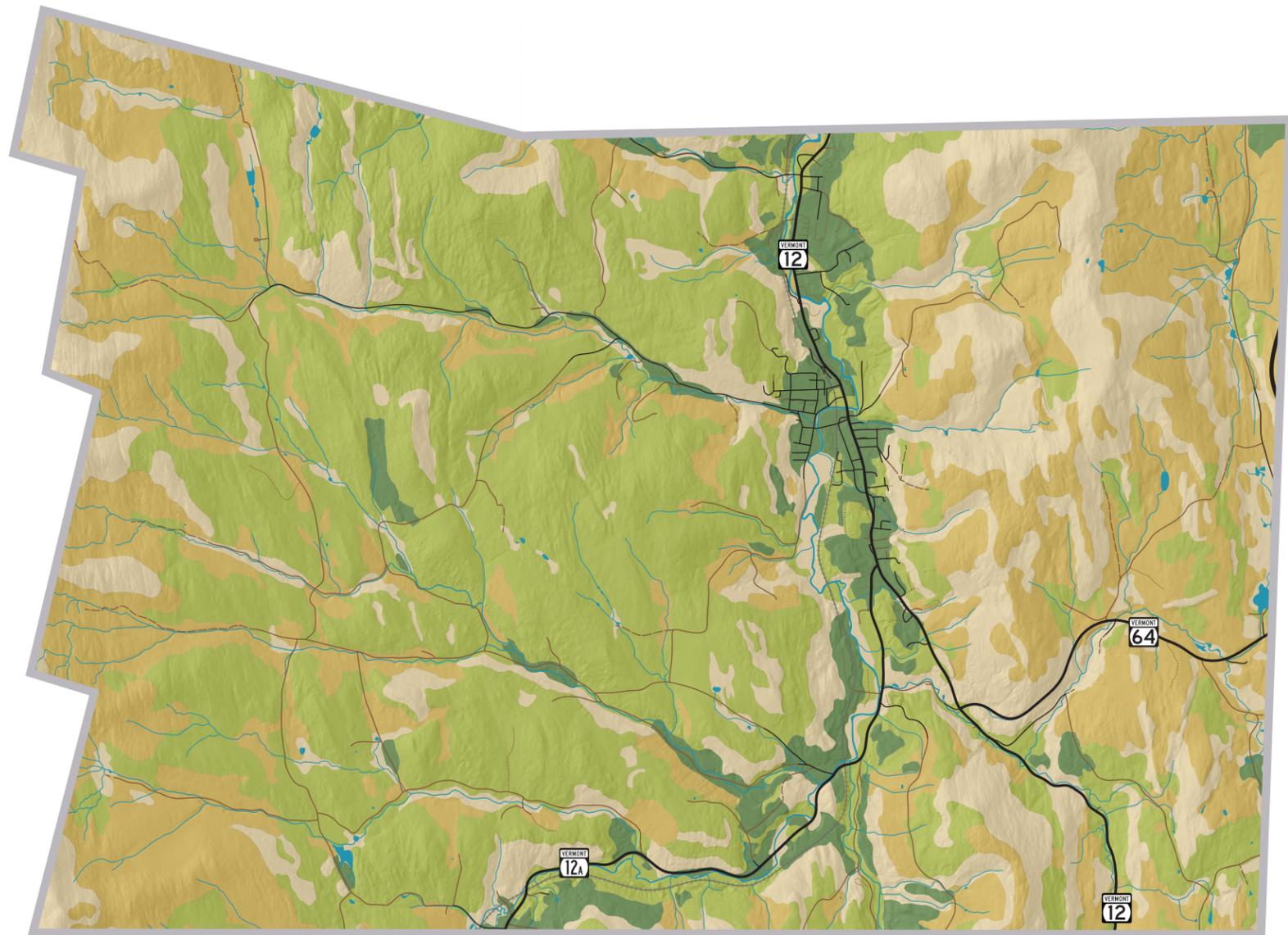
A significant amount of Northfield’s uplands have soil with constraints like steep slope, shallow depth to bedrock, or high water table, which present challenges for land development – 52% of the town’s soils are marginally or not suited for on-site septic systems based on the classification above.

There has not been a local groundwater study completed in Northfield so the availability of potable water as a potential development constraint cannot be adequately assessed.

Vermont has adopted [Wastewater System and Potable Water Supply Rules](#) to protect public health and the environment. Landowners should contact the [Springfield Regional Office](#) at 802-289-0603 for more information, but will likely need a state permit when:

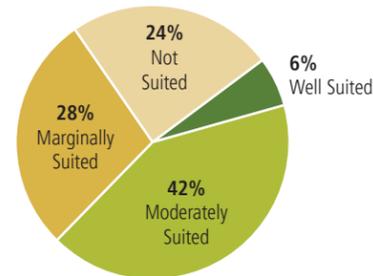
- ▶ Subdividing land;
- ▶ Constructing or modifying a wastewater or potable water system;
- ▶ Constructing a building;
- ▶ Modifying a building or its use in a manner that increases the flow or operational requires of a wastewater or potable water system (adding a bedroom to a home is considered an increase in flow); or
- ▶ Connecting an existing wastewater or potable water system to a new or modified building.

Figure 27. **Septic Suitability Map**



**KEY**

|   |                   |
|---|-------------------|
| <span style="display:inline-block; width:15px; height:15px; background-color:darkgreen;"></span>      | Well suited       |
| <span style="display:inline-block; width:15px; height:15px; background-color:mediumseagreen;"></span> | Moderately suited |
| <span style="display:inline-block; width:15px; height:15px; background-color:lightgreen;"></span>     | Marginally suited |
| <span style="display:inline-block; width:15px; height:15px; background-color:tan;"></span>            | Not suited        |



**SOURCES**  
2016 County Soil Maps, NRCS



Figure 28. Historic Resources Map

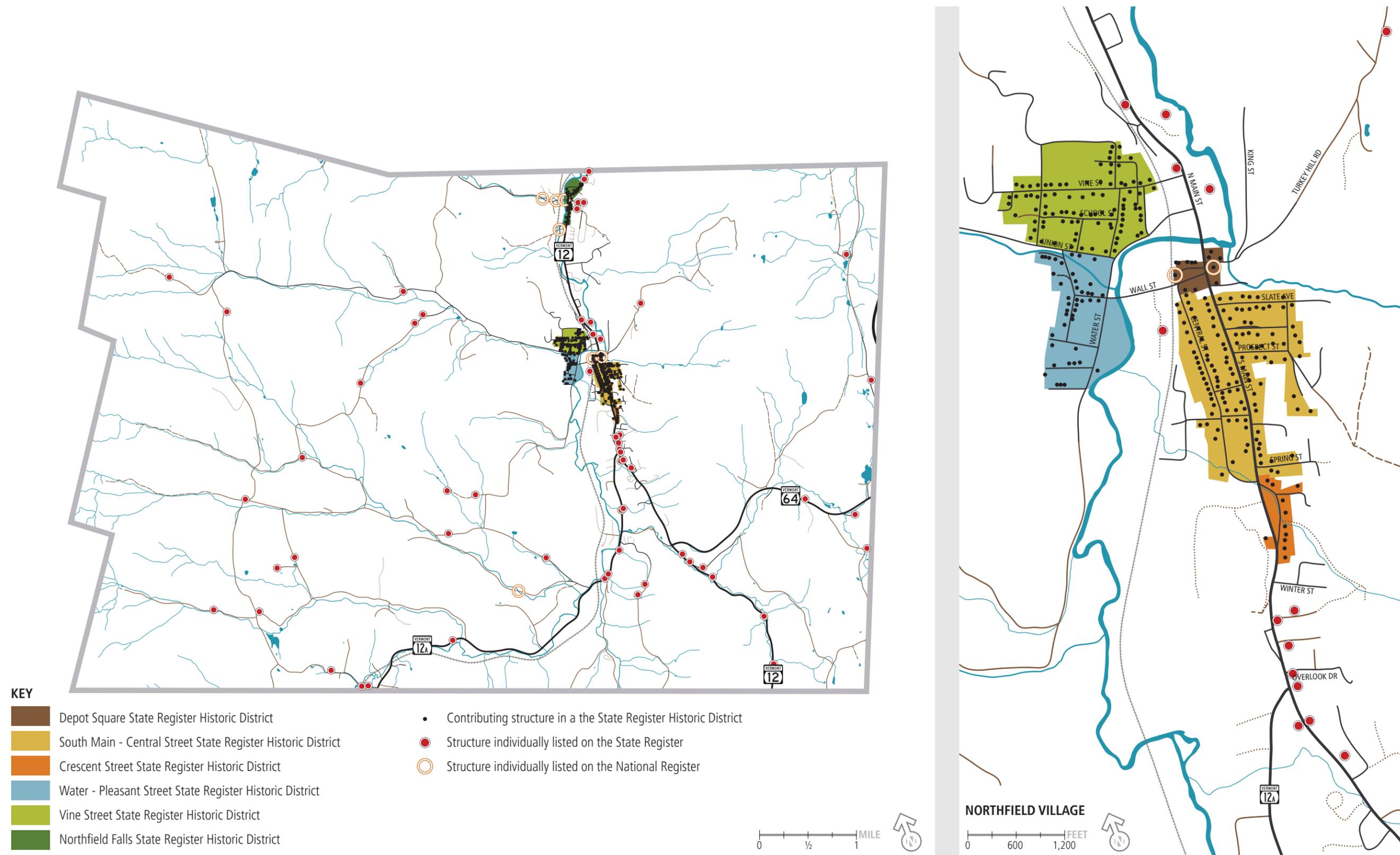


Figure 29. Listed Historic Structures

| National Register                               |     | Northfield Rd       |     | 71. 867 S Main St                             |     | 70 Richardson Ave |     | 81 North St   |     | 120 Vine St |                            | 70 Depot Sq |     | 331 Central St |     | 114 S Main St |     | Northfield Falls |  |
|---|-----|---------------------|-----|---|-----|-------------------|-----|---------------|-----|-------------|----------------------------|-------------|-----|----------------|-----|---------------|-----|------------------|--|
| <a href="#">Central Vermont Railway Depot</a>   | 29. | 3962 Stony Brook Rd | 72. | 55 Stagecoach Rd                              | 53  | Summer St         | 94  | North St      | 135 | Vine St     | 9                          | East St     | 356 | Central St     | 119 | S Main St     | 7   | Cox Brook Rd     |  |
| <a href="#">Mayo Building</a>                   | 30. | address unknown     | 73. | address unknown                               | 97  | Summer St         | 97  | North St      | 142 | Vine St     | 29                         | East St     | 374 | Central St     | 128 | S Main St     | 12  | Davis Ave        |  |
| <a href="#">Northfield Falls Covered Bridge</a> | 31. | 505 Hallstrom Rd    | 74. | 168 N Main St                                 | 98  | Summer St         | 30  | Pearl St      | 150 | Vine St     | 28                         | N Main St   | 429 | Central St     | 135 | S Main St     | 17  | Davis Ave        |  |
| <a href="#">Slaughter House Covered Bridge</a>  | 32. | 540 Bear Farm Rd    | 75. | 16 Vine St                                    | 41  | Union St          | 44  | Pearl St      | 182 | Vine St     | 7                          | S Main St   | 456 | Central St     | 152 | S Main St     | 11  | Mill St          |  |
| <a href="#">Upper Cox Brook Covered Bridge</a>  | 33. | 1564 Union Brook Rd | 76. | 423 N Main St                                 | 77  | Union St          | 58  | Pearl St      | 193 | Vine St     | 51                         | S Main St   | 38  | Elm St         | 176 | S Main St     | 21  | Mill St          |  |
| <a href="#">Lower Cox Brook Covered Bridge</a>  | 34. | address unknown     | 77. | 7 Belknap St                                  | 95  | Union St          | 64  | Pearl St      | 206 | Vine St     | 58                         | S Main St   | 43  | Elm St         | 183 | S Main St     | 33  | Mill St          |  |
| <a href="#">Stony Brook Covered Bridge</a>      | 35. | 462 Gib Ln          | 78. | 81 Freight Yard Way                           | 275 | Wall St           | 65  | Pearl St      | 220 | Vine St     | 61                         | Wall St     | 50  | Elm St         | 198 | S Main St     | 48  | Mill St          |  |
|   | 36. | 210 Morning Star Ln | 79. | Water-Pleasant Historic District              | 276 | Wall St           | 84  | Pearl St      | 221 | Vine St     | <b>S Main - Central St</b> |             | 59  | Elm St         | 203 | S Main St     | 49  | Mill St          |  |
|   | 37. | address unknown     | 80. | Vine Street Historic District                 | 287 | Wall St           | 94  | Pearl St      | 243 | Vine St     | 25                         | Central St  | 72  | Elm St         | 212 | S Main St     | 66  | Mill St          |  |
|   | 38. | address unknown     | 81. | Crescent Street Historic District             | 288 | Wall St           | 104 | Pearl St      | 273 | Vine St     | 40                         | Central St  | 106 | Elm St         | 232 | S Main St     | 93  | Mill St          |  |
|   | 39. | 368 Smith Hill Rd   | 82. | Depot Square Historic District                | 304 | Wall St           | 108 | Pearl St      | 282 | Vine St     | 47                         | Central St  | 143 | Highland Ave   | 245 | S Main St     | 312 | VT Rt 12 N       |  |
|   | 40. | 1468 Smith Hill Rd  | 83. | South Main - Central Street Historic District | 302 | Water St          | 111 | Pearl St      | 298 | Vine St     | 49                         | Central St  | 228 | Highland Ave   | 246 | S Main St     | 328 | VT Rt 12 N       |  |
|   | 41. | address unknown     | 84. | Town Bridge #57                               | 310 | Water St          | 122 | Pearl St      | 301 | Vine St     | 64                         | Central St  | 230 | Highland Ave   | 258 | S Main St     | 333 | VT Rt 12 N       |  |
|   | 42. | 50 Chamberlin Rd    | 85. | Vine Street Bridge (relocated)                | 324 | Water St          | 132 | Pearl St      | 322 | Vine St     | 86                         | Central St  | 268 | Highland Ave   | 263 | S Main St     | 348 | VT Rt 12 N       |  |
|   | 43. | address unknown     |     |   | 491 | Water St          | 19  | School St     | 334 | Vine St     | 87                         | Central St  | 12  | Highland Ave   | 274 | S Main St     | 376 | VT Rt 12 N       |  |
|   | 44. | address unknown     |     |   | 34  | Western Ave       | 20  | School St     | 360 | Vine St     | 108                        | Central St  | 57  | Highland Ave   | 277 | S Main St     | 381 | VT Rt 12 N       |  |
|   | 45. | 1300 W Hill Rd      |     |   | 46  | Western Ave       | 40  | School St     | 361 | Vine St     | 125                        | Central St  | 79  | Highland Ave   | 291 | S Main St     | 420 | VT Rt 12 N       |  |
|   | 46. | 436 W Hill Rd       |     |   | 56  | Western Ave       | 45  | School St     | 373 | Vine St     | 134                        | Central St  | 95  | Highland Ave   | 294 | S Main St     | 451 | VT Rt 12 N       |  |
|   | 47. | 330 W Hill Rd       |     |   | 94  | Western Ave       | 54  | School St     | 374 | Vine St     | 137                        | Central St  | 115 | Prospect St    | 306 | S Main St     | 467 | VT Rt 12 N       |  |
|   | 48. | 1151 VT Rt 12 S     |     |   | 113 | Western Ave       | 68  | School St     | 382 | Vine St     | 160                        | Central St  | 116 | Prospect St    | 307 | S Main St     | 508 | VT Rt 12 N       |  |
|   | 49. | 1267 VT Rt 12 S     |     |   |     |                   | 88  | School St     | 401 | Vine St     | 161                        | Central St  | 45  | Prospect St    | 341 | S Main St     | 514 | VT Rt 12 N       |  |
|   | 50. | 672 Winch Hill Rd   |     |   |     |                   | 91  | School St     | 408 | Vine St     | 173                        | Central St  | 50  | Prospect St    | 342 | S Main St     | 523 | VT Rt 12 N       |  |
|   | 51. | 818 Winch Hill Rd   |     |   |     |                   | 103 | School St     | 152 | Water St    | 176                        | Central St  | 55  | Prospect St    | 349 | S Main St     | 536 | VT Rt 12 N       |  |
|   | 52. | 98 Mckain Rd        |     |   |     |                   | 108 | School St     | 210 | Water St    | 187                        | Central St  | 66  | Prospect St    | 354 | S Main St     | 564 | VT Rt 12 N       |  |
|   | 53. | 416 Mckain Rd       |     |   |     |                   | 126 | School St     |     |             | 188                        | Central St  | 69  | Prospect St    | 367 | S Main St     | 571 | VT Rt 12 N       |  |
|   | 54. | address unknown     |     |   |     |                   | 127 | School St     |     |             | 200                        | Central St  | 84  | Prospect St    | 376 | S Main St     | 617 | VT Rt 12 N       |  |
|   | 55. | 646 Turkey Hill Rd  |     |   |     |                   | 140 | School St     |     |             | 201                        | Central St  | 91  | Prospect St    | 404 | S Main St     | 620 | VT Rt 12 N       |  |
|   | 56. | 95 VT Rt 12 S       |     |   |     |                   | 154 | School St     |     |             | 217                        | Central St  | 35  | Slate Ave      | 421 | S Main St     | 644 | VT Rt 12 N       |  |
|   | 57. | 21 White Rd         |     |   |     |                   | 176 | School St     |     |             | 218                        | Central St  | 50  | Slate Ave      | 423 | S Main St     | 670 | VT Rt 12 N       |  |
|   | 58. | 833 VT Rt 12 N      |     |   |     |                   | 64  | School St Ext |     |             | 226                        | Central St  | 60  | Slate Ave      | 434 | S Main St     | 671 | VT Rt 12 N       |  |
|   | 59. | 94 Gould Rd         |     |   |     |                   | 29  | Traverse St   |     |             | 231                        | Central St  | 65  | Slate Ave      | 443 | S Main St     | 692 | VT Rt 12 N       |  |
|   | 60. | 81 Davis Ave        |     |   |     |                   | 43  | Traverse St   |     |             | 238                        | Central St  | 79  | Slate Ave      | 454 | S Main St     | 718 | VT Rt 12 N       |  |
|   | 61. | address unknown     |     |   |     |                   | 106 | Union St      |     |             | 251                        | Central St  | 82  | Slate Ave      | 455 | S Main St     | 752 | VT Rt 12 N       |  |
|   | 62. | address unknown     |     |   |     |                   | 142 | Union St      |     |             | 252                        | Central St  | 96  | Slate Ave      | 471 | S Main St     | 759 | VT Rt 12 N       |  |
|   | 63. | 142 Gould Rd        |     |   |     |                   | 180 | Union St      |     |             | 266                        | Central St  | 103 | Slate Ave      | 489 | S Main St     | 768 | VT Rt 12 N       |  |
|   | 64. | address unknown     |     |   |     |                   | 204 | Union St      |     |             | 267                        | Central St  | 112 | Slate Ave      | 32  | Spring St     |     |                  |  |
|   | 65. | 1124 S Main St      |     |   |     |                   | 24  | Union St      |     |             | 276                        | Central St  | 128 | Slate Ave      | 37  | Spring St     |     |                  |  |
|   | 66. | 1137 S Main St      |     |   |     |                   | 56  | Union St      |     |             | 281                        | Central St  | 163 | Slate Ave      | 48  | Spring St     |     |                  |  |
|   | 67. | address unknown     |     |   |     |                   | 84  | Union St      |     |             | 281                        | Central St  | 27  | South St       | 91  | Spring St     |     |                  |  |
|   | 68. | 1037 S Main St      |     |   |     |                   | 75  | Vine St       |     |             | 292                        | Central St  | 28  | South St       | 24  | Washington St |     |                  |  |
|   | 69. | 1005 S Main St      |     |   |     |                   | 86  | Vine St       |     |             | 293                        | Central St  | 78  | S Main St      | 41  | Washington St |     |                  |  |
|   | 70. | 933 S Main St       |     |   |     |                   | 108 | Vine St       |     |             | 312                        | Central St  | 93  | S Main St      | 101 | Washington St |     |                  |  |
|   |     |                     |     |   |     |                   | 109 | Vine St       |     |             | 317                        | Central St  | 98  | S Main St      | 119 | Washington St |     |                  |  |

## OBJECTIVES

- 1 Maintain a safe and efficient multi-modal transportation system that is capable of supporting the land use, resource protection and economic development goals, objectives, policies and recommendations of this plan.
- 2 Provide transportation facilities and services that will allow people to travel into, out of and within Northfield by means other than private motor vehicles (rail, transit, biking, carpooling).

## POLICIES

- 1 Promote compact neighborhoods in and between Northfield Village and Northfield Falls to reduce the distance residents need to travel for work, shopping and services, and to improve the viability of transit service.
- 2 Focus commercial and industrial development in those areas designated for downtown business, general business and mixed use on the Future Land Use Map, [Figure 6 \(page 9\)](#) where it can be served by existing transportation infrastructure and transit service.
- 3 Call upon the state to maintain and improve their highways, bridges and associated infrastructure as necessary to support existing and future land use and economic development as envisioned in this plan.
- 4 Maintain and improve town highways, bridges and associated infrastructure as necessary to support existing and future land use and economic development as envisioned in this plan.
- 5 Seek improved access management along state highways and arterial streets.
- 6 Seek improved accommodation for bicyclists and pedestrians along state highways, arterial streets and village streets, including but not limited to calling upon VTrans to upgrade Route 12 with wider shoulders, bike lanes and/or an off-road path.
- 7 Incorporate electric vehicle charging stations into any new public off-street parking areas.
- 8 Avoid increasing the total length of roads maintained by the town unless it will improve the efficiency of maintenance operations and/or support development that generates adequate tax revenue to offset increased costs.
- 9 Prohibit use of Class 4 town roads and legal trails for providing access to land for purposes other than farming, forestry, conservation or recreation, and require all other new development to be accessed from maintained public or private roads.
- 10 Maintain town ownership of town roads, including Class 4 roads and legal trails, that serve or could serve as a public recreation resource or that form part of an interconnected road network.
- 11 Consider whether to discontinue or reclassify Class 3 town roads that provide access to three or fewer developed properties and that do not form part of an interconnected road network.
- 12 Require private roads to be constructed in accordance with town road standards and developers to provide a maintenance agreement or equivalent for new private roads.

## 4. TRANSPORTATION

## 4A. Existing Conditions

Streets and Highway Network

**State Highways and Bridges.** The location, capacity and condition of the three state highways in Northfield directly influence the town's land use and development pattern as evidenced by the fact that 75% of the residential structures and 95% of commercial, industrial or institutional structures in Northfield were located within 1/2 mile of a state highway as of 2018 (includes the Class 1 portion of Route 12).

As shown on [Figure 31 \(page 32\)](#), Vermont Route 12 is the major transportation corridor through Northfield – traveling north-south through the Dog River Valley, passing through both Northfield Village and Northfield Falls, and connecting Northfield to Central Vermont's employment and service center in Barre, Montpelier and Berlin. Vermont Route 12A provides an alternate route between Northfield and Randolph, while Vermont Route 64 connects Route 12 in Northfield to Route 14 in Williamstown and to Interstate 89 at Exit 5. VTrans classifies all three highways as major collectors that gather traffic from the local road network and feed arterial highways.

There is limited information about the current condition and capacity of state highways in Vermont. The Vermont Agency of Transportation last updated their highway sufficiency ratings in 2008 at which time Routes 12 and 12A through Northfield were classified as being in poor condition, while Route 64 was in good condition. VTrans improved and resurfaced Route 12A from Roxbury to Northfield Village in 2017 due to the substantial damage it sustained during Tropical Storm Irene in 2011.

The State Transportation Improvement Program (STIP) for 2018-2021 did not identify any other planned transportation projects on state highways in Northfield. There were no state bridge or highway projects in Northfield listed in Central Vermont Regional Planning Commission's 2018 Transportation Project Priorities.

The amount of traffic on the state highways in Northfield generally declined between 2000 and 2015 suggesting that there are not capacity issues. According to data from the 2008 Central Vermont Regional Transportation Plan, the level of service (LOS) in 2006 on Routes 12 and 64 was C (minor congestion and back-up at intersections) and on Route 12A was B (insignificant delays at intersections). It is VTrans policy to maintain a LOS rating of C or higher except within densely settled areas where a lower LOS may be acceptable.

VTrans identified 5 sections of Route 12 and the intersection of Routes 12 and 64 as high crash locations based on 2012-2016 data. All of these

ranked relatively low on the statewide list of high crash locations and as of 2018 VTrans had no plans for improvements in these locations. The appendix to the 2008 Central Vermont Regional Transportation Plan included an analysis of the Routes 12 and 64 intersection with specific recommendations for improvements (page 16-21).

There are 6 long bridges (>20 feet) on state highways in Northfield – 2 on Route 12 and 4 on Route 12A. According to VTrans inspection reports as of 2018, 5 of those bridges were in fair or good condition with only minor repairs needed.

The North Main Street bridge over the Dog River in the center of downtown needs extensive rehabilitation or replacement (see inspection report). The Central Vermont Regional Planning Commission has identified the North Main Street bridge as the top priority bridge project for the region. The North Main Street bridge was ranked 15<sup>th</sup> on VTrans' statewide bridge priority list. VTrans was beginning the scoping process for the replacement of the North Main Street bridge as of 2019.

**Town Roads and Bridges.** Northfield maintains approximately 74 miles of town road, 53 miles of which are unpaved as shown on [Figure 31 \(page 32\)](#). The town has approximately 8.5 additional miles of Class 4 roads that are not maintained for year-round travel. There is less than 1 mile of legal trails no longer maintained, but available for recreational use (see [Northfield General Highway Map](#)). Northfield uses a Road Surface Management System (RSMS) to assess the condition of town roads and prioritize road improvement projects.

There are 23 long bridges (>20 feet) and 17 short bridges (6-20 feet) on town roads in Northfield. VTrans bridge inspection reports indicate that at least 7 of the long bridges needed major rehabilitation as of 2018. According to culvert inventory data, there were also 89 culverts in urgent or critical condition and 116 in poor condition in Northfield as of 2018. The town has increased its capital budget funding for bridges and culverts in recent years.

New state permitting requirements under Act 64 will require Northfield to significantly reduce stormwater-related erosion from town roads, which will require improvements to town roads and associated infrastructure. The town has begun to address Act 64 requirements by obtaining grant funding for drainage and culvert work on several town roads in recent years.

The amount spent on town roads represents about 30% of Northfield's operating budget each year (not including capital expenses). That amounted to approximately \$12,000 in highway department costs per mile of town road in FY 2016-17. The RSMS, bridge inspection and

culvert inventory data all point to a need for greater investment in town road and associated infrastructure.

Given the dispersed, low-density land use pattern in the outlying areas of Northfield, it is possible for the cost of maintaining a town road to exceed the municipal taxes paid by the properties it serves. As a result, the town seeks to avoid further expansion or substantial upgrades of the maintained town road network in low-density areas. Further, Northfield should ensure that any property owner seeking to use a Class 4 road or legal trail to provide access to new development upgrades the road to at least Class 3 standards and agrees to maintain the upgraded road segment to those standards.

**Private Roads.** There were more than 40 private roads in Northfield totaling about 8 miles as of 2018. It is likely that most future development not accessible from the existing road network would be accessed from private roads. Northfield should ensure that new private roads are built to basic standards, including adequate emergency access and stormwater management, and that there is a formal maintenance agreement between the owners of the properties served by the road. This could avoid damage to public infrastructure caused by poorly constructed or maintained private infrastructure or future liability for taking over and repairing failed private infrastructure.

### Transit Service and Public Parking

**Transit.** Green Mountain Transit (GMT) is the public transit provider in central and northwestern Vermont. GMT offers commuter, deviated fixed routes and demand response shuttle service. As of 2018, GMT offered weekday commuter service along Route 12 from Norwich University to downtown Montpelier with stops in Northfield Village and Northfield Falls, as well as a community shuttle service one day per week from Northfield to the Berlin Mall primarily intended to serve seniors and other groups of residents who may not have access to private transportation. The town provides funding each year to support Green Mountain Transit (\$21,000 for the Northfield Commuter Service, and \$3,350 for the Community Shuttle Service in FY 2019-20). As of 2018, there was also a commuter bus operated by Stagecoach Transportation Services linking Montpelier to Randolph along the I-89 corridor that stopped at the Exit 5 park-and-ride.

**Parking.** There is a significant amount of on-street parking downtown (approximately 90 spaces around Depot Square and along the Mayo block), and a 30-space municipal parking lot located behind the American Legion building on Depot Square in downtown. All of the remaining off-street parking downtown is private. On-street parking is allowed on most village streets, but Northfield's traffic ordinance prohibits on-street parking overnight during the winter months.

A lack of off-street parking or the inability to expand the number of spaces limits the full use and occupancy of some downtown buildings. Current parking requirements and regulations also create a challenge for adding housing units or opening small businesses in village areas. As of 2018, Northfield's zoning regulations generally required a minimum of 2 off-street parking spaces for each dwelling unit and 1 parking space for each 300 square feet of commercial or other non-residential space. The 2016 Area Wide Plan includes recommended changes to increase the amount of parking downtown.

VTrans has a 25-space park and ride off Route 64 at Exit 5, just over the town line in Williamstown. Expansion of that facility or construction of another park and ride at Exit 5 was listed in Central Vermont Regional Planning Commission's 2018 Transportation Project Priorities. There is no park-and-ride facility along the Route 12 corridor, which limits the ability of residents not living within walking distance of a bus stop (center of Northfield Falls, Depot Square in Northfield Village or Norwich University) to commute by transit.

### Bicycle and Pedestrian Network

There were about 5.5 miles of sidewalks in Northfield Village as of 2018. Outside Northfield Village, bicycle and pedestrian facilities are limited. Most segments of Routes 12 and 12A through Northfield do not have shoulders adequate to accommodate bicyclists. There has long been considerable community support for improved bicycle and pedestrian facilities throughout town, particularly for a multi-use path connecting Northfield Falls, Northfield Village and Northfield Center.

Bike and pedestrian improvements within state highway rights-of-way require the approval and participation of VTrans. The state does not maintain sidewalks or paths along highways, so the town would have to agree to maintain any such facilities that might be constructed in the future. Route 12 through Northfield Village is a Class 1 town highway, which means that Northfield has taken over responsibility for maintaining that segment of state highway from VTrans. As a result, the town has greater ability to make bike and pedestrian improvements within that right-of-way.

There is a recognized need for improvements to make both Northfield Village and Northfield Falls more pedestrian and bicycle-friendly – from simple changes like providing bike racks to major projects like connecting the villages with an off-road multi-use path. A number of plans have been completed that include recommendations for making downtown more walkable and bikeable including the 2014 Vermont Downtown Action Team Report and the 2016 Area Wide Plan. The town received grant funding for another study to improve the connections between recreation areas and trail systems within and near the villages in 2019.

### Airport

There were no airports, heliports or other landing facilities in Northfield registered with the Federal Aviation Administration as of 2018. The nearest airport is the Edward F. Knapp State Airport, a state-owned general aviation airport located in the neighboring Town of Berlin. It did not offer passenger air service as of 2018. The Burlington International Airport in South Burlington, Vermont was the closest facility offering regular passenger air service (about a one-hour drive from Northfield).

### Rail

The New England Central Railroad (NECR) operates approximately 7.5 miles of track through Northfield generally paralleling the Dog River. Amtrak's Vermonter line passes through Northfield, but it no longer stops in town. Those wishing to travel to/from Northfield via rail must use either the Montpelier or Randolph stations (about a 15- to 30-minute drive from Northfield). Given the presence of Norwich University, there is considerable demand for more convenient passenger rail service in Northfield.

While potentially an economic development and transportation resource, the rail line also presents health and safety challenges as described in the 2017 All Hazards Mitigation Plan. The rail line is located in proximity to population centers, the Dog River and the municipal wells.

### 4B. Priority Needs

**Stormwater Management.** Stormwater-related improvements will be required on town roads to comply with Municipal Roads General Permit requirements, which took effect in 2018 with at least 15% of non-compliant segments upgraded to meet standards by 2021-22 and full compliance by 2036.

**Walking and Biking.** Enhancing the walkability and bikeability is another transportation priority for the town. The 2014 Vermont Downtown Action Team (VDAT) Report for Northfield and the 2016 Area Wide Plan both recommended a series of improvements that should be implemented. Some of these improvements will be completed by the private sector as part of development projects, while others will require public investment. Northfield also needs to work with CVRPC and VTrans on bike-ped improvements along the state highway portions of Route 12, particularly in an effort to connect Northfield Village and Northfield Falls. Adequate shoulders for bicycling should also be provided wherever feasible on Route 12.

**Transportation Energy.** To meet Act 174 requirements, Northfield will need to plan for reducing overall transportation energy demand and nonrenewable fuel use as discussed in [Chapter 6. Energy \(page 37\)](#). Given that municipalities have no authority to regulate private vehicle use, Northfield is limited in its ability to further state transportation energy goals. The most effective actions the town can take are to: (1) adopt land use policies that discourage scattered, low-density development in remote areas of town and encourage compact development in village areas and along major travel corridors as set forth in [Chapter 2. Land Use \(page 3\)](#), and (2) ensure that facilities and services are available so residents can choose more energy-efficient modes of transportation such as transit, carpooling, bicycling or walking.

**Projects.** Northfield will pursue the following transportation-related projects during this planning period:

- ▶ Adopt a capital program and budget that prioritizes the town’s road, bridge, culvert and sidewalk rehabilitation or replacement projects, as well as desired bike and pedestrian enhancement projects, and develop a long-range plan for addressing deferred maintenance and ensuring that town infrastructure will be maintained at an appropriate standard and in the most cost-effective manner in the future.
- ▶ Work with the state to undertake major rehabilitation or replacement of the North Main Street bridge.
- ▶ Complete a planning study for a multi-use path connecting Northfield Falls and Northfield Village.
- ▶ Work with the state and Green Mountain Transit to establish a park-and-ride lot serving Route 12 commuters and providing public parking in proximity to Northfield Village.



**Figure 30. Sidewalks, Paths and Trails**

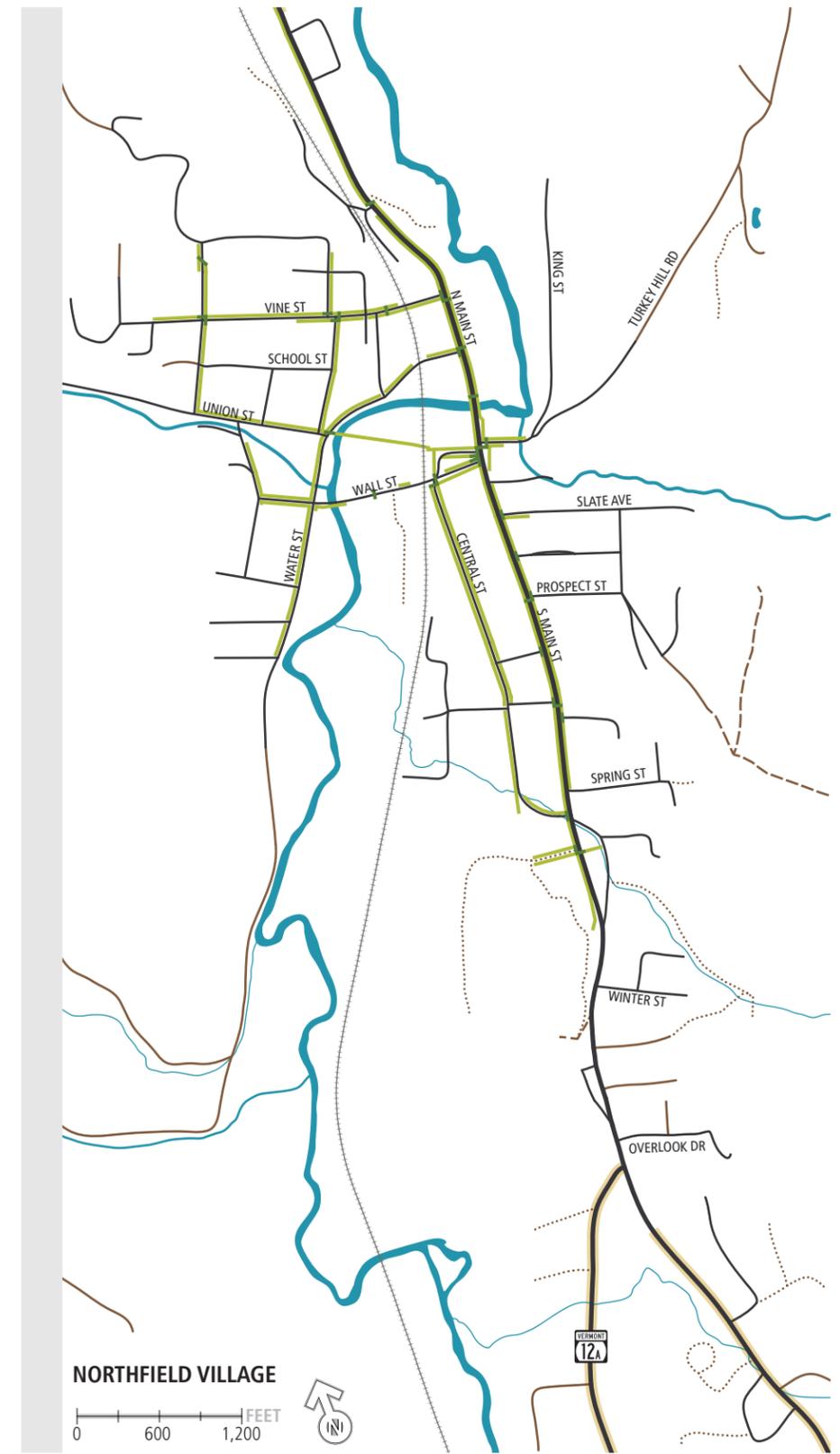
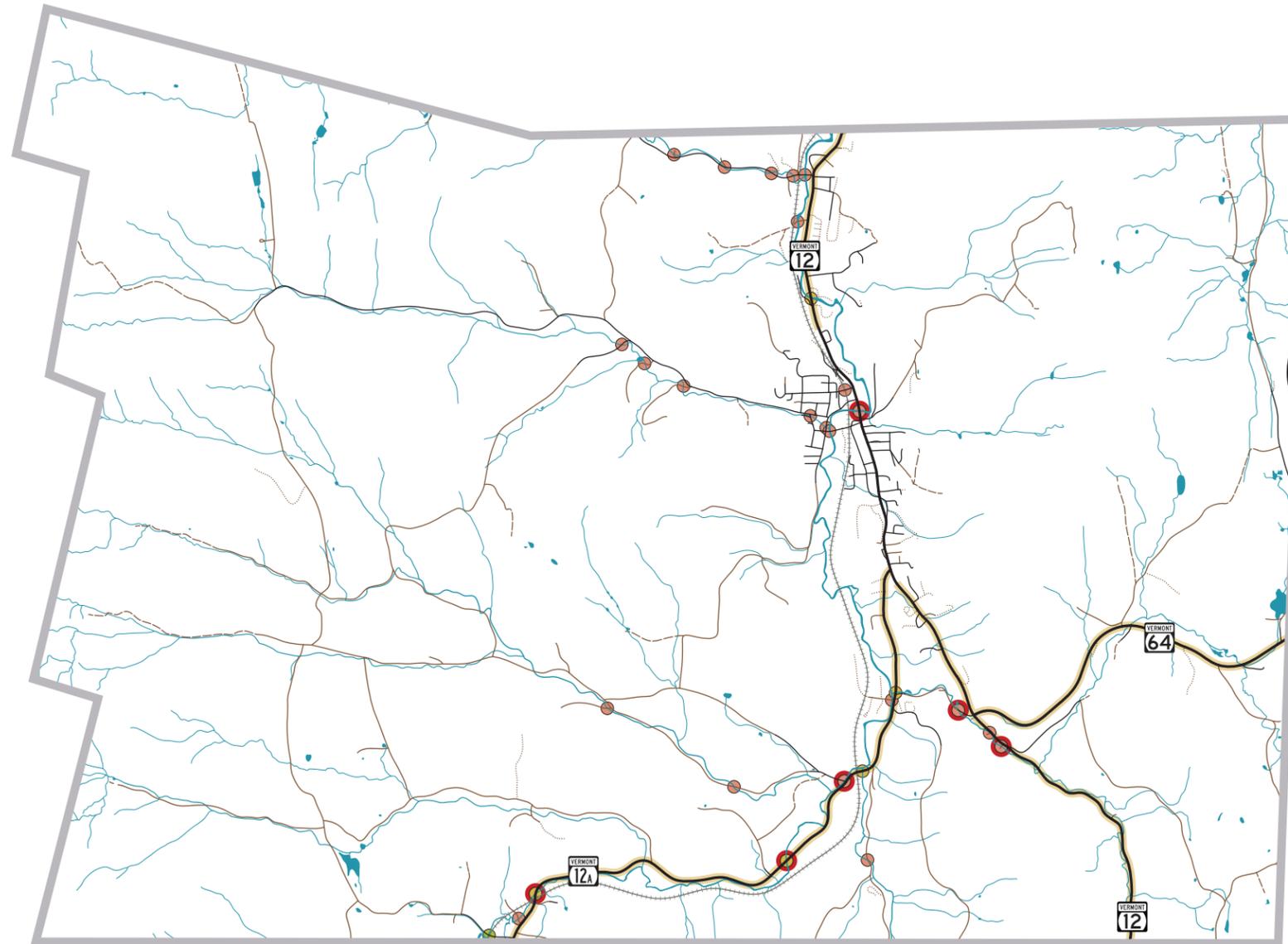
Northfield residents have expressed support for a shared-use path connecting Northfield Village and Northfield Falls for many years (see [Appendix Appendix A. Community Survey Results](#)), as well as for other connections between existing trail systems and for marketing Northfield as a destination for trail-based outdoor recreation.

The town was awarded a Better Connections grant from the Vermont Agency of Transportation in 2019 to study how to better-connect recreation resources with village centers by improving sidewalks, wayfinding signage, parking access and improving water quality and stormwater infrastructure.

Improving, expanding and inter-connecting Northfield’s network of sidewalks, paths and trails is an activity that would further objectives found in all chapters of this plan – land use, resource protection, transportation, energy, facilities, economic development, housing and flood resilience.

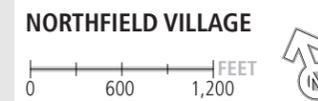


Figure 31. Transportation Map



**SOURCES**  
 2018 Road Centerline, VTrans  
 2018 Long Structures, VTrans  
 2018 Bridge Inspection Reports, VTrans

- KEY**
- State bridge
  - Town bridge
  - Railroad bridge
  - Bridge will need major rehabilitation or replacement in near future
  - State highway
  - Class 1 town highway
  - Paved Class 2 or 3 town highway
  - Unpaved Class 2 or 3 town highway
  - Class 4 town highway or legal trail
  - Private road
  - Sidewalk
  - Crosswalk



**OBJECTIVES**

- 1 Provide the utilities, facilities and services necessary to support existing and future residential, commercial, industrial and institutional uses in accordance with the goals, objectives, policies, recommendations and actions of this plan.
- 2 Have full cell phone coverage and affordable access to reliable, high-speed internet throughout town.
- 3 Keep most municipal buildings and facilities located in Northfield Village and maintain its role as the civic center of the community.
- 4 Meet the town's obligations under Vermont's Clean Water Act (Act 64).
- 5 Eliminate combined sewer overflows from the municipal wastewater system.

**POLICIES**

- 1 Focus higher-density housing, commercial, industrial and institutional development in and between Northfield Village and Northfield Falls where it can be efficiently served from existing or planned utility networks, and where the availability of that infrastructure will reduce development costs.
- 2 Ensure that stormwater run-off from developed land is managed at the source so it will not place an undue burden on public infrastructure.
- 3 Fund new or extended municipal infrastructure primarily through user fees (i.e., only water or sewer customers rather than all property taxpayers), grants or other financing mechanisms to avoid overburdening property taxpayers.
- 4 Plan for improvements to / replacements of municipal facilities, buildings, roads, equipment and vehicles to avoid higher costs resulting from deferred maintenance and sharp increases in municipal taxes.
- 5 Support the provision of quality recreation, childcare, eldercare, education, vocational training, healthcare and human services by community/regional organizations, the school district and private providers so Northfield can attract and retain a diverse population.
- 6 Support the improvement and extension of affordable, high-speed internet and cell phone service to all Northfield residents and businesses.

**5. UTILITIES, FACILITIES AND SERVICES**

**5A. Existing Conditions**

**Public Educational Facilities**

The Northfield Elementary School is located at 10 Cross Street in Northfield Village. It provides public education services for students from pre-kindergarten through grade 5, and licensed childcare services for school-age children through afterschool and summer programs. There were approximately 300 children enrolled at Northfield Elementary School during the 2017-18 school year (including those in pre-K). Enrollment has ranged between 300 and 330 students for more than 10 years; it peaked at more than 400 students in the 1990s (with no pre-K students).

The Northfield Middle and High School is located at 37 Cross Street in Northfield Village. It provides education services for students from grade 6 through 12. Northfield high school students seeking a technical education program can take classes at the Randolph Technical Career Center. There were approximately 290 students enrolled at Northfield Middle and High School during the 2017-18 school year. Enrollment has been declining for more than 10 years; it peaked at nearly 550 students in the 1990s.

The decline in student enrollment suggests that Northfield's public school facilities have adequate capacity for the foreseeable future. The Central Vermont Supervisory Union was not considering any major improvements to or expansions of public school facilities located in Northfield as of 2018.

In addition to the school buildings, the school district's property includes more than 160 acres of forestland on Garvey Hill, as well as athletic and recreation facilities. The athletic and recreation facilities are jointly managed and maintained by the school district and the Northfield Recreation Department. The trails on the Garvey Hill property are also open for public use.

**Town Government Facilities**

**Town Administration.** Northfield's town government is based at the Municipal Building located at 51 South Main Street in Northfield Village. The incorporated Village of Northfield dissolved in 2014 and all of its administrative and governance functions were consolidated with the Town of Northfield. The Municipal Building houses the town administrative, Public Works and Electric Department offices. The building provides sufficient office space for town staff and elected officials, but lacks adequate meeting space for boards and committees. An energy audit was completed and includes recommended

improvements to improve the building's efficiency. The town was not considering any plans for major improvement to or expansion of the building as of the writing of this plan.

**Highway Department.** The Northfield Highway Department is based at the town garage at 31 Dog River Drive, which is a shared facility with the Northfield Ambulance Service. The town has a site for storing sand and salt at the end of Burnham Road, but that does not provide covered storage for road materials. The town was not considering any plans for major improvement to or expansion of these facilities as of 2018. There is an ongoing need to replace vehicles and equipment as scheduled in the town's capital budget.

**Solid Waste Disposal.** Northfield is a member of the [Mountain Alliance](#), a four-town solid waste management advisory committee. The committee's [Solid Waste Implementation Plan](#) as most recently adopted is incorporated into this plan by reference. By belonging to Mountain Alliance, Northfield is meeting its obligation under state law to plan for the community's solid waste disposal needs. As of 2018, Northfield had a recycling depot and transfer station at 69 Dog River Drive where residents could take their trash during advertised hours. There is an identified need for a yard waste and composting facility – as of 2019, residents could deposit small amount of wood and yard debris at the transfer station. A number of haulers provide trash and recycling pick-up service in town.

**Public Safety Facilities and Services**

**Police Department.** Northfield has a police department that as of 2019 had 6 full-time officers and a chief, which allows the department to maintain 24-hour coverage. The department is based in the Northfield Police Station at 110 Wall Street and there were no identified needs for significant facility improvements as of 2019, although there is an ongoing need to replace vehicles and equipment as scheduled in the town's capital budget.

The police department budget in FY2019-20 was approximately \$994,000 (23% of town expenditures) including capital expenses and debt retirement (bond for police station renovation).

The Police Department made 46 arrests in 2016 (as reported in the Vermont Department of Public Safety Statewide Crime Statistics report), but responded to significantly more calls that did not result in an arrest. As a college town, Northfield has law enforcement needs that are not typical of most Vermont small towns. Norwich University does provide on-campus security, but does not go off campus to respond to student-related issues elsewhere in the community.

**Fire Department.** The Northfield Fire Department provides fire protection from the fire station at 128 Wall Street. In 2017, the department had approximately 30 active volunteer firefighters who responded to 131 calls.

Norwich University students regularly serve on the department and as a result Northfield has less difficulty maintaining an adequate roster of firefighters than most other volunteer departments in Vermont. This does result in a higher rate of turnover for responders than is typical in other departments.

The fire department budget in FY2019-20 was about \$200,000, including capital expenses for vehicle and equipment purchases. There is an ongoing need to replace vehicles and equipment as scheduled in the town's capital budget, but there were no identified needs for significant facility improvements or additional vehicles or equipment as of 2019.

**Ambulance Service.** Northfield residents receive emergency medical response and transport from the Northfield Ambulance Service, which shares a building with the Northfield Highway Department at 31 Dog River Drive. The town has recognized that relocating the Ambulance Service would be beneficial for both departments, eliminating conflicts and expanding the space available to both.

The Northfield Ambulance Service is staffed by approximately 50 part-time volunteers who get paid when they respond to a call. There is a full-time, paid ambulance director. It is a town-owned but regionalized service – providing emergency medical coverage in Northfield, Roxbury and portions of Berlin, Moretown and Brookfield. The Ambulance Service is almost entirely funded by billing patients for medical services and transport, and Berlin and Roxbury also make small financial contributions each year to support the service. The service's budget in FY2016-17 was nearly \$375,000 including both operating and capital expenses, less than 1% of which was raised through property taxes.

## Recreation and Cultural Facilities and Services

**Recreation Facilities and Services.** Northfield owns and maintains a number of recreation facilities:

- ▶ The 11-acre Memorial Park at 365 King Street offers an outdoor pool and playing fields.
- ▶ The 27-acre Northfield Falls Fields at 70 Burnham Road includes sports fields and courts.
- ▶ The 7-acre Dog River Park was created from 14 flood-damaged properties on the Dog River acquired by the town following Tropical Storm Irene in 2011. The park restores the river's natural floodplain and provides open space for passive recreation.

- ▶ Other undeveloped lands and trails open for public recreational use are discussed in [Recreational Resources \(page 19\)](#).

These facilities, in conjunction with the recreation facilities on school property, meet the community's needs for organized sports and youth recreation. There has been interest in connecting Memorial Park and the Northfield Falls Fields with an off-road multi-use path. The Dog River Park is linked by a pedestrian path to Norwich University's recreation areas and facilities. Northfield received a grant in 2019 to develop a plan for improved bike and pedestrian connections within and between Northfield Village and Northfield Falls.

Norwich University offers gym and pool memberships to Northfield residents (for a fee). Community members also have use of the Norwich's Shaw Center and trails on Paine Mountain as discussed in [Recreational Resources \(page 19\)](#).

Northfield relies upon a volunteer Recreation Committee and hires seasonal staff to oversee the town's recreation facilities and youth sports and summer programs. The total budget (operating and capital expenses) for parks and recreation was about \$120,000 in FY2016-17, 60% of which was spent on the pool and summer swimming programs. Those expenses were off-set by about \$14,000 in revenues primarily from user fees.

**Cultural Facilities and Services.** Brown Public Library, the Northfield Historical Society, Norwich University and Paine Mountain Arts Council offer cultural activities throughout the year including performances, lectures and community events.

The Town of Northfield owns the Brown Public Library and Northfield Historical Society Buildings at 75 and 93 South Main Street. The cost of operating and maintaining those buildings was approximately \$63,000 in FY2016-17 including bond payments for the library.

The library is operated by a staff of four employees and a number of volunteers. All the non-building expenses are funded through private fundraising, member dues and grants.

## Childcare Services

The Town of Northfield does not directly provide childcare services, but the school district does offer pre-school and afterschool programs for children living in town. There are several volunteer-run youth sports and summer recreation programs offered in Northfield. Current information about childcare providers in Northfield is available from Vermont's [Childcare Information System](#). In addition to the school-based programs, there was one licensed childcare provider and one registered family childcare home operating in Northfield as of 2019 according to state data. It is likely that many parents rely on childcare facilities located outside of Northfield either by choice (finding

childcare closer to their place of employment) or necessity (due to the limited supply of providers in town).

## Healthcare and Human Services

The Town of Northfield does not directly provide healthcare or human services. Northfield residents can find a comprehensive list of available healthcare or human services using Vermont's 2-1-1 system by either calling 211 or online at [www.vermont211.org](http://www.vermont211.org).

A number of non-profit organizations who serve Northfield residents annually request financial support from the town. In FY2016-17, the voters approved contributions totaling about \$58,000 to regional healthcare and human service providers. One such organization operating in Northfield is Veterans Place, a transitional housing facility for homeless veterans especially those suffering post-traumatic stress disorder.

Central Vermont Medical Center, and associated medical practices, in Berlin is the regional hospital serving Northfield. As of 2018, CVMC had a primary care practice located in Northfield and there were several other medical and dental practices in town. Mayo Healthcare provided residential care, memory care and rehabilitation services from its facility in Northfield Village as discussed in [Senior Housing \(page 43\)](#).

## Public Utilities

**Electric Infrastructure.** As shown on [Figure 32 \(page 36\)](#), three utilities provide service to portions of Northfield: Green Mountain Power (west side of town), Washington Electric Co-op (east side of town) and Northfield Electric Department (central part of town).

The Town of Northfield owns the Northfield Electric Department (NED), but as of 2018 it did not generate any power and contracted with Green Mountain Power to provide all maintenance services. NED serves about 1,900 customers in Northfield Falls and Northfield Village, including Norwich University, as well as a small number of customers in Berlin and Moretown. NED, along with Northfield's water and sewer departments, operate as enterprise funds and are supported by fees charged to users rather than by tax revenues.

There was three-phase power available along most of the Route 12 corridor and portion of Route 12A, as well as within Northfield Village and the Norwich University campus as of 2018 as shown on [Figure 40 \(page 41\)](#), which is necessary to support many commercial and industrial customers as well as community net-metered and utility-scale renewable energy projects.

There were two NED substations in Northfield – one serving Norwich University and the other in the village. A GMP 33 kV transmission

line travels between Berlin and Northfield Village paralleling and to the east of Route 12. Another 33 kV transmission line travels west from Northfield Village towards Waitsfield. As of 2018, there were no plans to significantly upgrade the electricity infrastructure serving Northfield.

**Telecommunications Infrastructure.** Northfield Telephone Company (TDS Telecom) provided landline phone and high-speed internet service throughout Northfield as of 2018. Several companies provided cable television and internet service in portions of town including a local company, Trans-Video. There remain fewer choices and less reliable and/or lower speed internet service in remote areas of town. Northfield is a member of [Central Vermont Fiber](#), a nonprofit organization working to fully service its 16-town area with affordable high-speed internet. There were several telecommunication towers in Northfield. Given the terrain, there remain areas of town lacking adequate cell service.

**Water Supply Infrastructure.** Northfield's municipal water system serves approximately 1,200 connections in Northfield Village and Northfield Falls as shown on [Figure 32 \(page 36\)](#). The system is fed by three wells located south of the village on Route 12A. Demand was approximately 450,000 gallons per day (gpd) and the average residence in Northfield was using about 200 gallons of water per day as of 2019. All other development in Northfield obtains water from individual, private wells.

The Source Protection Plan for the municipal water system identifies contamination from failed on-site septic systems as the most significant potential hazard to the municipal water system. An extension of the municipal wastewater treatment system to serve development in the vicinity of the well field has been considered to reduce this risk. The town has also been working to replace old distribution pipes, particularly lead pipes throughout the system.

**Wastewater Disposal Infrastructure.** Northfield's municipal wastewater treatment system serves approximately 800 connections in Northfield Village as shown on [Figure 32 \(page 36\)](#). The treatment plant was upgraded in 2004, but most of the collection system is 70-100 years old. The town anticipates another upgrade to the sewer plant around 2028.

The plant is permitted to discharge up to 1 million gallons per day (gpd) of treated municipal wastewater to the Dog River. The system had 550,000 gpd of unused capacity as of 2018, which is enough capacity to serve more than 2,600 additional homes. However, the system was not able to accommodate any significant growth despite that unused capacity because of combined sewer overflows (CSOs) and limits on the amount of phosphorus the plant is allowed to discharge into the Lake Champlain watershed.

CSOs occurred more than a dozen times between 2016 and 2018. Much of the piped stormwater drainage in the sewer service area flows into the wastewater system, including stormwater runoff collected from roofs. So during periods of heavy precipitation, the amount of combined stormwater and wastewater can exceed the plant's storage capacity resulting in the release of untreated or partially untreated effluent into the Dog River.

The town is working to address the CSO problem. New stormwater collection systems and rain gardens are being developed so runoff can be removed from the sewer system and redirected to green stormwater practices. Two stormwater filtrations had been built – one on lower Central Street and one within the municipal parking lot behind the American Legion – and a third was under construction on municipal property at the corner of Union and Water Streets as of 2019. Continuing these efforts to separate the stormwater and wastewater collection systems and disconnect roof downspouts will be necessary for Northfield to more fully utilize the sewage treatment plant's excess capacity to support economic and housing growth, including the desired extension of sewer service to Northfield Falls.

The National Pollutant Discharge Elimination System (NPDES) permit for the Northfield wastewater treatment facilities is anticipated to be re-issued in 2020. The allowable phosphorus level for the Northfield wastewater treatment plant was set at 0.829 metric tons/year by federal and state regulators under the 2002 Lake Champlain Phosphorus TMDL (total maximum daily load), but will be reduced to 0.276 mt/yr when the NPDES permit is re-issued under the 2016 TMDL. In 2018, the wastewater treatment plant discharged 0.244 metric tons of phosphorus. Under the new phosphorus limit, Northfield would only be able to add another 59,000 gpd of wastewater (equivalent to 280 homes) without triggering the need for plant upgrades or changes in treatment to remove more phosphorus from the effluent.

**Stormwater Infrastructure.** Municipal stormwater infrastructure consists of both closed pipe systems in village areas and open drainage ditches and culverts along town roads in the rural areas of town. Upgrades to this infrastructure and improved stormwater management on municipal sites will be required over the next decade under new state clean water and general road permit requirements (Act 64) and to eliminate CSOs.

Until very recently, most private development in Northfield was constructed with minimal stormwater management infrastructure, which has resulted in untreated stormwater discharging directly to municipal collection systems, roadside drainage systems or surface waters. Northfield has undertaken a number of stormwater studies that include a series of recommendations for upgrading the infrastructure

to improve stormwater management to address localized flooding, water quality and CSO issues:

- ▶ 2011 Village of Northfield Stormwater Mapping
- ▶ 2008 Stormwater Drainage Study
- ▶ Stantec Study of Northfield Falls

## 5B. Planning Considerations

### Municipal Infrastructure

Northfield will need to continue its efforts to provide municipal water, sewer and stormwater in and between Northfield Village and Northfield Falls to further the land use, housing and economic development goals of this plan. Extension of infrastructure into areas planned for service and commercial, industrial, institutional or higher-density residential development will be a joint responsibility of the town and private developers.

### Electric and Telecommunications Infrastructure

Electricity and telecommunications infrastructure will need to be maintained and upgraded on an ongoing basis to provide state-of-the-art, reliable, high-quality service to Northfield residents and businesses as technology advances and evolves. This infrastructure is essential to both economic development and quality of life. Necessary repairs and improvements will be primarily the responsibility of the utilities and service providers.

### Shared Facilities and Services

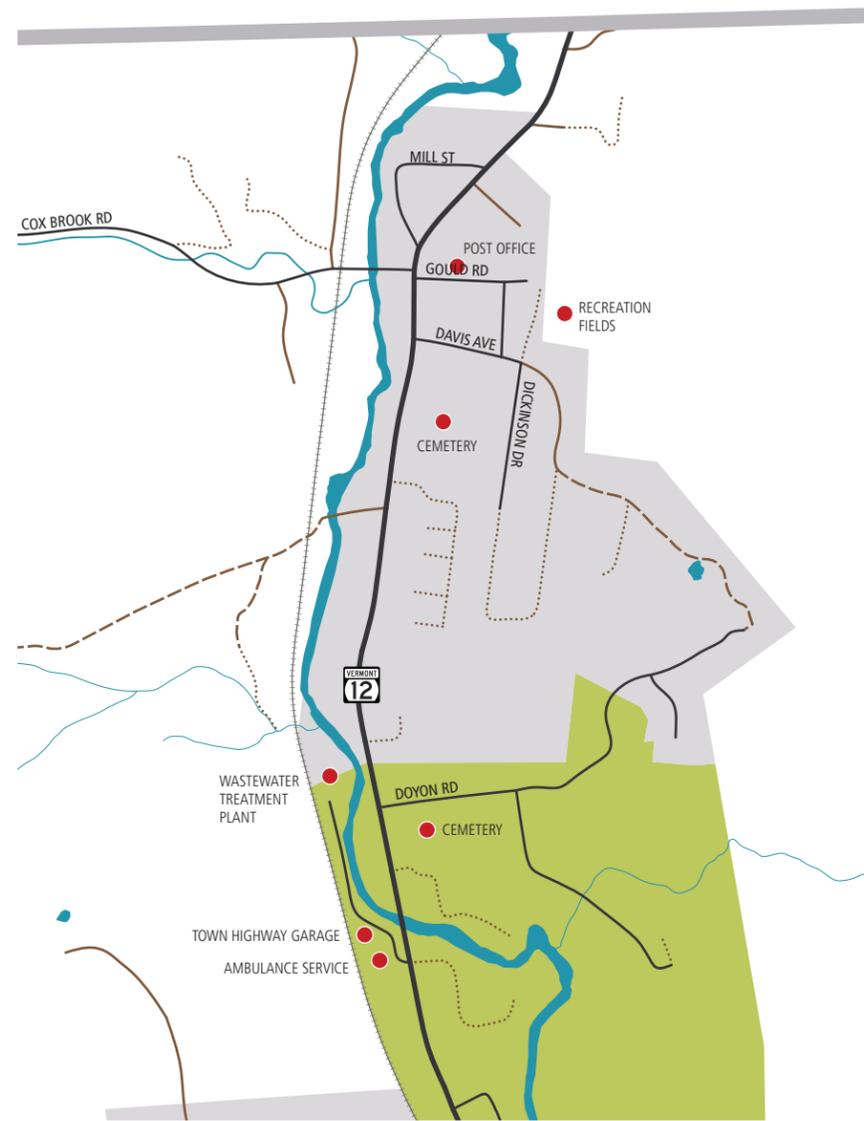
Northfield should explore alternative approaches to providing public services that would avoid escalating costs and maintain/improve service quality. The town should work with neighboring municipalities to study and plan for regionalization of services. The Northfield Ambulance Service is an example of successful regionalization of emergency services that could be replicated for other municipally-provided services such as public safety, recreation or highway maintenance.

### Norwich University

The presence of Norwich University poses particular challenges and offers distinct benefits related to the provision of public facilities and services in Northfield. Norwich University's facilities and properties are largely exempt from municipal property taxes as discussed in the [Assessment of Current Land Use \(page 5\)](#). However, the town is obligated to provide the university and its students with public services. Norwich University makes a direct financial contribution to the town annually to help offset the cost of providing those services. In

Figure 32. Utilities and Facilities Map

NORTHFIELD FALLS



- KEY**
- Water Service Area
  - Sewer and Water Service Area
  - Community Facilities

0 600 1,200 FEET



NORTHFIELD VILLAGE

In addition to that direct financial contribution, the university and town collaborate in other ways that are beneficial to the community. It will be necessary for the Town of Northfield and Norwich University to continue to monitor the demand for services and the cost of providing those services, as well as the non-financial benefits the university offers the community. That information should then be used to establish a fair and equitable payment in lieu of taxes (PILOT) when the current agreement expires.

## OBJECTIVES

- 1 Increase the percentage of trips made in Northfield by means other than single-occupancy vehicles (transit, rail, van or car pools, biking, walking, etc.) and by means that do not require fossil fuels (all-electric vehicles or transit, walking or biking, etc.).
- 2 Increase the amount of renewable energy being produced in Northfield to move towards meeting the state's Act 174 targets for the town in a manner that is consistent with the goals, objectives and policies of this plan.
- 3 Reduce energy use in Northfield through conservation and efficiency measures to move towards meeting the state's Act 174 targets for the town, which will also have the benefit of reducing greenhouse gas emissions and lowering energy costs for households and businesses.

## POLICIES

- 1 Promote compact, walkable neighborhoods in and between Northfield Village and Northfield Falls that offer residents efficient homes and reduced automobile dependence / miles driven. Also see Transportation Policy [6 \(page 29\)](#).
- 2 Guide most future residential development to the mixed use and residential areas in and between Northfield Village and Northfield Falls shown in the Future Land Use Map, [Figure 6 \(page 9\)](#), where public infrastructure and services can support more efficient and compact development patterns.
- 3 Guide commercial, industrial and institutional development to the downtown, mixed use and business areas shown on the Future Land Use Map, [Figure 6 \(page 9\)](#), where public infrastructure and services can support more efficient and compact development patterns.
- 4 Support and facilitate individual net-metered renewable energy projects in size that are compatible with the goals, objectives and policies of this plan, including but not limited to the Siting Standards on [page 42](#).
- 5 Support and facilitate installation of solar collectors on rooftops and within parking lots, as well as electric vehicle charging stations, as part of any future large-scale commercial, industrial and institutional development or redevelopment projects in accordance with the Siting Standards on [page 42](#). Also see Transportation Policy [7 \(page 29\)](#).
- 6 Guide the siting of group net-metered and utility-scale renewable energy projects Siting Standards on [page 42](#) to the extent possible given the inability of the town to directly regulate such projects.
- 7 Support and facilitate the management of working forestland in Northfield for long-term, sustainable harvesting of wood as a renewable fuel source.
- 8 Consider life cycle costs (initial construction, ongoing operation and disposal costs) and carbon footprint when planning to construct, upgrade, purchase or replace municipal buildings, facilities, vehicles or equipment.
- 9 Support and promote programs that assist owners with weatherizing and improving the efficiency of existing buildings, and/or that provide incentives for energy-efficient construction, renovation, and vehicle or equipment purchase/replacement.
- 10 Reduce municipal energy use and costs by improving the efficiency of town buildings, equipment and vehicles.

## 6. ENERGY

Our way of life depends on safe, reliable and affordable energy for lighting, heating and cooling buildings, transporting people and goods, manufacturing – nearly everything we do requires energy. Dependence on fossil fuels is not sustainable for future generations and has already changed the global climate. However, energy use is essential and deeply embedded into all aspects of daily life. Changing the ways we generate and use energy will be an incremental process as utility infrastructure and technology, the building stock, transportation systems and land use patterns adapt to a new energy regime. While there is an active grassroots effort in Vermont to act locally to address climate change, it must be recognized that the transition away from fossil fuels will be highly influenced by the decisions and actions of national governments and global corporations. This chapter provides an understanding of current energy use by Northfield residents and businesses in the context of Vermont's 90% renewable by 2050 goal. It establishes realistic, feasible policies that can be implemented by town government to move towards a renewable energy future.

### 6A. Current Energy Profile

#### Energy Use

The best available estimate of the total amount of energy being used in Northfield suggests that in 2016 nearly 790 billion BTUs of energy were consumed town-wide for electricity, thermal (heating and cooling buildings), and transportation. Electricity demand in town is split almost evenly between the residential sector and the commercial and industrial sector as shown in [Figure 33 \(page 38\)](#). Accurate data is not available to determine how thermal and transportation energy is split between the sectors. In developing this plan, the town relied upon the 2018 Central Vermont Regional Energy Plan in general and the following specific sources of information about energy use:

- ▶ The Energy Action Network's Community Energy Dashboard, which tracks the progress of each Vermont community towards the state's goal of meeting 90% of local energy needs through efficiency and renewable energy by 2050.
- ▶ The Central Vermont Regional Planning Commission's (CVRPC) municipal energy data for Northfield to be used for the purposes of enhanced energy planning under Act 174.

The published figures for thermal and transportation energy use are rough estimates based on statewide averages and Census data, while detailed statistics are kept about electricity generation and use by the utilities. Current commercial transportation energy use and future needs were not assessed by CVRPC as part of Act 174 energy planning. Northfield must use these data sources to demonstrate compliance with enhanced energy standards under Act 174, but more reliable and

accurate data about energy use at the local level will be necessary for the town's energy planning to be meaningful.

#### Vermont's Renewable Energy Goal

Renewable energy sources – hydro, solar, wind, biomass, geothermal – are constantly replenished unlike fossil fuels, which are finite. To reduce the greenhouse gas emissions leading to climate change, Vermont adopted a goal in 2011 to obtain 90% of the total energy used in the state (electricity, thermal, transportation) from renewable sources by 2050. Renewable energy sources – hydro, solar, wind, biomass, geothermal. Targets have been set for each Vermont municipality to reduce overall energy use and transition to renewable sources by 2050.

Less than 4 billion BTUs of renewable energy were generated in Northfield as of 2016 according to CVRPC's municipal energy data, which was less than 1% of the total energy used in town. While very little renewable energy is generated in Northfield, the town was meeting more than 25% of its total energy use from renewables in 2016 based on data from the Energy Action Network's Community Energy Dashboard as shown in [Figure 34 \(page 38\)](#). According to the Dashboard, the town should have achieved 27% renewable energy use in 2016 to be on target to meet the state's energy goal by 2050.

Efforts to meet the state's 90% by 2050 goal face two significant challenges – the conversion of thermal and transportation energy demand to renewable (primarily electric) sources, and the limited ability of municipalities to affect the type and amount of energy being supplied and used within its borders. Converting current electricity use to renewable sources has been relatively straightforward and a response to state policies such as the [Renewable Energy Standard](#), which required utilities to procure 55% of their electricity from renewable sources in 2017 – a figure that will incrementally increase to 75% by 2032.

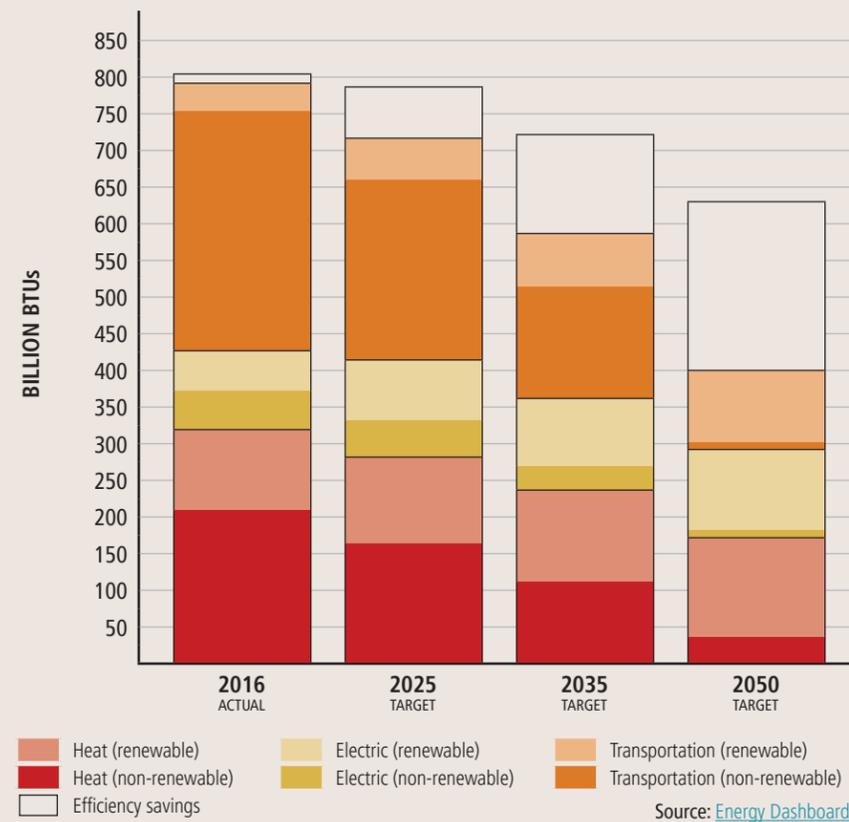
Conversion of transportation energy to renewable sources will be significantly more difficult and disruptive to existing systems. As is typical in rural communities, most Northfield residents rely on a personal vehicle for their daily transportation needs. While a limited public transportation system is available as discussed in [Transit Service and Public Parking \(page 30\)](#), most residents would find it impractical to carry out their daily activities if they were dependent on the bus for transportation. Nearly 70% of employed residents age 16 and older drove to work alone in 2017 according to the Census Bureau, and there was almost one (0.96) vehicle for every town resident

Figure 33. Electricity Use by Sector, 2015



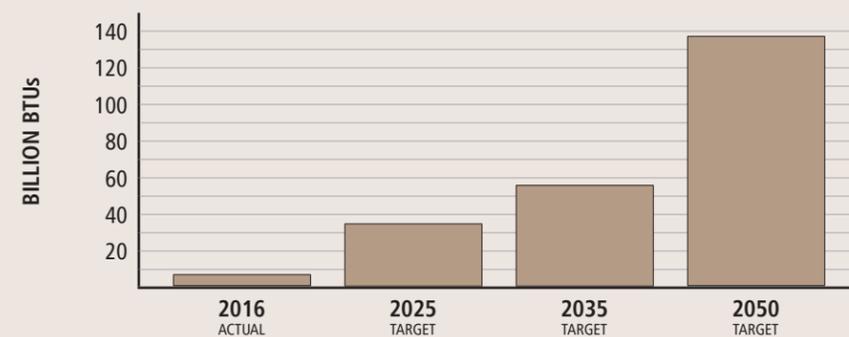
Source: Act 174 Energy Data for Northfield, CVRPC

Figure 34. Energy Use Targets



Source: Energy Dashboard

Figure 35. Renewable Energy Generation Targets



Source: Act 174 Energy Data for Northfield, CVRPC

age 16 or older. A transition to electric personal vehicles is the most feasible option (requiring fewer changes to our existing way of life and development patterns). This change will necessarily be incremental as an unknown but substantial increase in renewable electricity generation will be needed, individuals will need to make a major investment in purchasing a new electric vehicle, and the technology and infrastructure for battery storage and vehicle recharging will need to mature.

### Potential for Renewable Energy Generation

**Act 174 Maps.** As required by the state under Act 174, CVRPC has mapped areas of town that have potential for renewable energy generation (see CVRPC’s municipal energy maps for Northfield). The maps do not consider factors such as current land use and lot patterns, forest cover, proximity to roads, distance to electric distribution and transmission infrastructure, or the ability of the power grid to take additional load that could significantly increase development costs and reduce the likelihood of grid or group net metered (commercial) renewable energy projects being proposed in many of the areas shown as potential sites.

At present, the most salient factors for determining where commercial renewable energy projects may feasibly be located is proximity to the existing power grid (three-phase power distribution lines and transmission lines) and the capacity of the grid to accommodate additional load. Figure 40 (page 41) shows where there is three-phase power and the transmission corridors in Northfield.

**Wind Power.** CVRPC’s mapping indicates that there is potential for wind generation in Northfield as shown on Figure 37 (page 40). The 8,200 acres in Northfield mapped under Act 174 as having potential for wind generation have average wind speeds between 4.5 and 8.7 meters per second – speeds of 6 meters per second or greater are needed for large (utility-scale) wind turbines, while the smaller turbines used for individual and group net metering projects require wind speeds of 4.5 meters per second or greater. 86% of the 8,200 mapped acres has possible natural resource constraints that could limit wind development. According to the Energy Action Network’s Community Energy Dashboard, there were no wind energy projects in Northfield as of 2018.

**Solar Power.** The potential for commercial solar generation in Northfield is limited by natural resource constraints, the current availability of three-phase power distribution lines or transmission lines (which are necessary to connect solar projects to the electric grid) and existing land use and cover on the land best suited for solar generation in terms of orientation and slope as shown on Figure 37 (page 40). 75% of the 4,800 acres mapped under Act 174 as suitable for grid or group net metered (commercial) solar generation has

possible natural resource constraints that would likely limit solar development. 76% is more than half a mile from three-phase power distribution lines or transmission lines and 72% is currently forested. According to the Energy Action Network’s Community Energy Dashboard, a large group net metered solar project went online in 2017 that is generating 2 billion BTUs of energy annually. The remaining 52 solar installations were individual net metered projects generating electricity primarily for on-site that together produced 1.7 billion BTUs of energy in 2018. It is anticipated that individual net metered solar projects will continue to be installed on residential and business properties.

**Hydro Power.** Northfield hosts a hydroelectric generating facility, Dog River Hydro (also known as the Nantanna Mill), a small run-of-the-river hydro dam on the Dog River in Northfield Village that generates about 2.3 billion BTUs of energy annually. It is anticipated that any future hydro power projects in Northfield would be small run-of-the-river rather than utility-scale hydro facilities given the available resource and the complexities of permitting large hydro facilities.

**Biomass.** While it is not known how much wood is harvested for fuel in Northfield on an annual basis, it is clear that there is potential for sustainable biomass production given that the town is more than 80% forested. Wood is a renewable source of thermal energy and technological improvements have greatly increased the efficiency and reduced the pollution associated with burning wood. Norwich University, for example, is meeting some of its thermal energy needs with renewables using a wood chip heating system. A large percentage of homes in Northfield use wood as either a primary or secondary heating source.

**Geothermal.** Geothermal systems (also referred to as ground source heat pumps) can be used to heat and cool buildings by taking advantage of the stable temperature of the soil or well water (around 55° F year-round). Geothermal systems are often combined with renewable electricity (for operating the necessary pumps), making them a clean, fossil fuel free choice for building heating and cooling. The feasibility of geothermal needs to be assessed for each site individually, and the presence of ledge or shallow bedrock can be a challenge in many areas.

**Distributed Power Generation and Storage.** Utilities will need to invest in infrastructure improvements and new technologies to achieve the state’s renewable energy goal. As distributed net metered and relatively small energy generation projects (as compared to conventional, centralized power plants) are connected to the existing grid, the infrastructure will need to be modified to accept different types of loads and electricity flows. Further, solar and wind are not a stable, constant source of energy. They will not be able to replace base load generators and supply peak demand like conventional power plants without new energy storage technologies.

The limited availability of three-phase power lines and capacity of existing substations currently limits opportunity for utility-scale solar or wind energy projects in Northfield. Specific information about the capacity of the distribution lines to accommodate future interconnection of individual and group net metered projects within the Washington Electric Co-Op and Northfield Electric Department (NED) service territories was not available as of the writing of this plan. However, it is clear that the existing electricity distribution and transmission infrastructure will need to be upgraded to supply the renewably generated electricity necessary to meet the state’s energy goal by 2050, particularly if the transportation sector switches to electricity.

Municipalities generally have no control over the rate of infrastructure improvements and technological innovation needed to meet the state’s renewable energy goal – those decisions are made by utilities and energy companies both in and out of state, and are influenced by state and federal regulators. Northfield has a municipal electric department as discussed in [Public Utilities \(page 34\)](#), which does provide the town with more ability to decide whether to invest in the infrastructure and technology upgrades that will be needed to expand use of renewable energy, at least in a portion of the community (although these costs would be borne by NED customers).

## Energy Conservation and Efficiency

According to the Energy Action Network’s Community Energy Dashboard, nearly 13 billion BTUs of energy were being saved annually in Northfield as of 2016 (from the 2014 baseline) due to energy efficiency and conservation. The scenario for meeting the state’s renewable energy goal presented on the Dashboard shows that a total of 230 billion BTUs of energy will need to be saved annually through efficiency and conservation to meet the 2050 goal. If efficiency and conservation targets are not met, then additional renewable energy generation will be necessary to meet the 90% goal.

[Efficiency Vermont](#) offers homeowners and businesses various programs and incentives for energy efficiency and conservation. Other state and regional programs to assist with weatherization and efficiency improvements are discussed in [Figure 36 \(page 39\)](#). Opportunities for energy efficiency and conservation include:

- ▶ Weatherizing existing buildings.
- ▶ Replacing inefficient mechanical systems, equipment and vehicles with more efficient models.
- ▶ Siting and designing buildings to take advantage of passive solar.
- ▶ Constructing new buildings, additions and renovations to meet or exceed state residential or commercial energy code standards.
- ▶ Reducing vehicle miles driven.

## 6B. Future Energy Plan

### Enhanced Energy Planning

This plan is intended to qualify as an enhanced energy plan under Act 174 in accordance with the standards and procedures of 24 V.S.A. § 4352. Given that most renewable energy projects are subject to state rather than local review, the Town of Northfield has decided to seek a determination of energy compliance for this plan to increase the likelihood that local concerns and policies will be addressed through the state’s Section 248 (or Certificate of Public Good) process for permitting electricity generation projects. Act 174 requires the Public Utilities Commission to give substantial deference (rather than due consideration) to the policies of municipal plans that have been determined to meet the enhanced standards when reviewing applications for in-state electric generation facilities under Section 248. The 2018 Central Vermont Regional Energy Plan and CVRPC’s municipal energy data and maps for Northfield are incorporated by reference into this plan solely for the purposes of meeting Act 174. [Chapter Appendix B. Municipal Energy Determination Standards Matrix](#) details the required standards for enhanced energy planning and how this plan conforms to those state requirements.

### Energy Targets

Future targets for energy generation, use and conservation have been set for all Vermont municipalities as part of the state’s enhanced energy planning under Act 174 as shown in [Figure 34 \(page 38\)](#) and [Figure 35 \(page 38\)](#). Central Vermont Regional Planning Commission established targets for Northfield that are incorporated into this plan by reference (see CVRPC’s municipal energy data). The planning scenario presented on the Energy Action Network’s Community Energy Dashboard envisions that between 2016 and 2050:

- ▶ Total energy consumption in Northfield will decrease by 51%.
- ▶ Use of fossil fuels for heating and transportation will be almost entirely phased out.
- ▶ The amount of renewable energy used annually in Northfield will increase by 138 billion BTUs.
- ▶ The amount of renewable energy generated annually in Northfield will increase by more than 3000% (from 4 to 136 billion BTUs)

This plan’s land use, housing and transportation goals, objectives and policies call for new housing and economic development to be focused in existing settlement areas where people can live close to employment, shopping and services, and it is more feasible to walk, bike or take public transit, in order to reduce energy used for transportation. Encouraging such a development pattern through the

Figure 36. Energy Conservation and Efficiency Resources

The following resources and programs are available to assist Northfield residents, business operators and property owners with making energy conservation and efficiency improvements:

- ▶ The Vermont Department of Families and Children offers a [Weatherization Program](#) that helps lower-income residents — particularly older Vermonters, people with disabilities, and families with children — to save fuel and money by improving the energy efficiency of their homes.
- ▶ [HEAT Squad](#), a service of NeighborWorks of Western Vermont, offers low-cost energy audits and weatherization services for homes and businesses. HEAT Squad helps building owners identify the best renovations to improve efficiency and reduce costs, provides loans, and helps to identify contractors to complete the work.
- ▶ [ENERGY STAR Rebates](#) are available for products and new home construction that meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and U.S. Department of Energy. Efficiency Vermont provides free financial, design and technical to help build an ENERGY STAR qualified home.
- ▶ Northfield formed an [Energy Committee](#) in 2019, which is able to assist residents with accessing available energy conservation and efficiency programs.



Figure 38. Mapping of Energy Resources and Siting Constraints

The Vermont Legislature passed Act 174 in 2016, which established a new set of municipal and regional energy planning standards. A town plan that meets those standards will carry greater weight - substantial deference rather than due consideration - in the Section 248 siting process for electricity generation facilities.

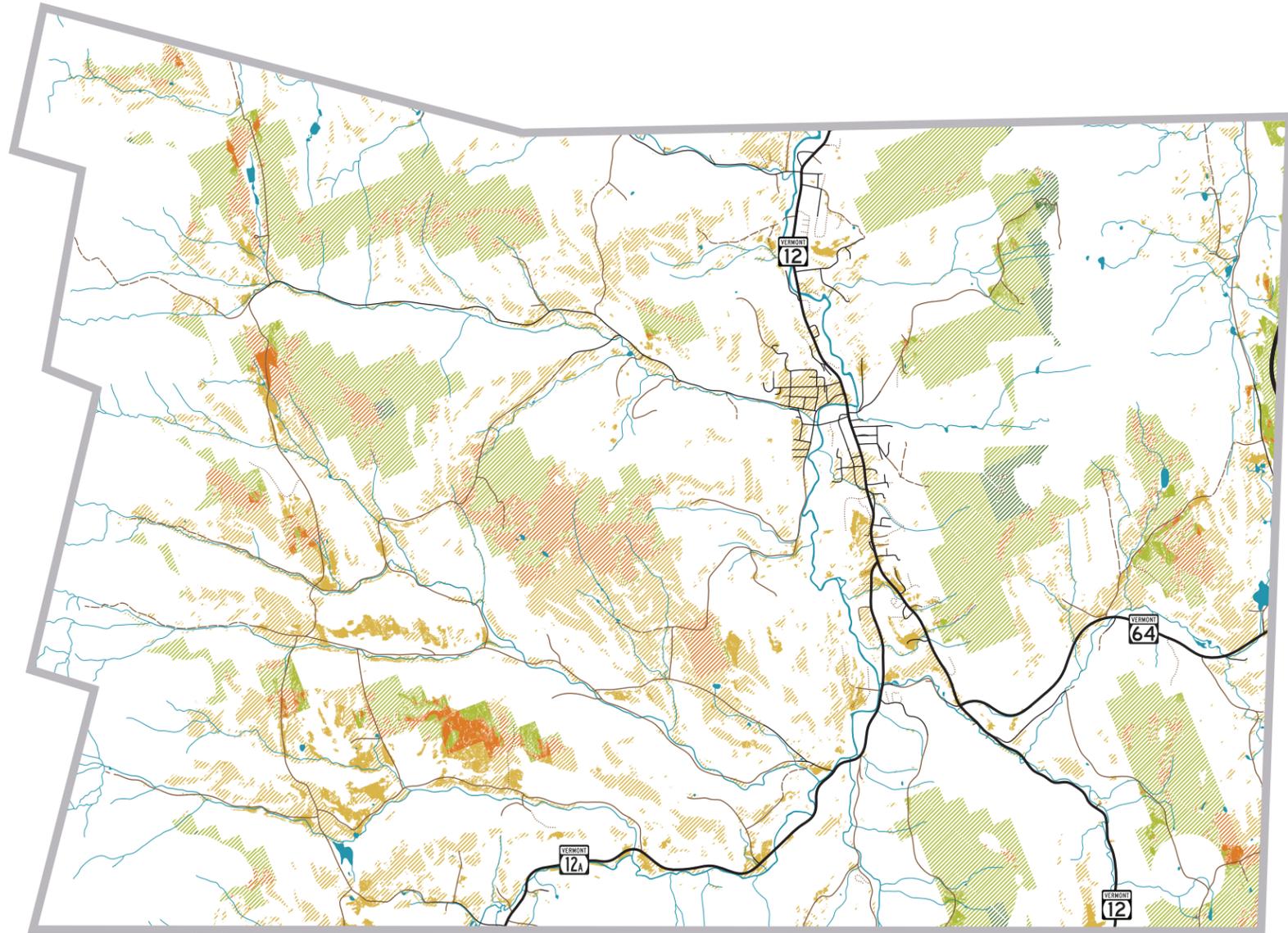
To meet the energy planning standards under Act 174, the Northfield Town Plan must identify potential areas for the development and siting of renewable energy generation facilities and areas that are unsuitable for siting those facilities or particular categories or sizes of those facilities (see [Renewable Energy Project Siting Standards \(page 42\)](#)).

The state has a list of "known constraints" and these areas are considered unsuitable for siting renewable energy generation facilities. Known constraints include: vernal pools, river corridors, floodways, significant natural communities, RTE (rare, threatened or endangered) species, Class 1 and Class 2 wetlands. Locations with these resources were excluded from the mapping of wind or solar resources as shown in [Figure 37 \(page 40\)](#).

The state also has a list of "possible constraints" and these resources could impact the siting process but do not preclude the siting of renewable energy generation facilities in certain areas. State-mapped possible constraints are shown in [Figure 37 \(page 40\)](#) and include: agricultural soils, special flood hazard areas, protected lands (state and private conservation), Act 250 agricultural soil mitigation areas, deer wintering areas, highest priority forest blocks, and hydric soils. The Central Vermont Regional Plan Energy Chapter includes additional possible constraints: elevations above 2,500 feet, slopes greater than 25%, municipally-owned lands, and lakeshore protection buffer areas.

As indicated in [Figure 39 \(page 41\)](#), the Town of Northfield has identified areas that are preferred and unsuitable for renewable energy generation facilities. Elevations above 1,800 feet, the Northfield Town Forest on Paine Mountain, and the Dog River Park will be considered local known constraints under this plan. Priority forest blocks as shown on [Figure 18 \(page 21\)](#), slopes greater than 25%, municipally-owned lands (including town-owned conservation easements, town forests and town protected greenspaces, but not parcels such as the town garage or land surrounding the town offices) will be considered local possible constraints under this plan.

Figure 37. Resources Facilities and Infrastructure Map



SOURCES

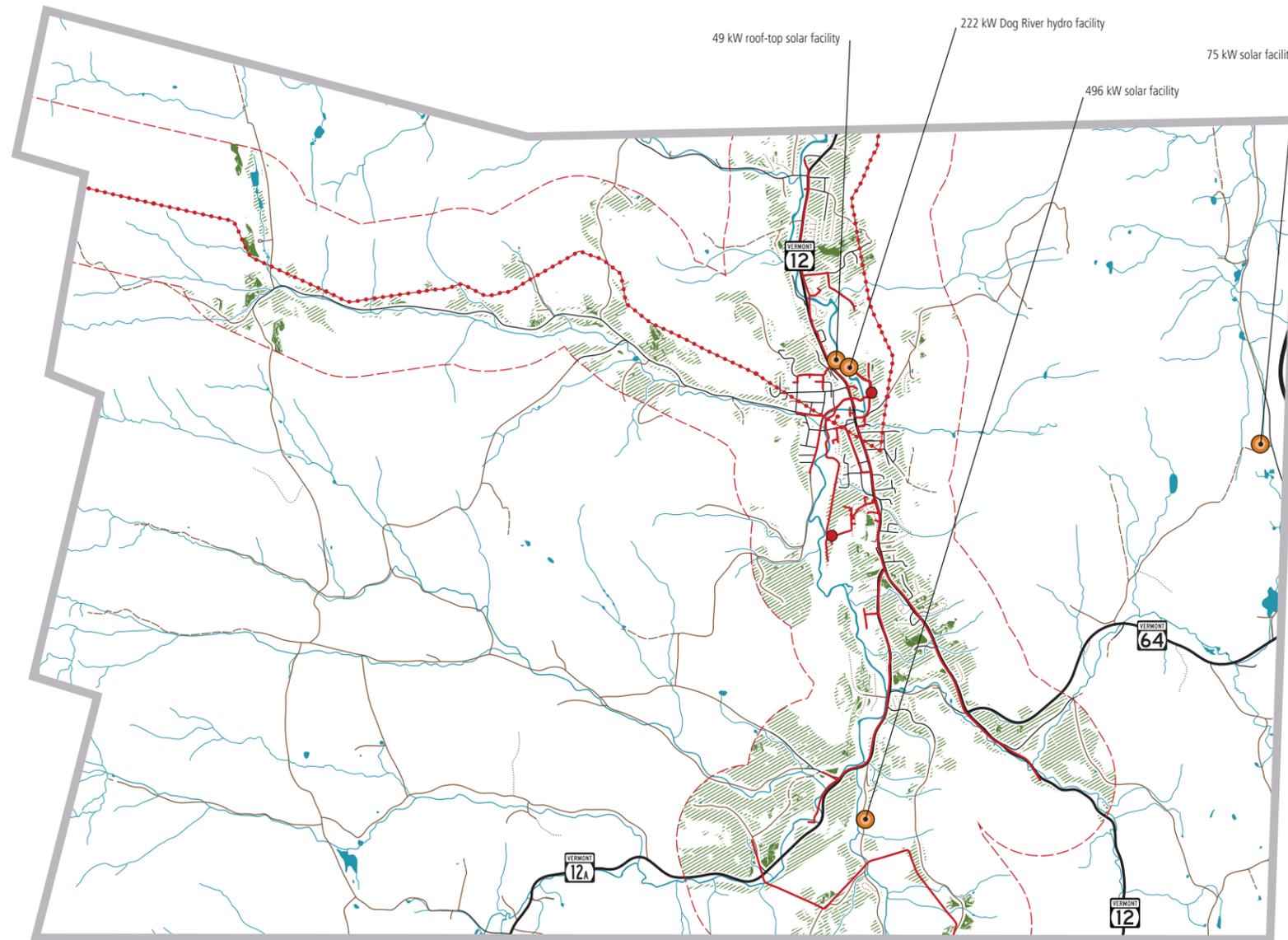
2017 Act 174 Solar Potential with local and regional constraints added  
 2017 Act 174 Wind Potential with local and regional constraints added

KEY

- Wind energy resource (6.0 m/s ave wind speed or greater)
- Wind energy resource (4.5 to 5.9 m/s ave wind speed)
- Solar energy resource
- Large wind and solar energy resource
- Small wind and solar energy resource
- With possible constraints



Figure 40. Energy Facilities and Infrastructure Map



**SOURCES**

2018 Renewable Energy Sites, EAN  
 2017 Overhead Power Line Data, CVRPC  
 2003 Electric Transmission Corridors, VCGI

**KEY**

- Electric substation
- 3-phase electric distribution lines
- - - Electric transmission lines
- ⋯ 1/2 mile from existing 3-phase or transmission lines
- Existing renewable energy generator (>15 kW)

- May meet preferred site criteria (has mapped renewable resources)
- May meet preferred site criteria (no mapped renewable resources)

*These layers are advisory only. Site investigation will be needed to confirm whether a specific location meets the preferred site criteria in the Northfield Town Plan.*



Figure 39. Preferred and Unsuitable Sites

The criteria below are the specific policies of this plan with regard to the siting of renewable electricity generation projects in accordance with 30 VSA § 248. The preferred sites are those where the town would support projects be located in accordance with Vermont Public Utility Commission rules. The unsuitable sites are those that are not in accordance with the land conservation policies of this plan. The unsuitable sites below are in addition to those locations with known constraints as identified and mapped by the state or Central Vermont Regional Planning Commission under Act 174.

| Individual or group net metered projects up to 150 kW  |   |
|--|---|
| <p><b>PREFERRED SITES</b></p> <ol style="list-style-type: none"> <li>Locations not unsuitable provided that the developer has taken reasonable measures to site and/or screen the installation to minimize adverse physical or environmental impacts on other properties in the immediate neighborhood including, but not limited to, visual, glare or noise impacts.</li> </ol>   | <p><b>UNSUITABLE SITES</b></p> <ol style="list-style-type: none"> <li>Locations where installation will unreasonably restrict access to renewable energy resources on nearby property.</li> </ol>   |
| Solar projects larger than 150 kW  |   |
| <p><b>PREFERRED SITES</b></p> <ol style="list-style-type: none"> <li>On rooftops and within parking lots.</li> <li>On previously developed land with limitations for redevelopment such as brownfields or resource extraction sites.</li> <li>Locations (a) served by existing roads and power distribution/transmission infrastructure, (b) not identified as unsuitable, (c) not identified as a known or possible constraint, and (d) not dominate the view from public roads.</li> </ol> | <p><b>UNSUITABLE SITES</b></p> <ol style="list-style-type: none"> <li>Locations that would remove active farmland (includes but is not limited to land enrolled in Current Use) from productive use unless approval is conditioned on the energy project owner returning the land to a suitable condition for agricultural use when the project is decommissioned.</li> <li>Locations that require tree clearing within a priority forest block as shown on <a href="#">Figure 17 (page 21)</a>.</li> <li>Locations above 1,800 feet in elevation.</li> <li>Northfield Town Forest on Paine Mountain and the Dog River Park.</li> </ol> |
| Wind projects larger than 150 kW   |   |
| <p><b>PREFERRED SITES</b></p> <ol style="list-style-type: none"> <li>Locations (a) served by existing roads and power distribution/transmission infrastructure, (b) not identified as unsuitable, (c) not identified as a known or possible constraint, and (d) not dominate the view from public roads.</li> </ol>  | <p><b>UNSUITABLE SITES</b></p> <ol style="list-style-type: none"> <li>Locations that require tree clearing within a priority forest block as shown on <a href="#">Figure 17 (page 21)</a>.</li> <li>Locations above 1,800 feet in elevation.</li> <li>Northfield Town Forest on Paine Mountain and the Dog River Park.</li> </ol>   |

town's land use regulations and provision of public infrastructure are the most effective and direct measures Northfield can take to move towards meeting the state's energy goals.

Central Vermont Regional Planning Commission's municipal energy data for Northfield establishes targets for renewable energy generation in Northfield and states that there is sufficient land to meet those targets from solar and wind projects. Meeting Northfield's 2050 renewable energy generation target would require an additional 255 acres developed with ground mounted solar (assuming 8 acres per megawatt of generation) or 127 acres developed with large wind turbines (assuming 4 acres per megawatt of generation).

Based on Act 174 mapping with state, regional and local constraints considered, there are 584 acres with no constraints for solar development and 322 acres with no constraints for wind development (wind speeds of 4.5 meters per second or greater). While Act 174 energy mapping exercise identified adequate land to meet the target, much of the identified land is not currently available or feasible to develop for renewable energy generation as discussed in the Renewable Energy Resources section above. The most significant and immediate limiting factor is the lack of power distribution and transmission infrastructure serving much of the land mapped as having renewable energy generation potential – a factor that is outside the control of the municipality except within the area served by the Northfield Electric Department.

### Renewable Energy Project Siting Standards

This plan supports renewable energy production in Northfield, but that policy must be balanced with this plan's policies related to:

- ▶ Protecting natural resources, environmental quality, scenic resources and rural character.
- ▶ Maintaining viable farms and the working lands needed to sustain them.
- ▶ Focusing development in those areas of town already served by existing public infrastructure.

This plan calls upon the Public Utilities Commission to issue Certificates of Public Good for renewable energy projects in accordance with the siting standards of [Figure 39 \(page 41\)](#) and to ensure that:

- ▶ Projects meet equivalent standards for setbacks, site design (landscaping, screening, lighting, stormwater, etc.), and performance (noise, glare, vibration, etc.) as other industrial uses in the same area of town.

- ▶ Projects sited at high elevation or in other environmentally sensitive areas use low-impact techniques to minimize the amount of clearing, soil disturbance and compaction during construction.
- ▶ Corridors for access roads and utility lines be shared, follow natural contours and avoid stream and wetland crossings to the greatest extent feasible.

## OBJECTIVES

- 1 Diversify the housing stock and offer quality housing choices so that households across age and income ranges will be able to live in Northfield.
- 2 Maintain or improve the affordability of the housing stock for households earning the prevailing wages in Northfield and surrounding communities.
- 3 Maintain or improve housing quality and neighborhood stability in Northfield Village and Northfield Falls.

## POLICIES

- 1 Promote compact, walkable neighborhoods that offer a range of quality housing options in and between Northfield Village and Northfield Falls.
- 2 Guide most future residential development to the downtown, mixed use and residential areas shown on the Future Land Use Map, [Figure 6 \(page 9\)](#), where public infrastructure and services can support more efficient and compact development patterns.
- 3 Guide any future residential development away from floodplains and river corridors, ridgelines and steep slopes, ecologically sensitive lands, remote lands not currently served by roads or utilities, and high-quality working farm or forest lands.
- 4 Support and facilitate the maintenance and improvement of the town's affordable housing stock, and development of affordable housing as needed to support a diverse population.
- 5 Support and facilitate development of a continuum of senior housing, as well as in-home care programs, that will allow residents to remain living in the community as they age.
- 6 Support and facilitate development of on-campus or university-affiliated (housing developed under a direct agreement between a university and a third-party owner or manager) student housing with the goal of increasing the percentage of undergraduates living on campus.
- 7 Work with Norwich University officials and landlords to address conflicts between neighborhood residents and students.
- 8 Seek the removal of at-risk housing, particularly mobile homes and residential care facilities, from flood and erosion hazard areas through buyouts or relocation.

## 7. HOUSING

### 7A. Current Conditions

#### Single-Family Housing

More than 70% of Northfield's housing stock consists of owner-occupied, single-family homes. About 30% of those homes are located in Northfield Village. The 2017 Grand List included 1,421 single-family homes on their own lots, 72% of which were homestead properties. The average assessed value of a single-family home was \$190,000.

About half of the homes in Northfield were built before 1970 (this increases to 83% for homes in Northfield Village). There was a significant amount of housing construction in Northfield, as throughout Central Vermont, during the 1970s and 1980s following construction of Interstate 89 and growth in the regional economy.

Northfield has averaged about 16 new homes per year since 2000 as shown in [Figure 42 \(page 45\)](#). Most new housing built since 2000 has been located in the rural areas of town in contravention of Northfield's long-standing goal to focus development in and between Northfield Village and Northfield Falls.

#### Multi-Unit Housing

Less than 20% Northfield's housing is in multi-unit buildings. Most of those units are located in Northfield Village. Zoning requirements and a lack of infrastructure has made construction of multi-unit housing infeasible in most other areas of town. There were several affordable multi-unit housing developments in Northfield as of 2018 as shown on [Figure 41 \(page 44\)](#) and listed in the Vermont Housing Finance Agency's [affordable rental housing database](#).

#### Rental Housing

About 25% of Northfield's housing stock consists of rental units. Rental housing is concentrated in Northfield Village where it comprises about half of all units. There was almost no change in the number of rental units between 2000 and 2016 according to the Census Bureau as shown in [Figure 42 \(page 45\)](#).

The limited availability of developable land served by infrastructure and zoned for higher-density, multi-unit housing in Northfield has likely contributed to stagnation in rental housing development. Northfield's rental market has also been significantly affected by demand for student housing as discussed below.

There is unmet regional demand for rental housing, particularly for young families and lower income households. County-wide in 2016, 62% of households headed by someone 34 or younger rented, as did 50% of households earning less than \$35,000 per year.

#### Mobile Home Parks

The 2017 Grand List included 132 mobile homes located within one of the 7 mobile home parks in Northfield as shown on [Figure 41 \(page 44\)](#). The average site rent for a mobile home park lot (excluding utilities) in 2017 was approximately \$300 per month. The average assessed value of a mobile home in the parks was approximately \$20,000 in 2017.

All of the mobile home parks in Northfield were privately owned as of 2018. State laws and programs promote and facilitate formation of resident-owned cooperatives when private owners want to sell mobile home parks. This model can be effective if the cooperative is able to generate the revenue necessary to pay off the purchase and maintain the park. However, cooperatively-owned parks elsewhere in Vermont have struggled to maintain financial viability, particularly when faced with failing infrastructure.

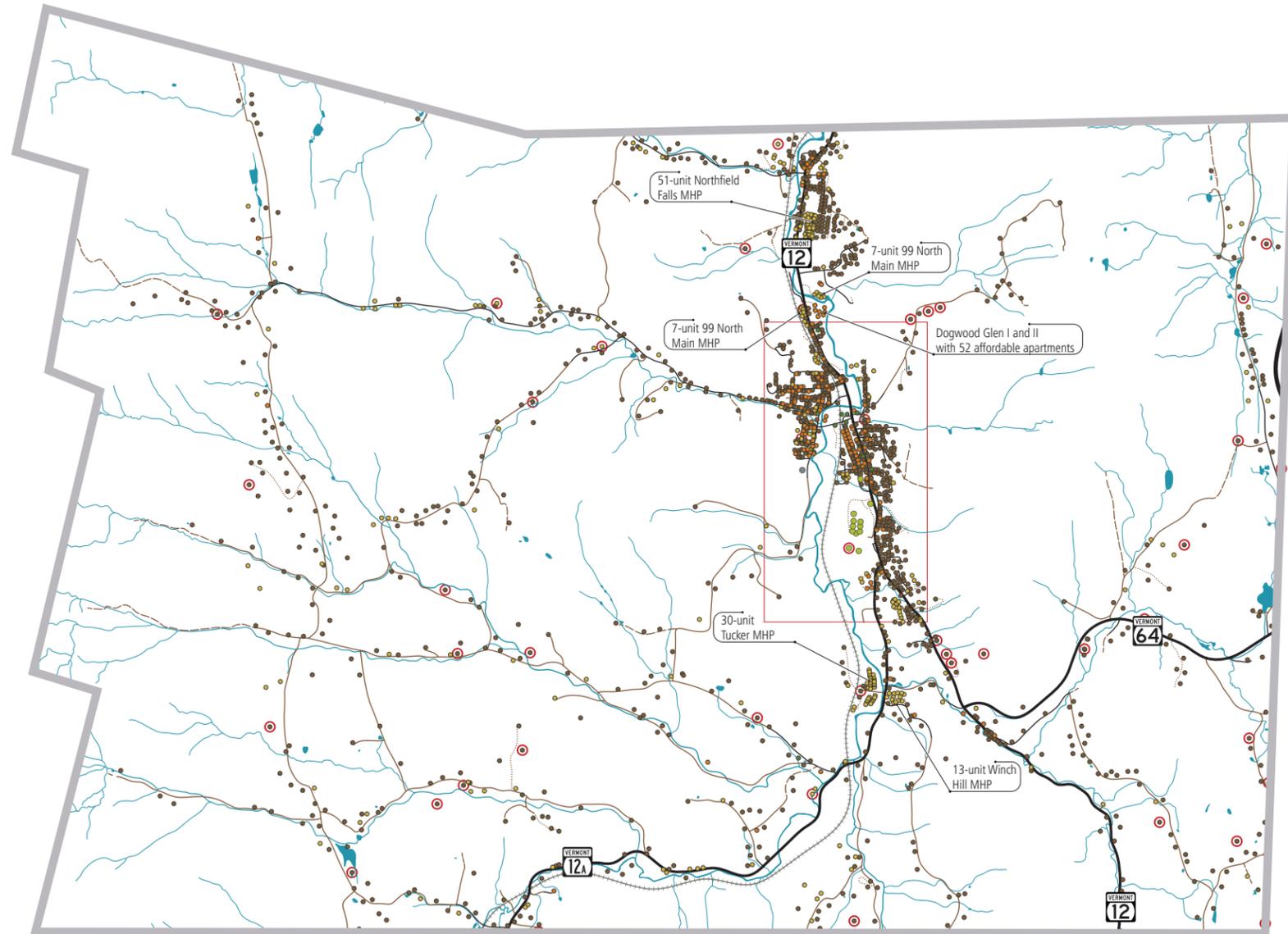
Five mobile home parks in Northfield were developed in the 1960s and '70s. They pre-date zoning and most state and federal regulations that would apply if they were to be constructed today. The age, quality and condition of the infrastructure serving these parks could present a future liability for both park residents and the town as evidenced in other communities when a park's private infrastructure has failed and the municipality has had to act to protect public health and safety.

Several of the mobile home parks have homes that are located in the special flood hazard area as discussed in [Chapter 9. Flood Resilience \(page 49\)](#), including the Tucker MHP which is almost entirely located in the floodway and had two homes destroyed during Tropical Storm Irene in 2011. Mobile homes are often not adequately anchored and therefore are at greater risk of being swept downstream or otherwise substantially damaged during a flood. Most owners of mobile homes in the special flood hazard area cannot afford to purchase high-cost flood insurance. As illustrated by the aftermath of Tropical Storm Irene, mobile homes in flood and erosion hazard areas are an issue statewide.

#### Senior Housing

Northfield is a college town with young people age 15 to 24 representing more than one-third of the town's population (as

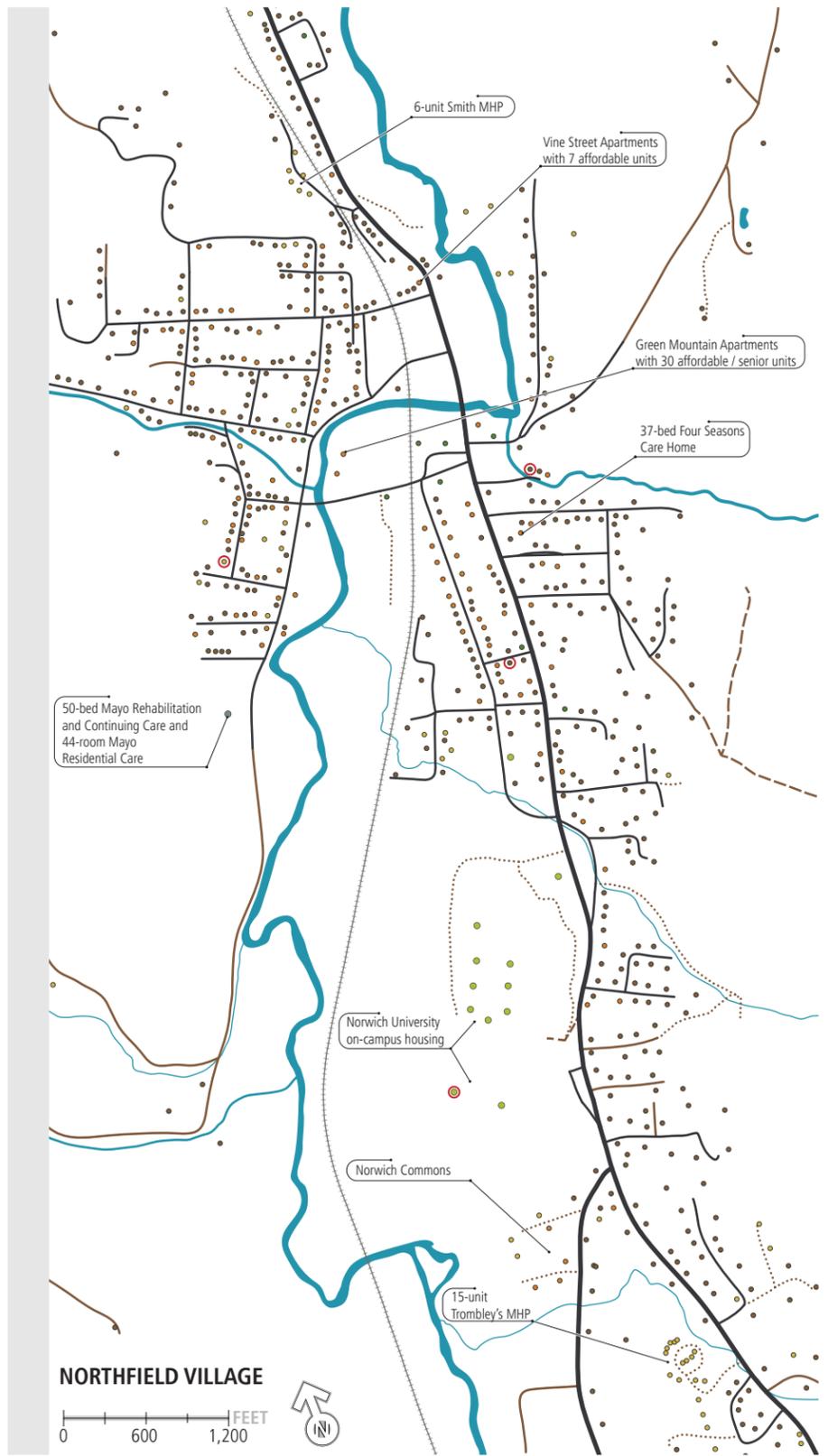
Figure 41. Housing Map



**SOURCES**  
2018 e911 Sites, VCGI

**KEY**

- Single-family dwelling
- Multi-family dwelling
- Mobile home
- Institutional housing
- Skilled nursing facility
- Built from 2008 to 2018



**NORTHFIELD VILLAGE**



compared to 14% of residents statewide). The demographic profile of non-student residents is typical of other rural communities across the state, however. Approximately 25% of Vermont’s population is expected to be age 65 or older by 2030. Estimates derived from 2012-2016 American Community Survey suggest that 20% of Northfield’s non-student residents were age 65 or older (as compared to 17% of residents statewide).

It is likely that many of these residents will want to ‘age-in-place’ over the next 20 years. Some will opt to stay in their current home, but others will need or want an alternative to a single-family home in a rural setting. Seniors will likely be seeking housing that is smaller, more affordable, closer to services and transportation, lower maintenance and/or single-level with accessibility features. As of 2018, there is a limited amount of housing in Northfield that meets those criteria. Dedicated senior housing in Northfield as of 2018 is shown on [Figure 41 \(page 44\)](#).

Looking forward, a continuum of housing from small rental or condo units suitable for active, healthy seniors through assisted living and skilled nursing facilities that provide varying levels of support and care will be needed to allow people to remain in the community as they age.

### Student Housing

As of 2018, Norwich University provided on-campus housing for approximately 2,200 students. Most undergraduates live on campus, but the university does not require civilian students to do so. A significant percentage of the rental units in Northfield Village has been serving as off-campus student housing. As of 2019, the university had just completed construction of new dormitories, which was reducing the number of students living off-campus.

The conflicts that arise in neighborhoods hosting off-campus student housing are not unique to Northfield but are typical of most college towns. They include issues related to noise and partying, the number of units/residents in a building, impact of student housing on rents, the quality and maintenance of student rentals, conversion family or affordable housing to student housing, and high rates of resident turnover eroding neighborhood stability. As evidenced by responses to the 2018 Community Survey (see [Appendix A](#)), impacts of off-campus student housing are of concern to many Northfield residents.

### Housing Affordability

Most of the residential properties on Northfield’s grand list in 2017 met the state’s definition of ‘affordable ownership housing’ as defined in [Figure 44 \(page 46\)](#). Despite this, 76% of households with an annual income less than \$35,000 were living in ‘unaffordable’ housing

in 2016, as were 56% of those with incomes between \$35,000 and \$50,000 according to the American Community Survey. So while the housing stock is theoretically affordable, in reality many households in Northfield are spending more than 30% of their income on housing. Reliable information about rental housing costs in Northfield was not available to assess affordability in the rental market.

A lack of affordable housing has been a statewide concern since the late 1990s. It is a problem that is affecting not only low-income households who have traditionally struggled to find decent, affordable housing, but middle-income households. All areas of the state need workforce housing – both rental and ownership units that are affordable to households earning the average wages for the jobs available in the area.

## 7B. Regional Housing Distribution Plan

### Housing Targets

The Central Vermont Regional Planning Commission (CVRPC) established the amount of housing each municipality in the region was expected to plan for from 2000 through 2020 in its [Regional Housing Distribution Plan](#) (page 6-15 through 6-18 of the 2016 Regional Plan). This plan is based on a regional economic and demographic forecast that estimated much higher rates of job and population growth than actually occurred.

Northfield added 143 housing units between 2000 and 2009, meeting more than 70% of its target as shown in [Figure 43 \(page 45\)](#). However, the rate of housing construction slowed considerably during the recession and has not recovered to pre-recession levels as of 2019. It is evident that both Northfield and the region as a whole will have added far less housing than projected between 2010 and 2019.

One of the purposes of the Regional Housing Distribution Plan was to ensure that all municipalities in the region continue to contribute similar percentages of housing to the region in 2020 as they did in 2000. In 2000, about 7% of the region’s housing was in Northfield – a percentage that remained unchanged in 2015. So by this measure, Northfield is meeting the intent of the distribution plan.

As required by CVRPC, [Figure 41 \(page 44\)](#) shows the location of housing units built between 2008 and 2018. The areas designated as downtown, mixed use and residential on the Future Land Use Map, [Figure 6 \(page 9\)](#), are the preferred locations for future housing.

Figure 42. Housing Units in Northfield, 1990 to 2016

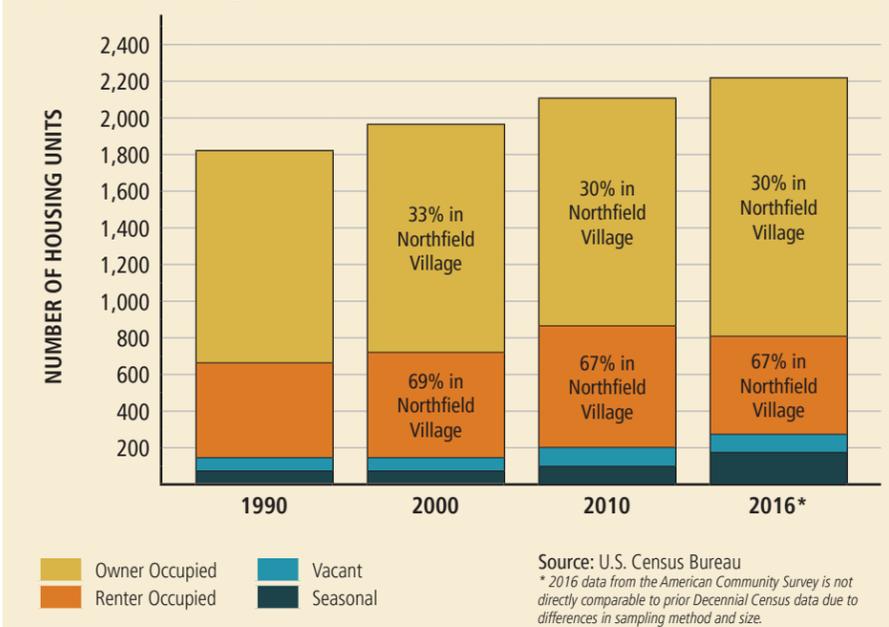


Figure 43. Regional Housing Targets and Actuals

|            |          | 2000-2009   | 2010-2014   | 2015-2020   | Total       |
|------------|----------|-------------|-------------|-------------|-------------|
| Northfield | Target   | 200 units   | 113 units   | 195 units   | 510 units   |
|            | Actual   | 143 units   | 52 units    |             |             |
|            | % Target | 72%         | 46%         |             |             |
| Region     | Target   | 3,465 units | 2,126 units | 3,244 units | 8,835 units |
|            | Actual   | 2,567 units | 42 units    |             |             |
|            | % Target | 74%         | 2%          |             |             |

Source: U.S. Census Bureau



Figure 44. **Housing Affordability**

Under Vermont statute affordable housing means:

- ▶ Owner-occupied housing with costs (mortgage, taxes, insurance & condo fees) that do not exceed 30% of the gross annual income of a household earning 120% of the county median income; or
- ▶ Renter-occupied housing with costs (rent, utilities & condo fees) that do not exceed 30% of the gross annual income of a household earning 80% of the county median income.

For a three-person household in Washington County in 2018, that definition equated to an owner-occupied home valued at up to \$277,000 (\$2,100/month housing costs) or a rental unit with costs not to exceed \$1,400/month. According to the U.S. Department of Housing and Urban Development, the median family income for a three-person household in Washington County in 2018 was \$69,950 (this figure is very similar to the 2016 Census estimate of median household income in Northfield of \$69,700).

Figure 45. **Norwich University Design Build Collaborative**

Students in Norwich University's School of Architecture + Art have developed seven affordable housing prototypes since 2011. Norwich was forming a Design Build Collaborative in 2019 to produce and site additional affordable homes around Vermont in the next several years based on those prototypes.



Figure 46. **Households with Unaffordable Housing**

Many households in Northfield are spending more than 30% of their income on housing. In 2016, 552 households (28%) had housing costs that were unaffordable (>30% of income).

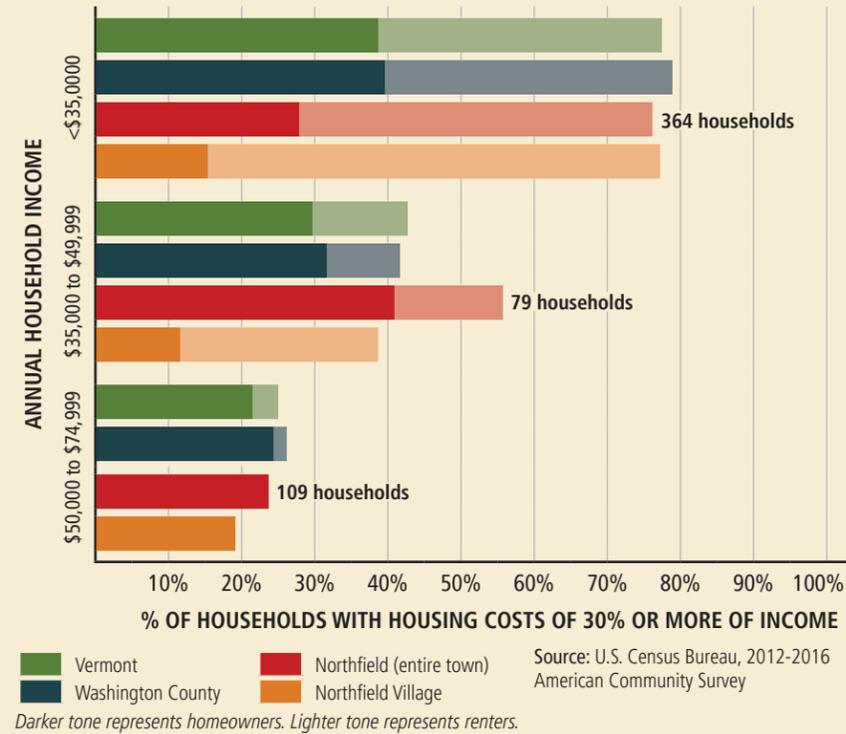
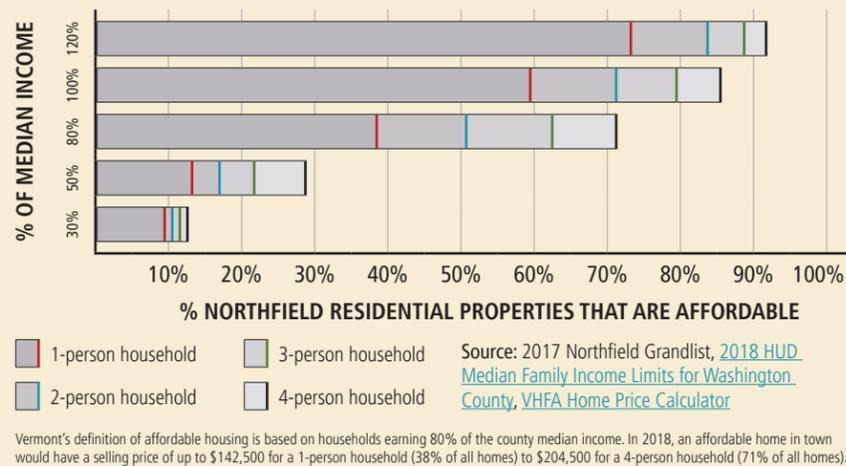


Figure 47. **Affordability of Northfield's Housing Stock**

The figure below shows the percentage of residential properties in Northfield that would be considered affordable to households of varying sizes (1 to 4 people) and income levels (30% to 120% of median income). More than 70% of existing ownership housing in Northfield would have been considered affordable in 2018 under the state's definition.



Vermont's definition of affordable housing is based on households earning 80% of the county median income. In 2018, an affordable home in town would have a selling price of up to \$142,500 for a 1-person household (38% of all homes) to \$204,500 for a 4-person household (71% of all homes).

## 7C. Future Housing Needs

### Stabilizing Village Neighborhoods

While there are many well-maintained homes in Northfield, there is evidence that some village neighborhoods are being impacted by student and low-quality rental housing. Poor property maintenance and high turnover rates can erode neighborhood stability. Given the constant supply of students seeking housing in Northfield, landlords do not have to make improvements beyond what is needed to meet minimum standards to attract and retain tenants. Buildings that are allowed to deteriorate decline in value, depress the value of surrounding properties, and generally make a neighborhood less desirable.

Northfield is seeking to encourage livable neighborhoods in the villages that include both ownership and rental units by: (1) addressing potential adverse impacts of increasing the number of dwelling units in a building such as loss of greenspace, traffic, parking, trash, noise, etc.; and (2) ensuring ongoing maintenance and upkeep of rental properties. The recent addition of more on-campus housing for Norwich students should also help address this issue over time.

### Diversifying the Housing Stock

Average household size has declined and lifestyle preferences have changed in recent decades leading to a mismatch between the available housing stock in Northfield, as in most rural Vermont communities, and the type of housing people want. Northfield is seeking to encourage a greater diversity of housing options (apartments, townhouse/condo units, cottage/small homes, accessory dwellings, etc.) in and between Northfield Village and Northfield Falls in order to make it possible for households of various sizes, ages and income levels to live in town.

### Redirecting Housing Development to the Villages

This plan calls for most new housing to be located in and between Northfield Village and Northfield Falls where it can be supported by existing infrastructure and further other objectives and policies of this plan.

Dispersed, low-density, rural housing costs more to service than compact, centrally-located housing and increases the amount of infrastructure that must be maintained. Often such residential properties pay less in taxes than it costs to provide them with municipal and educational services, increasing the tax burden on all property owners in town. Northfield is seeking to discourage the continued expansion of housing into remote areas of town, particularly those not currently served by public roads and utilities.

## OBJECTIVES

- 1 Maintain and enhance Northfield Village's business district with a mix of small-scale retail, dining, entertainment, service and office uses located in a compact, walkable downtown setting.
- 2 Revitalize Northfield Falls with small businesses located in a walkable village setting, out of the flood and erosion hazard areas and where they can be served by public infrastructure and utilities (water, sewer, telecommunications).
- 3 Maintain and enhance Norwich University's role in the local economy as a major employer, an institution that brings students and visitors to Northfield, a provider of workforce training and education, and a generator of entrepreneurs and spin-off businesses.
- 4 Focus commercial and industrial growth in the areas designated downtown, mixed use and business on the Future Land Use Map, [Figure 6 \(page 9\)](#).
- 5 Revitalize existing commercial and industrial areas to enhance aesthetics, improve access, and increase economic competitiveness.
- 6 Maintain a base of working farm and forest land in the rural areas of town in order to support viable farming and forestry businesses, including agri-tourism, agri-education and value-added business.
- 7 Expand the commercial and industrial tax base to generate more of the revenue necessary to provide municipal services and reduce the burden on residential property owners.
- 8 Increase the number of jobs in town that pay a living wage to attract new residents, employ more residents locally and increase household income.
- 9 Provide the housing, school system, recreation amenities and cultural institutions necessary for the community to retain existing and attract a diversity of new residents and businesses.
- 10 Diversify and expand the number of jobs and businesses in town to enhance economic stability and resilience.

## POLICIES

- 1 Have a town government that supports economic development and all sizes of businesses and institutions, maintains a strong relationship with the town's business community and employers, and assists business growth and development including support for workforce training, vocational education and childcare services.
- 2 Work with prospective developers and entrepreneurs in identifying suitable sites for new or expanded businesses in Northfield and navigating the permitting process.
- 3 Support proposed development projects seeking state permits that conform to the objectives and policies of this plan and Northfield's land use and development regulations.
- 4 Provide municipal infrastructure (water, sewer, etc.) and support the provision of the utility and telecommunication services necessary to sustain and grow Northfield's economy. Also see Utilities, Facilities and Services Objectives and Policies on [page 33](#).
- 5 Promote Northfield's recreation and cultural resources to support tourism-oriented businesses and attract employers and residents to the community.
- 6 Support existing businesses to encourage their continued presence in Northfield.

# 8. ECONOMIC DEVELOPMENT

## 8A. Current Conditions

### Overview

Northfield functions as a small employment center in Central Vermont. Due to the presence of Norwich University and Cabot Hosiery, as well as the availability of the transportation (state highway & interstate access) and municipal infrastructure (water & sewer), Northfield supports a diversity of small- to medium-scale businesses. More information about Northfield's economy can be found in the 2014 Vermont Downtown Action Team Report, including a retail market study.

There were about 1,900 jobs and 110 business establishments in Northfield in 2017 according to the Vermont Department of Labor as shown in [Figure 49 \(page 48\)](#). Many Northfield residents are self-employed or own small businesses and are not counted in the Department of Labor statistics, which only include jobs covered by unemployment insurance. As of 2019, there were nearly 400 active business names registered to a Northfield address with the Vermont Secretary of State. According to the Census Bureau, more than 300 households (15%) in Northfield reported self-employment earnings during 2016 and nearly 200 residents worked from home.

The number of business establishments in Northfield declined between 2000 and 2017 according to Vermont Department of Labor statistics. Despite those losses, the number of jobs in town remained relatively stable as some firms added employees. Growth in the local economy is further evidenced by an increase in gross receipts received and total wages paid by Northfield businesses as shown in [Figure 48 \(page 48\)](#).

According to Census Bureau data, about 1,450 Northfield residents commute out of town while about 1,200 people commute into town for work. The number of Northfield residents working in town was virtually unchanged between 2005 and 2015 at less than 650 people. About half of those who commute into Northfield for work live elsewhere in Washington County as shown in [Figure 50 \(page 48\)](#).

The unemployment rate in Northfield is typically higher than the rate in Washington County or Vermont. The unemployment rate in Northfield peaked in 2010 at 7% and had fallen to 3.5% by 2018.

Commercial and industrial property comprised only 4% of the total value of property on Northfield's 2017 grand list. However, in 2017 Norwich University's holdings represented 51% of the total value and as discussed in the [Assessment of Current Land Use section on page](#)

[5](#) most of their property is tax-exempt. As a result, commercial and industrial properties accounted for 11% of municipal property taxes paid in 2017. These statistics indicate that without the influence of Norwich University, Northfield would be considered a rural bedroom community as the tax base is primarily composed of residential properties and undeveloped land.

### Major Employers and Employment Sectors

Norwich University, the oldest private military college and one of six senior military colleges in the country, is the largest employer in town with nearly 700 employees. That includes approximately 400 instructional employees (40% full-time and 60% part-time) and 300 support staff. Many of the service sector businesses in Northfield are also highly dependent on Norwich's employees, 3,400 students and visitors. This is evidenced by the finding from the 2014 Vermont Downtown Action Team Report that 80% of customers at downtown retail and dining establishments were town residents or Norwich students.

Cabot Hosiery, the manufacturer of Darn Tough socks, is another major employer in Northfield. The company has been expanding in recent years and employed more than 300 workers as of 2018 and was projecting it would employ 500 people by 2020. Cabot Hosiery hosts an annual factory sale in November that brings thousands of visitors to Northfield. The company had annual revenues in excess of \$20 million in 2017.

Government (federal, state, local and school) employed about 230 people in Northfield in 2017 and nearly 200 people worked in the healthcare sector according to the Vermont Department of Labor. There were also about 150 retail and 165 food service jobs in town in 2017.

### Agriculture and Forestry

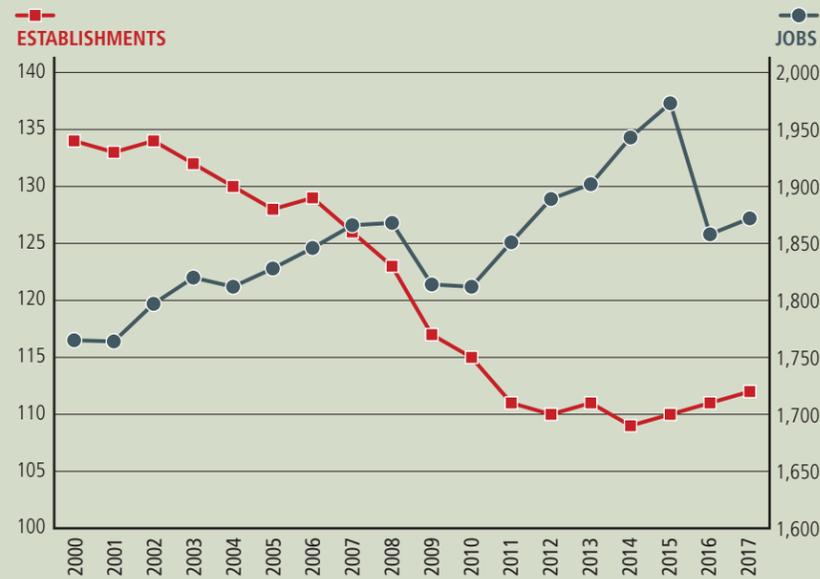
Northfield is largely a rural town with a working landscape that supports agriculture and forestry businesses. Nearly 40% of the land in town is farm or forest land enrolled in Current Use as shown on [Figure 20 \(page 22\)](#). Agriculture in Northfield, once dominated by dairy farms, has diversified. Managed forests are producing timber, wood for heating fuel and other forest products like maple syrup. Agri-tourism and agri-education businesses are a growing market segment building upon the success of Vermont-branded farm and food products. As of 2018, Northfield hosted a Farmers Market on Depot Square weekly from mid-May to mid-October and a winter market at Plumley Armory

Figure 48. Economic Activity in Northfield, 2000-2017



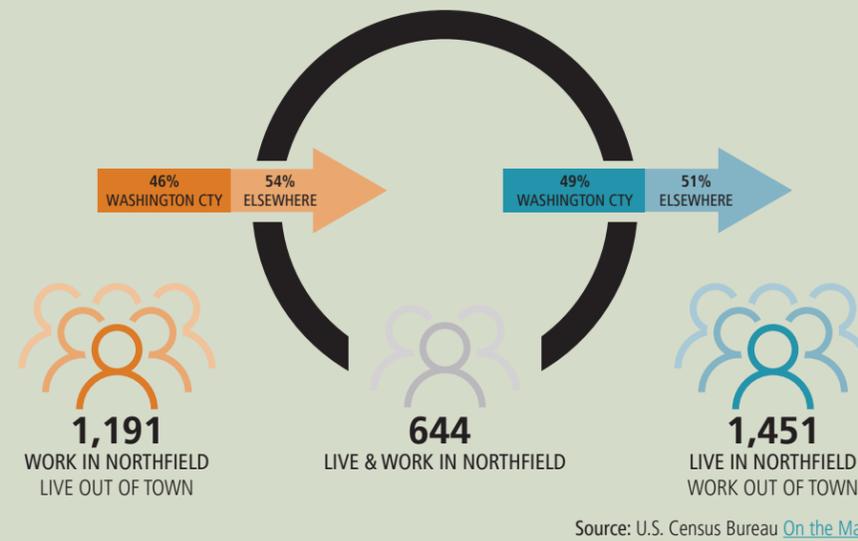
Sources: Vermont Department of Labor, Vermont Department of Taxes  
dollar amounts adjusted for inflation using the CPI

Figure 49. Businesses and Jobs in Northfield, 2000-2017



Source: Vermont Department of Labor

Figure 50. Commuting Patterns, 2015



Source: U.S. Census Bureau On the Map

Figure 51. SWOT Analysis

**STRENGTHS.** Local factors supporting economic development:

- Presence of Norwich University
- Availability of infrastructure
- Town funds for economic development
- Available space / land zoned for businesses
- Community amenities
- Access to outdoor recreation
- More affordable housing costs
- Local school
- Community engagement

**OPPORTUNITIES.** Outside factors supporting economic development:

- Existing village center designations
- State economic development programs
- Proximity to Montpelier

**WEAKNESSES.** Local factors constraining economic development:

- Need for infrastructure improvements
- Lack of townwide broadband internet
- Lack of townwide cell phone service
- Flood hazard / river corridor areas
- Town development review processes
- No town economic development staff

**THREATS.** Outside factors constraining economic development:

- Aging / shrinking workforce
- State permitting processes
- Increases in education property tax rates

on the Norwich campus. There are also many hobby and homesteading farms that are not primary income sources for their operators, but which are sustaining Northfield’s rural character and way of life.

**Resources**

Northfield relies upon regional and state agencies and organizations to support economic development in the community. As of 2018, Northfield did not have an economic development department/staff. There is an economic development sub-committee comprised of two select-board members and the town manager; the committee meets upon request.

The Northfield Community Development Network (NCDN) is a local, small, all-volunteer non-profit organization interested in economic and community development. While NCDN has been successful at driving community participation and engagement in economic development focused events and workshops, they do not have the capacity to work to attract and retain business in Northfield or to provide economic development assistance during the business day.

The Central Vermont Economic Development Corporation (CVEDC) is the principal organization working to attract and retain businesses in the region. CVEDC offers assistance with business start-ups and expansions, technology, regulations and workforce development. They maintain current lists of resources for the business community and available commercial property. However, CVEDC’s charge is to promote development in the region and their services are not designed to specifically address Northfield’s needs.

**8B. SWOT Analysis**

When planning for business growth and development in Northfield, it is beneficial to understand the strengths, weaknesses, opportunities and threats affecting the town’s economy. The SWOT analysis, [Figure 51](#), identifies the community’s competitive advantages – those local assets that make it distinctive or competitive in the larger economy – juxtaposed against those internal or external factors that can keep a community from realizing its potential. Determining and analyzing what Northfield already possesses that could be leveraged better to build the capacity for growth is critical to promoting economic vitality.

## OBJECTIVES

- 1 Mitigate potential flood and erosion hazards, and increase the community's resilience to flooding and other disasters.
- 2 Avoid increased flood and erosion hazards resulting from irresponsible land use and development practices.
- 3 Improve or maintain natural riparian functions along streams and rivers in Northfield to prevent or minimize future flood and fluvial erosion hazards.
- 4 Educate property owners about flood and erosion hazards, and encourage more to purchase flood insurance.
- 5 Reduce the number of buildings in the floodway in Northfield through means such as buyouts.
- 6 Increase the amount of public or conserved land within flood and fluvial erosion hazard areas in order to provide flood storage, stabilize streambanks and protect water quality.

## POLICIES

- 1 Guide future housing away from flood and erosion hazard areas and support efforts to flood-proof existing homes within hazard areas.
- 2 Locate structures and impervious areas away from surface waters and encourage property owners to maintain or establish riparian buffers.
- 3 Locate new, and relocate existing, public infrastructure and critical facilities out of flood and erosion hazard areas whenever feasible.
- 4 Ensure that all land use and development within the Special Flood Hazard Area fully conforms to the minimum requirements of the National Flood Insurance Program.
- 5 Ensure that stormwater runoff from developed land is managed at the source so it will not place an undue burden on public infrastructure, increase flood and erosion hazards, or reduce water quality.
- 6 Support efforts to reduce the severity of future floods such as allowing rivers and streams to access their floodplains, providing compensatory flood storage, and replacing/removing structures constricting water flow.

## 9. FLOOD RESILIENCE

## 9A. Hazard Areas

Flooding

Roads and development share narrow valleys with streams and rivers in many areas of Northfield as a result of the town's landform. Flood conditions regularly occur during storms and as a result of rapid snowmelt and ice jams. Flooding is often minor or affects only a limited area. Due to climate change, however, the frequency and intensity of major storms that can cause widespread, catastrophic property damage and potential loss of life is increasing.

Tropical Storm Irene in 2011 resulted in severe flooding in Northfield with the Dog River cresting at 17.26 feet (more than nine feet above flood stage) resulting in total property damages that exceeded \$2 million. It was largest storm to occur in Vermont since the devastating 1927 flood. While Irene was remarkable because of its statewide impact, it was only one of a number of storms that have caused significant local damage in Northfield since the late-1990s. Section 7.2 of the town's [2017 Hazard Mitigation Plan](#) further describes the flood hazards in Northfield.

Flooding is a natural process that can become a natural disaster through human activities such as:

- ▶ Tree removal, compaction of soil and construction of impervious surfaces within watersheds. This can cause higher quantities of stormwater runoff to flow into streams and rivers more quickly during storms, leading to rapid downstream flooding.
- ▶ Construction of buildings and infrastructure within flood-prone areas, which is often followed by efforts to protect that investment from flood damage by straightening, berming or armoring the adjacent stream or river. This can increase the volume, speed and power of the stream or river during a storm by preventing it from meandering, accessing its floodplains and dissipating its energy naturally.
- ▶ Building infrastructure such as bridges or culverts within or over rivers or streams that constricts the channel. This can reduce the carrying capacity of the river or stream and lead to ice or debris jams that block water flow resulting in unanticipated localized flooding.
- ▶ Undersizing driveway culverts and storm drainage basins/pipes, or inadequately managing stormwater from impervious surfaces. This can also result in unanticipated localized flooding,

damage public infrastructure and cause runoff to flow untreated into streams and rivers.

While flooding will always occur, flood damage is not a given. How we use and develop land can either exacerbate or mitigate the frequency and intensity of future flooding. Mitigation requires an understanding of the natural processes and forces at work in a watershed so that development can be appropriately sited, designed, engineered and constructed to avoid or withstand flooding, and to not contribute to increased flooding downstream.

National Flood Insurance Program

Northfield has participated in the National Flood Insurance Program (NFIP) since 1978. The NFIP is a federal program intended to improve floodplain management, and to assist communities and property owners when severe flooding occurs. Property owners in Northfield can purchase flood insurance because the town is enrolled in the NFIP. To maintain eligibility for the NFIP, Northfield must regulate development in mapped floodplains as required by federal regulations (see Town Regulations, below). According to FEMA's NFIP Insurance Report, Northfield property owners received approximately \$2 million through flood insurance claims from 1978 through 2018. Northfield does not participate in FEMA's Community Rating System, which would reduce flood insurance rates by 5% or more in exchange for the town exceeding minimum NFIP requirements.

FEMA most recently mapped the town's floodplains in March 2013. The official Flood Insurance Rate Maps (FIRMs) are available online through the FEMA Flood Map Service Center and in paper form at the Northfield town office. A floodplain is the area of land alongside a water body that is naturally subjected to flooding during periods of high water. FEMA categorizes floodplains into three distinct areas as shown on [Figure 52 \(page 51\)](#):

- ▶ Floodway, which includes the stream or river channel and the adjacent land where there will be flowing water during a flood.
- ▶ 100-Year Floodplain, which is the area where floodwaters will accumulate during the 100-year storm. The 100-year storm statistically has a 1% chance of occurring in any given year. In Northfield, it is a storm that produces approximately 5½ inches of rain in a 24-hour period.
- ▶ 500-Year Floodplain, which is the area that will flood during a 500-year storm (statistical 0.2% chance of occurring in any given

year). In Northfield, it is a storm that produces approximately 11 inches of rain in a 24-hour period.

The 2013 Vermont Hazard Mitigation Plan shows Northfield ranked as #20 out of 251 Vermont communities based on total number of structures in the Special Flood Hazard Area. According to Northfield's 2018 Expanded Community Report, there were 108 buildings in town located within the Special Flood Hazard Area (the floodway and the 100-year floodplain):

- ▶ 21 (19%) of those buildings were in the floodway.
- ▶ 40 of those were mobile homes, including most of the homes in the 32-lot Tucker Mobile Home Park on Fairgrounds Road.
- ▶ 43 properties had flood insurance policies.
- ▶ An additional 54 structures were located in the 500-year floodplain, including the town's wastewater facility, ambulance station and town garage.

### River Corridors

The NFIP applies to areas at risk of inundation flooding, but that is not the only flood hazard in Northfield. Many small streams flow down Northfield's hillsides and these small streams can become powerful torrents of water during heavy storms or rapid snowmelt. They can erode their banks or even cut new channels causing massive damage in the process.

This type of flood hazard is known as fluvial erosion. There are many areas in Northfield that are not FEMA mapped flood hazard areas that are at risk of flood-related damage due to fluvial erosion. Much of the property and infrastructure damage that has occurred during severe storms in Northfield since the late-1990s has been caused primarily by fluvial erosion rather than inundation flooding.

To address fluvial erosion hazards, the Vermont River Management Program has defined and mapped 'river corridors' along all major streams and rivers and within 50 feet of small streams as shown on [Figure 52 \(page 51\)](#). The river corridor is intended to encompass land adjacent the stream or river needed to accommodate its meandering, floodplain and riparian functions so that it can remain in, or be restored to, a naturally stable condition thus reducing future erosion hazards. This approach is based on giving rivers room to move rather than seeking to armor or berm them to prevent their movement.

As of 2018, there were 226 structures in Northfield located within mapped river corridors or 50 feet of small streams. 133 (59%) of those were not in the NFIP Special Flood Hazard Area. In 2010, Northfield enacted regulations to manage development within fluvial erosion

hazard areas in a manner similar to development within mapped floodplains (see Town Regulations, below). Additionally, the state regulates development within river corridors for projects that require an Act 250 permit.

### Roads

There were 17 miles of roads located within mapped river corridors or 50 feet of small streams, 13 miles of which were maintained town roads as of 2018. The state has identified and classified road segments potentially at risk of erosion as shown on [Figure 52 \(page 51\)](#). In 2018, the state required all municipalities to obtain a Municipal Roads General Permit that will require improved stormwater management on road segments in proximity to rivers and streams and at risk of erosion. The permit requires municipalities to undertake a detailed road erosion inventory and establishes a series of benchmarks for upgrading road segments that do not fully meet state standards.

## 9B. Hazard Mitigation

### Mitigation Plans & Projects

The risks to life and property associated with flooding in Northfield can be reduced or eliminated through hazard mitigation. Specific hazard mitigation projects in Northfield are identified in the plans below:

- ▶ Northfield has an adopted Hazard Mitigation Plan. That plan was most recently approved by FEMA in 2017. The Hazard Mitigation Plan (as most recently adopted) is incorporated into this plan by reference, including the Proposed Hazard Mitigation Programs, Projects and Activities (listed on pages 30-34 in the 2017 plan) intended to mitigate hazards from flooding and severe storms.
- ▶ The 2009 Dog River Corridor Plan identifies potential projects to improve channel stability in the Dog River and its tributaries. That plan is incorporated into this plan by reference, including the projects recommended in Northfield that are listed in Table 7.1 on pages 92-94. Priorities include projects #4, 5, 13, 14 and 15.

Northfield has also been proactive in addressing its stormwater issues. The projects recommended in the 2008 and 2011 stormwater studies have essentially been completed as discussed in [Municipal Infrastructure \(page 35\)](#). A further study was completed in 2019 that addresses issues in the South Main Street area, including a CSO removal. Engineering for that project is in progress and once completed the town will be seeking funding for construction.

### Town Regulations

The authority to regulate development, including prohibiting development in hazard areas and within riparian buffers as described in [Figure 15 \(page 20\)](#), is one of the principal means by which Northfield can mitigate flood hazards. Article V of Northfield's 2016 Zoning Regulations regulates development within the NFIP Special Flood Hazard Area and a Fluvial Erosion Hazard Zone along the Dog River. As of 2018, Northfield's regulations prohibited construction of new principal structures, storage and fill within those hazard areas. The town's regulations are compliant with and in some cases exceed minimum NFIP requirements.

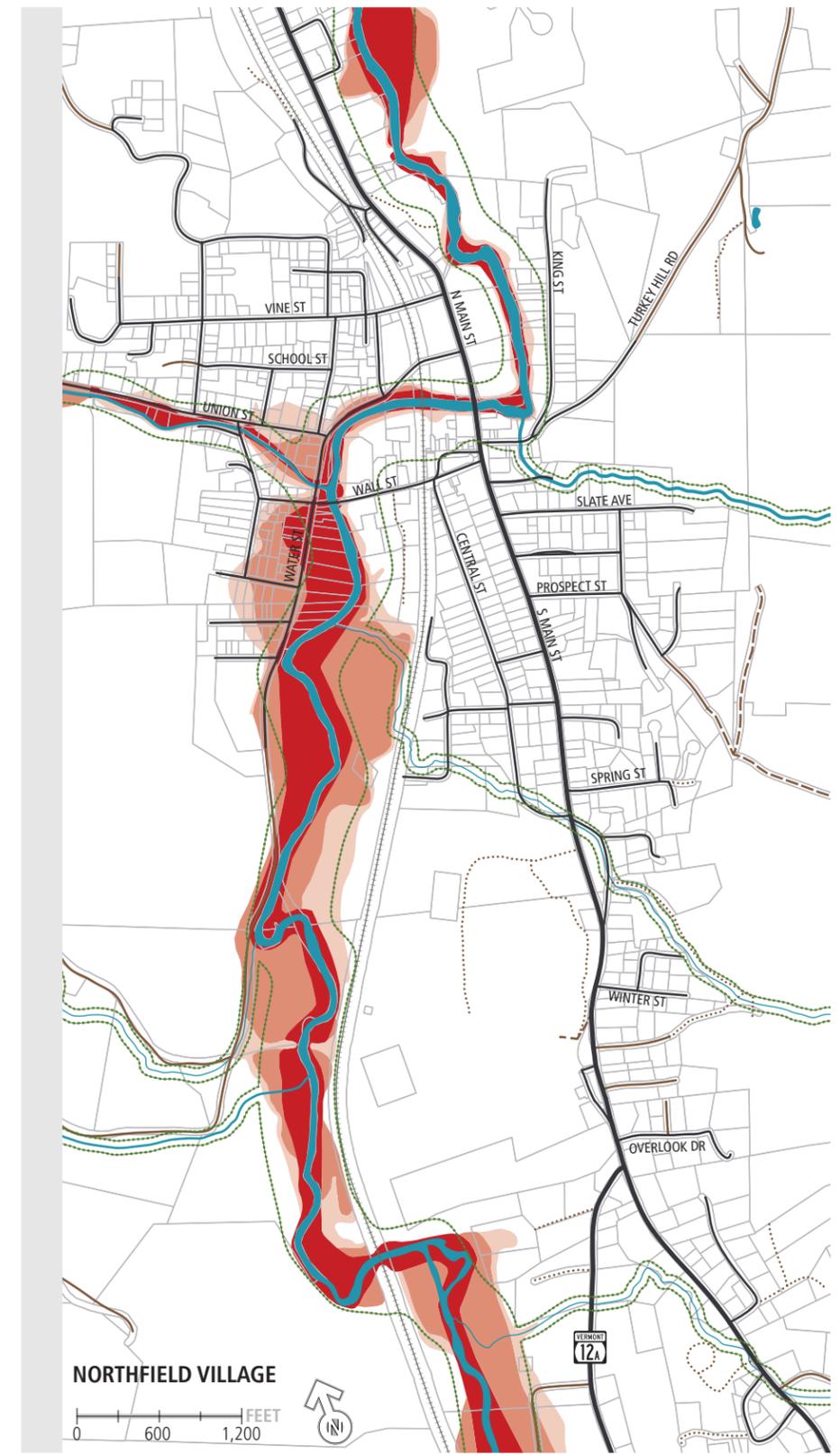
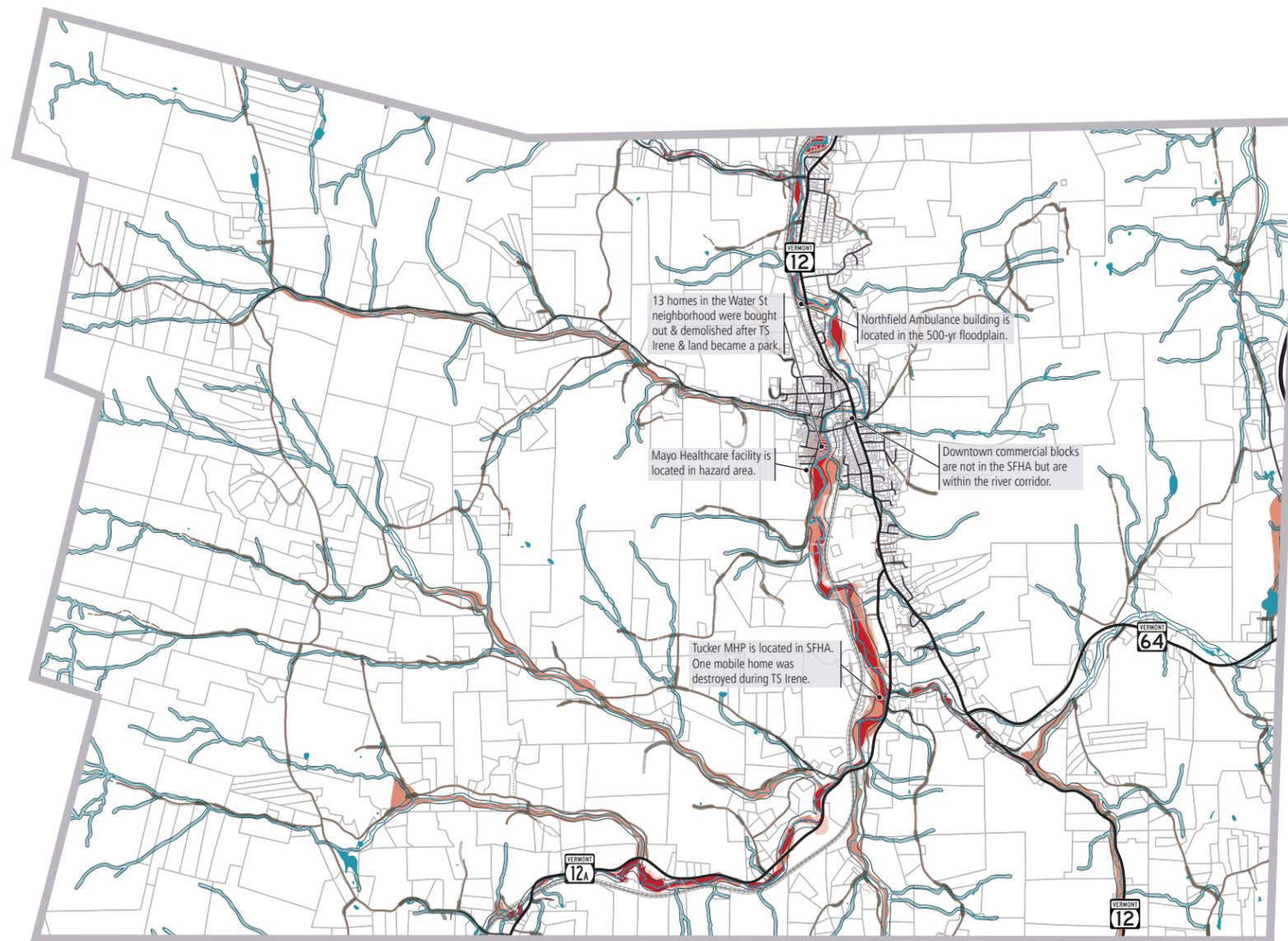
Northfield adopted its fluvial erosion hazard provisions in 2010 prior to the state establishing its river corridor program. Those provisions are based on the fluvial erosion hazard mapping that was a component of the Dog River Corridor planning effort completed in 2009. The intent remains for the town to adopt permanent river corridor regulations upon the state completing its statewide river corridor mapping to incorporate the Phase 2 Geomorphic Assessment data.

As of 2018, Northfield qualified for 17.5% in state funding under the Vermont Emergency Relief and Assistance Fund (ERAF), which matches Federal Public Assistance funding to repair roads and other public infrastructure after federally-declared disasters and reduces the town's cost share by 10%. To maintain the higher 17.5% ERAF rate, Northfield must continue to:

- ▶ Participate in the National Flood Insurance Program, which requires the town adopt and administer flood hazard regulations;
- ▶ Maintain and implement adopted Town Road and Bridge Standards;
- ▶ Maintain and implement a Local Emergency Operations Plan and a Local Hazard Mitigation Plan; and
- ▶ Either adopt and administer river corridor regulations or participate in FEMA's Community Rating System.

Currently, Northfield regulates development within the Dog River fluvial erosion hazard area. That has allowed the town to qualify for the additional 10% ERAF funding. However, state requirements have changed and Northfield anticipates needing to revise the existing fluvial erosion hazard regulations to conform to the state's current river corridor mapping and model standards. The additional 10% in state funding represents a significant cost savings for Northfield taxpayers in the event of future severe flooding or other disasters, so it is important for the town to maintain eligibility for full ERAF funding.

Figure 52. Flood and Erosion Hazard Map



- KEY**
- Floodway
  - 100-year floodplain
  - 500-year floodplain
  - River corridor & 50' small stream setback
  - High erosion potential
  - Moderate erosion potential

**SOURCES**  
 2015 National Flood Hazard Layer, FEMA  
 2015 River Corridors, VTANR  
 2017 Hydrologically Connected Road Segment, VTANR

0 1/2 1 MILE

0 600 1,200 FEET



## 10. IMPLEMENTATION PROGRAM

The actions through which the Town of Northfield will implement vision, goals and objectives of this plan are summarized below with an indication of when the action is currently anticipated to occur (some actions are an ongoing part of town government and are therefore not assigned to a particular year) and the parties involved. While this plan can be in place for up to eight years, specific actions are assigned only for the next five years with the expectation that needs and priorities may evolve over time and that several of the actions, once underway or completed, are likely to generate a need for follow-up actions not currently identified. Not all of the actions listed below will be fully completed within the 8-year planning period, but the Town of Northfield recognizes the actions assigned to a specific year as top priorities for the community and intends to make as much progress as possible on their successful implementation.

### 10A. Priority Actions

| Action  | Target Completion Date   Lead Entity & Partners  | Corresponding Goals & Objectives   |
|---|--|--|
| 1 Complete and adopt the master plan for the town’s trees, and then work to implement its recommendations.  | <b>2020</b><br>Conservation Commission, Selectboard  | Goal 5, Goal 6<br>Land Use Objective 7<br>Resource Protection Objectives 1, 3<br>Economic Development Objective 5  |
| 2 Seek a determination of energy compliance for this plan to expand the town’s ability to influence the review and permitting process for in-state electric generation projects as provided for under Act 174                 | <b>2020</b><br>Planning Commission, Energy Committee   | Goal 7<br>Energy Objective 2   |
| 3 Adopt a complete streets policy that calls upon the town to incorporate context-appropriate bicycle and pedestrian facilities into road improvement and construction projects.  | <b>2021</b><br>Selectboard   | Goal 4, Goal 7, Goal 8<br>Land Use Objectives 3, 5<br>Transportation Objectives 1 & 2<br>Energy Objectives 1 & 3<br>Economic Development Objectives 1, 2, 5, 9   |
| 4 Develop specific plans for use of the town’s Economic Development funds.  | <b>2021</b><br>Selectboard, Town Manager/Economic Development Director, Northfield Community Development Network   | Goal 2, Goal 12<br>Land Use Objectives 3, 9<br>Economic Development Objectives 1, 2, 4, 5, 7, 8, 10  |
| 5 Develop and implement a marketing strategy to expand low-impact recreation and tourism activities that would benefit the local economy and lead to business creation in Northfield.   | <b>2022</b><br>Town Manager/Economic Development Director, Northfield Community Development Network, Recreation Committee, Conservation Commission, Energy Committee | Goal 2, Goal 8, Goal 10<br>Land Use Objectives 5, 9<br>Resource Protection Objective 1<br>Economic Development Objective 6, 7, 8, 10   |
| 6 Update and re-adopt Northfield’s Hazard Mitigation and Emergency Operations plans as necessary to meet state and federal requirements, and ensure they are consistent with the goals, objectives and policies of this plan. | <b>2022</b><br>Town Manager, Selectboard   | Goal 15<br>Land Use Objectives 3, 8<br>Resource Protection Objectives 1, 6<br>Transportation Objective 1<br>Utilities, Facilities and Services Objectives 1, 3, 4, 5<br>Flood Resilience Objectives 1, 3, 4, 5 |
| 7 Negotiate a PILOT (payment in lieu of taxes) from Norwich University this is commensurate with its demand on town services  | <b>2022</b><br>Selectboard, Town Manager, Norwich University officials   | Goal 12, Goal 13<br>Land Use Objectives 5, 6, 9<br>Utilities, Facilities and Services Objective 1, 5<br>Economic Development Objectives 3, 5, 9  |

| Action  | Target Completion Date   Lead Entity & Partners   | Corresponding Goals & Objectives   |
|---|---|--|
| <p><b>8</b> Revise and adopt land use and development regulations that will implement and align with the goals, objectives and policies of this plan including the recommendations for maintaining, evolving and transforming land use and development patterns set forth in the <a href="#">Future Land Use Recommendations section on page 8</a>. Specific changes recommended in this plan include:</p> <ol style="list-style-type: none"> <li>1. Establishing an advisory role in the local permitting process for the Conservation Commission to review and comment on applications for land development and subdivision in the rural areas of town that could have adverse impacts on the natural resources identified in this plan.</li> <li>2. Incorporating clear standards for access to property, access management along major travel corridors, curb cuts, driveways, roads and sidewalks to promote a safe and efficient transportation network.</li> <li>3. Reducing off-street parking requirements, allowing for shared and off-site parking, and integrating green stormwater management into parking lot design standards.</li> <li>4. Allowing required off-street parking spaces to be used for electric vehicle charging, electric vehicle charging stations as an accessory structure on any lot, and gasoline stations to offer electric vehicle charging.</li> <li>5. Incorporating screening standards for renewable energy projects as authorized by state statute.</li> <li>6. Allowing for a diversity of higher-density housing types in and between Northfield Village and Northfield Falls, and maintaining low residential densities in rural areas of town.</li> <li>7. Incorporating permanent river corridor regulations that meet state minimum requirements, which will ensure ongoing eligibility for the highest ERAF funding.</li> <li>8. Incorporating requirements for riparian buffers and stormwater management standards.</li> <li>9. Providing for on-farm businesses and value-added businesses.</li> </ol> | <p><b>2023</b><br/>Planning Commission, Selectboard, Conservation Commission and Energy Committee</p> | <p>Goal 1, Goal 4, Goal 5, Goal 6, Goal 7, Goal 9, Goal 10, Goal 11, Goal 15<br/>Land Use Objectives 1, 3, 4, 5, 7, 8<br/>Resource Protection Objectives 1, 2, 3, 5, 6<br/>Transportation Objective 1<br/>Utilities, Facilities and Services Objective 4<br/>Energy Objectives 1 &amp; 3<br/>Housing Objectives 1, 2, 3<br/>Economic Development Objectives 1, 2, 4, 5, 6, 7, 8, 9, 10<br/>Flood Resilience Objectives 1, 2, 3, 4, 5</p> |
| <p><b>9</b> Maintain the village center designation for Northfield Village and Northfield Falls, and seek a downtown designation for Northfield Village if it would meaningfully benefit the town and downtown property owners.</p>   | <p><b>2023 &amp; 2025</b><br/>Planning Commission, Selectboard</p>                                    | <p>Goal 1<br/>Land Use Objectives 1, 3, 4, 5<br/>Resource Protection Objective 2<br/>Utilities, Facilities and Services Objectives 1, 3, 5<br/>Energy Objective 3<br/>Housing Objectives 1, 2, 3<br/>Economic Development Objectives 1, 2, 4, 5, 7, 8, 9</p>   |
| <p><b>10</b> Undertake a comprehensive, town-wide Natural Resource Inventory, and update this plan and the implementing regulations as necessary to integrate the most accurate information about Northfield's natural resources</p>  | <p><b>2024</b><br/>Conservation Commission, Planning Commission, Selectboard</p>                      | <p>Goal 5, Goal 6, Goal 10<br/>Land Use Objective 7, 8<br/>Resource Protection Objectives 1, 3, 4, 5, 6<br/>Utilities, Facilities and Services Objective 4<br/>Energy Objective 2<br/>Economic Development Objective 6<br/>Flood Resilience Objectives 1, 2, 3, 6</p>  |
| <p><b>11</b> Explore the feasibility and potential cost savings of partnering with neighboring communities to regionalize municipal services such as public safety, emergency response, highway maintenance and recreation.</p>   | <p><b>2027</b><br/>Town Manager, Selectboard</p>  | <p>Goal 8, Goal 13<br/>Land Use Objective 9<br/>Transportation Objective 1<br/>Utilities, Facilities and Services Objective 1<br/>Housing Objective 2<br/>Economic Development Objective 9</p>   |

| Action  | Target Completion Date   Lead Entity & Partners                   | Corresponding Goals & Objectives   |
|---|---|--|
| <b>12</b> Work with VTrans and Green Mountain Transit to develop a park-and-ride in Northfield that would serve Route 12 commuters. | <b>2027</b><br>Energy Committee, Planning Commission, Selectboard | Goal 4, Goal 7<br>Transportation Objectives 1 & 2<br>Energy Objectives 1 & 3 |

10B. **Ongoing Actions**

| Action   | Lead Entity & Partners   | Corresponding Goals & Objectives  |
|--|--|---|
| <b>1</b> Continue the Conservation Commission’s community education efforts to further the resource protection goals and policies of this plan.  | Conservation Commission  | Goal 5, Goal 6, Goal 9, Goal 10<br>Land Use Objective 7, 8<br>Resource Protection Objectives 1, 3, 4, 5, 6<br>Utilities, Facilities and Services Objective 4<br>Energy Objective 2<br>Economic Development Objective 6<br>Flood Resilience Objectives 1, 2, 3, 4, 6 |
| <b>2</b> Continue to advocate for the state-funded transportation projects needed to further the goals, objectives, policies and recommendations of this plan, including through active participation in the Central Vermont Transportation Advisory Committee.  | CVRPC TAC Representative, Planning Commission, Selectboard, Town Manager | Goal 4, Goal 13<br>Land Use Objectives 3, 5<br>Transportation Objectives 1 & 2<br>Energy Objective 1<br>Economic Development Objectives 1, 2, 4, 5, 8, 10<br>Flood Resilience Objective 1   |
| <b>3</b> Maintain membership in Green Mountain Transit, including continuing to fund the annual member assessment, and work with the GMT Commissioner representing Washington County to advocate for transit facilities and services that meet the needs of Northfield residents, businesses and institutions                | Selectboard, Town Voters, Energy Committee                               | Goal 4, Goal 7<br>Land Use Objective 3<br>Transportation Objectives 1 & 2<br>Energy Objectives 1 & 3<br>Economic Development Objectives 1, 2, 4, 5, 8, 10   |
| <b>4</b> Participate in the Section 248 process and call upon the Public Utilities Commission to make decisions that further the goals, objectives and policies of this plan to the full extent provided for under Act 174, specifically including the <a href="#">Renewable Energy Project Siting Standards (page 42)</a> . | Energy Committee, Selectboard, Planning Commission                       | Goal 7, Goal 10<br>Land Use Objective 7, 8<br>Resource Protection Objectives 1, 3, 5, 6<br>Utilities, Facilities and Services Objectives 1, 2<br>Energy Objective 2<br>Economic Development Objective 6   |
| <b>5</b> Maintain and update the town’s bridge and culvert inventory and road surface management system on a regular basis.  | Highway Foreman, Town Manager  | Goal 4, Goal 13, Goal 15<br>Transportation Objective 1<br>Utilities, Facilities and Services Objective 4<br>Flood Resilience Objective 1  |
| <b>6</b> Continue to appoint an energy committee and/or an energy coordinator to implement the energy-related goals, objectives and policies of this plan.   | Selectboard  | Goal 7<br>Land Use Objective 4<br>Transportation Objective 2<br>Energy Objectives 1, 2, 3   |

| Action  | Lead Entity & Partners  | Corresponding Goals & Objectives  |
|---|---|---|
| <b>7</b> Maintain and implement a capital improvement program that is aligned with the goals and objectives of this plan.   | Selectboard, Town Manager, Planning Commission  | Goal 13<br>Land Use Objectives 2, 3, 5, 6, 9<br>Transportation Objectives 1 & 2<br>Utilities, Facilities and Services Objectives 1, 3, 4, 5<br>Energy Objective 1<br>Housing Objective 2<br>Economic Development Objectives 1, 2, 4, 5, 9<br>Flood Resilience Objective 1 |
| <b>8</b> Call upon the state and supervisory union to continue efforts to control education costs through reduced administrative costs, shared services, facility consolidation and other means as necessary.   | Selectboard, School Board Representatives   | Goal 13<br>Land Use Objective 9<br>Utilities, Facilities and Services Objectives 1, 3<br>Housing Objective 2<br>Economic Development Objective 7, 9   |
| <b>9</b> Maintain an up-to-date inventory of property available for commercial and industrial development, infill and redevelopment.  | Town Manager/Economic Development Director, Northfield Community Development Network, Central Vermont Economic Development Corporation  | Goal 2<br>Land Use Objective 3<br>Economic Development Objectives 1, 2, 4, 5, 7, 8, 10  |
| <b>10</b> Maintain eligibility and continue to participate in the National Flood Insurance Program.   | Zoning Administrator and Development Review Board, Planning Commission, Selectboard, Town Manager   | Goal 15<br>Land Use Objective 3, 8<br>Resource Protection Objective 6<br>Utilities, Facilities and Services Objective 4<br>Housing Objectives 2, 3<br>Economic Development Objectives 1, 2, 5<br>Flood Resilience Objectives 1, 2, 3, 4, 5                                |
| <b>11</b> Call upon the state to develop a program to facilitate the relocation or buy-out of homes, particularly those within mobile home parks, that are located in flood or erosion hazard areas.  | Selectboard, Planning Commission  | Goal 11, Goal 15<br>Housing Objectives 2, 3<br>Flood Resilience Objective 1, 5, 6   |
| <b>12</b> Form a committee to include neighborhood residents, students, university officials, landlords, and town officials and staff to resolve conflicts as they arise, and to minimize and mitigate the impacts of student housing on the rental market and housing costs, homes and neighborhoods, and quality of life in Northfield Village. | Student-Community Relations Committee, Selectboard, Planning Commission, Northfield Police Chief, Norwich University officials and staff, landlords, students, Northfield Village residents | Goal 11, Goal 12<br>Land Use Objectives 4, 6<br>Resource Protection Objective 2<br>Housing Objectives 1, 2, 3<br>Economic Development Objective 9   |
| <b>13</b> Work closely with Norwich University and other major employers to further the economic development goals, objectives and policies of this plan.   | Selectboard, Town Manager, Northfield Community Development Network   | Goal 2, Goal 3, Goal 14<br>Land Use Objectives 3, 6, 9<br>Utilities, Facilities and Services Objective 2<br>Energy Objective 1<br>Economic Development Objectives 1, 2, 3, 4, 5, 7, 8, 9, 10  |
| <b>14</b> Continue to support and partner with the Central Vermont Economic Development Corporation to further the economic development goals, objectives and policies of this plan.  | Selectboard, Town Manager, Northfield Community Development Network   | Goal 2<br>Land Use Objectives 3, 9<br>Utilities, Facilities and Services Objective 2<br>Energy Objective 1<br>Economic Development Objective 1, 2, 4, 5, 6, 7, 8, 10  |

10C. Long-Term Actions

| Action  | Lead Entity & Partners  | Corresponding Goals & Objectives   |
|---|---|--|
| <p><b>1</b> Continue to implement the recommendations of the 2014 Vermont Downtown Action Team Report and the 2016 Northfield Area-Wide Plan.</p>   | <p>Selectboard, Town Manager, Planning Commission, Northfield Community Development Network</p> | <p>Goal 1<br/>                     Land Use Objectives 1, 2, 3, 4, 5, 6, 9<br/>                     Resource Protection Objective 2<br/>                     Transportation Objectives 1 &amp; 2<br/>                     Utilities, Facilities and Services Objectives 1, 3, 4, 5<br/>                     Energy Objective 1<br/>                     Housing Objectives 1, 2, 3<br/>                     Economic Development Objectives 1, 2, 4, 5, 7, 8, 9, 10<br/>                     Flood Resilience Objectives 1, 5, 6</p> |
| <p><b>2</b> Continue to improve and extend municipal water and sewer within and between Northfield Village and Northfield Falls to support efficient development patterns, economic growth and compact residential neighborhoods, in a manner consistent with the goals, objectives, policies and recommendations of this plan and with smart growth principles (as defined in <a href="#">24 VSA § 2791(13)</a>)</p> | <p>Utility Superintendent, Selectboard, Town Manager</p>  | <p>Goal 1, Goal 2, Goal 7, Goal 11, Goal 13<br/>                     Land Use Objectives 1, 2, 3, 4, 9<br/>                     Resource Protection Objective 2<br/>                     Utilities, Facilities and Services Objectives 1, 3, 4, 5<br/>                     Energy Objective 1<br/>                     Housing Objectives 1, 2, 3<br/>                     Economic Development Objectives 1, 2, 4, 5, 7, 8, 9, 10<br/>                     Flood Resilience Objective 1</p>   |
| <p><b>3</b> Undertake a Scenic Resource Assessment to help inform decision-making about ridgeline and scenic resource protection, as well as town policies on siting utility-scale wind power generation facilities.</p>  | <p>Conservation Commission, Planning Commission</p>   | <p>Goal 5, Goal 7<br/>                     Land Use Objectives 7, 8<br/>                     Resource Protection Objectives 1, 3, 4<br/>                     Energy Objective 2</p>  |
| <p><b>4</b> Request that the Vermont Division of Historic Preservation update its inventory and assessment of historic structures, and the related State and National Register listings, in Northfield.</p>   | <p>Historical Society, Planning Commission</p>  | <p>Goal 5<br/>                     Land Use Objective 4<br/>                     Resource Protection Objective 2<br/>                     Housing Objectives 2 &amp; 3<br/>                     Economic Development Objectives 1, 2, 5, 9<br/>                     Flood Resilience Objective 5</p>   |
| <p><b>5</b> Continue to implement the recommendations of the Dog River Corridor Plan and the <a href="#">2019 Northfield Town Forest Stewardship Plan</a>, and protect and conserve the lands and current uses of the Northfield Town Forest and the Dog River Park.</p>  | <p>Conservation Commission, Planning Commission, Selectboard</p>                                | <p>Goal 5, Goal 6, Goal 15<br/>                     Land Use Objectives 7, 8<br/>                     Resource Protection Objectives 1, 3, 4, 5, 6<br/>                     Utilities, Facilities and Services Objective 4<br/>                     Economic Development Objective 6, 9<br/>                     Flood Resilience Objectives 1, 2, 3, 6</p>  |
| <p><b>6</b> Continue efforts to conserve at least two patches of contiguous forest habitat on public or private land totaling a minimum of 1,000 acres in Northfield in coordination with landowners and conservation organizations.</p>  | <p>Conservation Commission, Planning Commission, Selectboard</p>                                | <p>Goal 5, Goal 6, Goal 10<br/>                     Land Use Objective 7<br/>                     Resource Protection Objectives 1, 3, 4, 5<br/>                     Utilities, Facilities and Services Objective 4<br/>                     Economic Development Objective 6, 9<br/>                     Flood Resilience Objectives 2, 3, 6</p>  |

| Action  | Lead Entity & Partners                            | Corresponding Goals & Objectives  |
|---|---|---|
| <b>7</b> Work with Norwich University, VTrans, Vermont state and federal elected representatives, and others to petition Amtrak to provide passenger rail service in Northfield.                  | Town Manager, Selectboard                         | Goal 4, Goal 7<br>Land Use Objective 6<br>Transportation Objectives 1 & 2<br>Energy Objective 1<br>Economic Development Objectives 3, 5   |
| <b>8</b> Continue to separate stormwater from the municipal wastewater system and direct it to green stormwater practices wherever feasible   | Utility Superintendent, Selectboard, Town Manager | Goal 6, Goal 13, Goal 15<br>Land Use Objectives 2, 3, 8<br>Resource Protection Objectives 1, 6<br>Utilities, Facilities and Services Objectives 1, 3, 4, 5<br>Economic Development Objectives 1, 2, 4, 5, 9<br>Flood Resilience Objectives 1, 3 |
| <b>9</b> Continue to implement the hazard mitigation programs, projects and activities identified in Northfield's Hazard Mitigation Plan as most currently adopted.                               | Selectboard, Town Manager, Fire Chief             | Goal 15<br>Land Use Objectives 3, 8<br>Resource Protection Objectives 1, 6<br>Transportation Objective 1<br>Utilities, Facilities and Services Objectives 1, 3, 4, 5<br>Flood Resilience Objectives 1, 2, 3, 4, 5, 6                            |
| <b>10</b> Investigate the feasibility of capturing methane at the municipal wastewater treatment plant and using it to generate renewable electricity or other similar methane recovery projects. | Energy Committee, Town Manager, Selectboard       | Goal 7, Goal 13<br>Utilities, Facilities and Services Objective 1<br>Energy Objective 2   |



**Should Northfield expand water or sewer to accommodate new or expanded business or more housing? If yes, where should those systems be expanded?**

63% of survey respondents thought that water or sewer should be expanded for economic development and 46% agreed that it should be expanded for residential development.

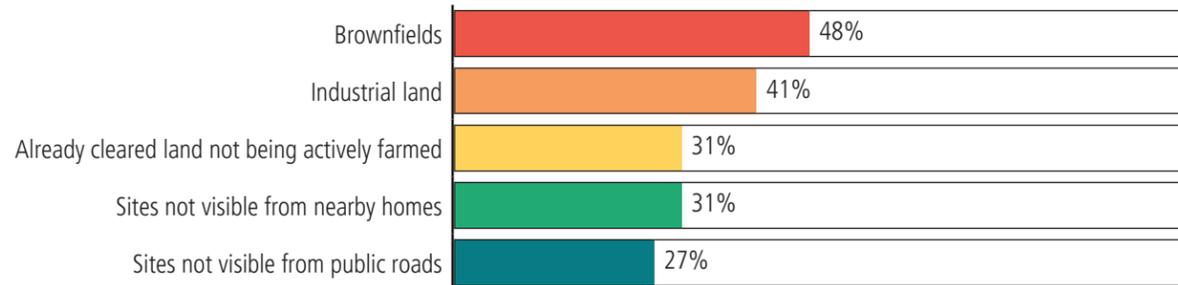
Written comments indicate that respondents thought that Northfield Falls, the area south of the village near the town wells, the Route 12 and 12A corridors, and existing clusters of development (mobile home parks, business parks, etc.) were potential areas to be served by water or sewer. A number of respondents expressed concern about taxpayers being asked to fund any expansions. Some respondents also noted that existing homes and commercial/industrial buildings already served by infrastructure are vacant or underutilized, and that water or sewer should not be expanded until those buildings are fully occupied.

**What locations in Northfield would be appropriate for utility-scale solar or wind projects?**

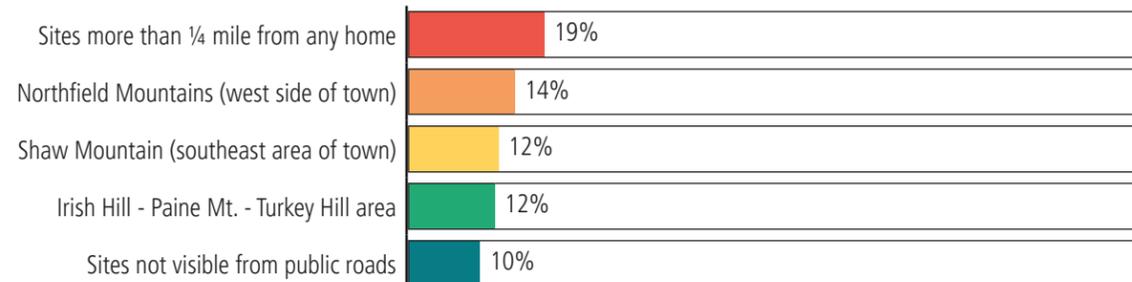
The responses to these two questions suggest that there is not a consensus regarding utility-scale renewable energy in Northfield. Only 11% of respondents thought that utility-scale solar was not appropriate anywhere in town, but 38% of respondents thought that there were no appropriate locations for utility-scale wind in Northfield – indicating that there would likely be greater opposition to a wind project than a solar project. 20% of respondents thought that either utility-scale solar or wind would be appropriate on any feasible location in Northfield, suggesting that these respondents are strongly supportive of renewable energy generation. The charts below show responses to specific types of locations or areas of town.

Written comments suggest that some respondents are supportive of smaller scale solar generation, particularly on rooftops and within parking areas. Others indicated that they do not support locating solar generation on farmland or clearing trees to allow for solar development. There were fewer other comments related to wind generation and those primarily expressed concern about the scenic and environmental impact of locating wind turbines on ridgelines, and about the cost-effectiveness of wind power. There were several comments encouraging more hydropower generation.

Percentage of respondents agreeing that the following would be appropriate locations for utility-scale solar projects



Percentage of respondents agreeing that the following would be appropriate locations for utility-scale wind projects



**Is high-speed internet and cell phone service in Northfield adequate? If no, what improvement needed?**

Only 25% of survey respondents thought that high-speed internet and cellphone service was adequate in town. There were a significant number of comments related to a lack of service (or poor reliability and/or speeds) in the more rural areas of town, as well as limited competition from providers and high prices for service. Respondents also suggested that improved service is necessary for to attract businesses and residents to town, and for those already in town including people working from home.

Survey respondents were asked a series of questions to gauge the level of support for various town goals and policies as expressed in the adopted town plan and potential goals and policies being considered for inclusion in the updated town plan. The results (listed in order based on level of support) are shown below:

| How important is it for Northfield to...   | SCORE<br>0-100 | DISTRIBUTION OF RESPONSES |          |          |     |           |
|--|----------------|---------------------------|----------|----------|-----|-----------|
|  |                | VERY                      | SOMEWHAT | SLIGHTLY | NOT | UNSURE/NR |
| 1 Increase the number of businesses in the downtown  | 77.9           |                           |          |          |     |           |
| 2 Continue having Norwich University contribute funds to offset the cost of providing municipal services | 75.3           |                           |          |          |     |           |
| 3 Offer recreation facilities and programs for youth   | 70.5           |                           |          |          |     |           |
| 4 Increase cooperation between town government and Norwich University                                    | 70.3           |                           |          |          |     |           |
| 5 Provide safe places for people to walk or bike in village areas  | 70.3           |                           |          |          |     |           |
| 6 Focus economic development efforts on locally produced farm, forest and food products                  | 68.6           |                           |          |          |     |           |
| 7 Provide housing, amenities and activities that will attract more young people                          | 66.4           |                           |          |          |     |           |
| 8 Improve the condition of town roads  | 66.4           |                           |          |          |     |           |
| 9 Maintain working woodlands actively managed for forestry uses like maple and timber production         | 66.0           |                           |          |          |     |           |
| 10 Protect wildlife habitat and travel corridors from being fragmented or disrupted by development       | 66.0           |                           |          |          |     |           |
| 11 Offer more housing that is affordable to people working in town                                       | 65.4           |                           |          |          |     |           |
| 12 Improve integration between outlying areas of town, Northfield Falls and the former village           | 64.5           |                           |          |          |     |           |
| 13 Limit new development in flood or erosion hazard areas  | 63.1           |                           |          |          |     |           |
| 14 Preserve high elevations and ridgelines in an undeveloped, natural state                              | 61.6           |                           |          |          |     |           |
| 15 Offer more housing for families with young children   | 60.0           |                           |          |          |     |           |
| 16 Partner with neighboring municipalities to share or regionalize services                              | 59.7           |                           |          |          |     |           |
| 17 Provide accommodations, amenities and activities that will attract more tourists                      | 59.2           |                           |          |          |     |           |

| How important is it for Northfield to...  | SCORE<br>0-100 | DISTRIBUTION OF RESPONSES |          |          |     |           |
|---|----------------|---------------------------|----------|----------|-----|-----------|
|   |                | VERY                      | SOMEWHAT | SLIGHTLY | NOT | UNSURE/NR |
| 18 Improve water quality by requiring vegetated buffers along streams and ponds                     | 59.0           |                           |          |          |     |           |
| 19 Limit tax increases  | 58.4           |                           |          |          |     |           |
| 20 Connect downtown and Northfield Falls with an off-road walking/bicycling path                    | 52.6           |                           |          |          |     |           |
| 21 Prevent productive farmland and agricultural soils from being developed                          | 49.9           |                           |          |          |     |           |
| 22 Require all runoff from impervious surfaces to be treated, managed and infiltrated on-site       | 49.5           |                           |          |          |     |           |
| 23 Focus economic development efforts on green energy and related technological innovations         | 48.8           |                           |          |          |     |           |
| 24 Offer more housing for older residents   | 47.8           |                           |          |          |     |           |
| 25 Provide safe places for people to walk or bike in rural areas                                    | 45.0           |                           |          |          |     |           |
| 26 Offer trail networks on public and private land for non-motorized, low-impact use                | 43.0           |                           |          |          |     |           |
| 27 Focus economic development efforts on the arts and creative economy                              | 42.5           |                           |          |          |     |           |
| 28 Offer bus service  | 42.3           |                           |          |          |     |           |
| 29 Offer more housing in village areas  | 38.5           |                           |          |          |     |           |
| 30 Offer passenger rail service   | 36.8           |                           |          |          |     |           |
| 31 Continue to have a municipal electric utility  | 36.3           |                           |          |          |     |           |
| 32 Continue to prohibit ATV use on town land  | 36.3           |                           |          |          |     |           |
| 33 Support Norwich University's plans to expand its enrollment and programs                         | 35.8           |                           |          |          |     |           |
| 34 Offer more rental housing  | 35.8           |                           |          |          |     |           |
| 35 Offer trail networks on public and private land for mountain biking or similar non-motorized use | 35.4           |                           |          |          |     |           |
| 36 Require new development to exceed minimum state requirements for energy efficiency               | 33.4           |                           |          |          |     |           |
| 37 Provide additional parking downtown  | 33.0           |                           |          |          |     |           |
| 38 Offer more multi-family housing  | 27.7           |                           |          |          |     |           |
| 39 Continue to allow motorized recreational vehicles to use Class 4 town roads                      | 23.4           |                           |          |          |     |           |

| How important is it for Northfield to...   | SCORE<br>0-100 | DISTRIBUTION OF RESPONSES |          |          |     |           |
|--|----------------|---------------------------|----------|----------|-----|-----------|
|  |                | VERY                      | SOMEWHAT | SLIGHTLY | NOT | UNSURE/NR |
| 40 Offer more housing in rural areas   | 17.5           |                           |          |          |     |           |
| 41 Offer trail networks on public and private land for snowmobile or similar motorized use in winter | 11.3           |                           |          |          |     |           |
| 42 Offer more off-campus student housing   | -2.2           |                           |          |          |     |           |
| 43 Offer trail networks on public and private land for ATV or similar motorized use                  | -7.2           |                           |          |          |     |           |



# APPENDIX B. MUNICIPAL ENERGY DETERMINATION STANDARDS MATRIX

| Checklist Question   | Response  |
|--|---|
| 1. Has your plan been duly adopted and approved for confirmation according to 24 V.S.A. § 4350?  |   |
| 2. Is a copy of the plan (or adopted energy element/plan, along with underlying plan and planning commission report addressing consistency of energy element/plan with other elements of underlying plan) attached to this checklist?  |   |
| 3. Does the plan contain an energy element, that contains the same components described in 24 V.S.A. § 4348a(a)(3)?  | See response to 4-13 below.<br>Policies on page 37 comprise this plan's statement of policy on the conservation and efficient use of energy including Energy Policies 1, 2, 3, 8, 9 and 10.   |
| 4. Does your plan's energy element contain an analysis of resources, needs, scarcities, costs, and problems within the municipality across all energy sectors (electric, thermal, transportation)?   | To the extent possible given the availability of town-level data, the plan contains an analysis of resources, needs, scarcities, costs, and problems within the municipality across all energy sectors, including electric, thermal, and transportation in the Current Energy Use section on pages 37-39. Where reliable, local data is not available, this plan looks to the 2018 Central Vermont Regional Energy Plan for the required data and analysis.   |
| 5. Does your plan contain an analysis that addresses A-E below, either as provided by your Regional Planning Commission or as developed by your municipality?  | See response to A-E below.  |
| A. Does the plan estimate current energy use across transportation, heating, and electric sectors?   | The figures on page 38 estimate current energy use across transportation, heating, and electric sectors based on data from the Energy Action Network's Community Energy Dashboard.  |
| B. Does the plan establish 2025, 2035, and 2050 targets for thermal and electric efficiency improvements, and use of renewable energy for transportation, heating, and electricity?  | The figures on page 38 show the 2025, 2035, and 2050 targets for thermal and electric efficiency improvements, and use of renewable energy for transportation, heating, and electricity based on the planning scenario presented on the Energy Action Network's Community Energy Dashboard. CVRPC's energy data, which includes targets for thermal and electrical efficiency improvements and use of renewable energy are incorporated into the plan by reference.   |
| C. Does the plan evaluate the amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve these targets?  | CVRPC's energy data sets targets for thermal and electrical efficiency improvements and use of renewable energy that are incorporated into the plan by reference.   |
| D. Does the plan evaluate transportation system changes and land use strategies needed to achieve these targets?   | The Energy Targets section on pages 39-40 evaluates transportation system changes and land use strategies needed to achieve the targets.  |
| E. Does the plan evaluate electric-sector conservation and efficiency needed to achieve these targets?   | CVRPC's energy data sets targets for electric-sector conservation and efficiency that are incorporated into the plan by reference.  |
| 6. Does your plan's energy element contain a statement of policy on the conservation and efficient use of energy?  | Policies on page 37 comprise this plan's statement of policy on the conservation and efficient use of energy including Energy Policies 1, 2, 3, 8, 9 and 10. The Renewable Energy Project Siting Standards on page 41 and the Energy Resources, Facilities and Infrastructure Map on page 40 comprise this plan's statement of policy on the development and siting of renewable energy resources.  |
| A. Does the plan encourage conservation by individuals and organizations?<br>(Actions could include educational activities and events such as convening or sponsoring weatherization workshops, establishing local energy committees, encouraging the use of existing utility and other efficiency and conservation programs and funding sources, etc.)  | Ongoing Action 6 on page 56 supports ongoing action to implement this plan's energy-related actions by maintaining a town energy committee. Energy Policy 9 on page 37 encourages conservation. However, as this plan is intended to be primarily a municipal land use policy document and its policies are focused on the actions and decisions that are within the purview of municipal government.   |
| B. Does the plan promote efficient buildings?<br>(Actions could include promoting compliance with residential and commercial building energy standards for new construction and existing buildings, including additions, alterations, renovations and repairs; promoting the implementation of residential and commercial building efficiency ratings and labeling; considering adoption of stretch codes, etc.)   | Energy policies 8, 9 and 10 on page 37 promote efficient buildings. Further, Northfield administers and enforces land use regulations in conformance with state law. That includes 24 V.S.A. § 4449, which requires the municipality to have applicants certify that new construction meets the state's residential or commercial building energy standards before issuing a certificate of compliance for permitted development. Northfield does not have local building codes and therefore has no mechanism by which to establish or enforce standards for the efficiency of new construction. |
| C. Does the plan promote decreased use of fossil fuels for heating?<br>(Actions and policies could promote switching to wood, liquid biofuels, biogas, geothermal, and/or electricity. Suitable devices include advanced wood heating systems and cold-climate heat pumps, as well as use of more energy efficient heating systems; and identifying potential locations for, and barriers to, deployment of biomass district heating and/or thermal-led combined heat and power systems in the municipality) | Energy policy 7 on page 37 supports use of sustainably harvested wood as a heating source. However, it should be recognized that municipal government has no authority to regulate how property owners choose to heat their buildings.  |
| D. Does the plan demonstrate the municipality's leadership by example with respect to the efficiency of municipal buildings?<br>(Actions could include building audits and weatherization projects in schools and town offices, etc.)  | Energy policies 8 and 10 call for energy costs and carbon footprint to be considered when constructing, upgrading, purchasing or replacing municipal buildings, facilities, equipment and vehicles.   |
| E. Other<br>(please use the notes section to describe additional approaches that your municipality is taking)  | n/a   |
| 7. Does your plan's energy element contain a statement of policy on reducing transportation energy demand and single-occupancy vehicle use, and encouraging use of renewable or lower-emission energy sources for transportation?  | A number of objectives and policies in the Transportation and Energy chapters support reducing transportation energy demand including Energy objective 1 on page 37 and Transportation objective 2 on page 29.  |

| Checklist Question   | Response  |
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| <p>A. Does the plan encourage increased use of public transit?<br/>(Actions could include participation in efforts to identify and develop new public transit routes, promote full utilization of existing routes, integrate park-and-rides with transit routes, etc.)</p>   | <p>Ongoing Action 3 on page 55 calls for Northfield to continue paying its annual assessment to maintain membership in Green Mountain Transit. Energy Objective 1 on page 37 and Transportation Objective 2 on page 29 support public transit service in town.</p>  |
| <p>B. Does the plan promote a shift away from single-occupancy vehicle trips, through strategies appropriate to the municipality?<br/>(Actions could include rideshare, vanpool, car-sharing initiatives; efforts to develop or increase park-and-rides; enhancement of options such as rail and telecommuting; education; intergovernmental cooperation; etc.)</p>  | <p>Priority Action 11 on page 55 calls for Northfield to work with VTrans to develop a park-and-ride lot in town. Also as stated above, the town is a member of GMT and supports transit service in the community. However, it should be recognized that municipal government has no authority to regulate private vehicle use.</p>   |
| <p>C. Does the plan promote a shift away from gas/diesel vehicles to electric or other non-fossil fuel transportation options through strategies appropriate to the municipality?<br/>(Actions could include promoting the installation of electric vehicle charging infrastructure, providing education and outreach to potential users, supporting non-fossil fuel vehicle availability through outreach to vehicle dealers, etc.)</p>   | <p>Priority Action 9 on page 54 calls for Northfield's regulations to allow parking spaces (existing or proposed) to be used for electric vehicle charging and continue to count towards any minimum parking requirements, electric vehicle charging stations to be treated as an accessory structure and allowed throughout town, and to revise the gasoline station use to clearly allow electric vehicle charging.</p>   |
| <p>D. Does the plan facilitate the development of walking and biking infrastructure through strategies appropriate to the municipality?<br/>(Actions could include studying, planning for, seeking funding for, or implementing improvements that encourage safe and convenient walking and biking; adopting a Complete Streets policy, etc.)</p>  | <p>A number of policies in the plan support improvements to walking and biking infrastructure in Northfield including Energy Policy 1 on page 37 and Transportation Policy 6 on page 29. Priority Action 3 on page 53 calls for the town to adopt a complete streets policy. Action 9 on page 54 calls for Northfield's regulations to require applicants to maintain, improve or install pedestrian and bicycle infrastructure as appropriate to the location.</p>   |
| <p>E. Does the plan demonstrate the municipality's leadership by example with respect to the efficiency of municipal transportation?<br/>(Actions could include purchasing energy efficient municipal and fleet vehicles when practicable, installing electric vehicle charging infrastructure, etc.)</p>  | <p>Energy Policy 8 on page 37 requires the town to consider energy efficiency and total life cost (purchase, operation, maintenance) as criterion when purchasing municipal vehicles.</p>   |
| <p>F. Other<br/>(please use the notes section to describe additional approaches that your municipality is taking)</p>  | <p>n/a</p>  |
| <p>8. Does your plan's energy element contain a statement of policy on patterns and densities of land use likely to result in conservation of energy?</p>  | <p>Energy policies 1 through 3 comprise this plan's statement of policy on patterns and densities of land use likely to result in conservation of energy. These policies are consistent with the future land use plan set forth in pages 8-13.</p>  |
| <p>A. Does the plan include land use policies (and descriptions of current and future land use categories) that demonstrate a commitment to reducing sprawl and minimizing low-density development?<br/>(Actions could include adopting limited sewer service areas, maximum building sizes along highways, policies or zoning that require design features that minimize the characteristics of strip development [multiple stories, parking lot to the side or back of the store], and requirements that development in those areas be connected by means other than roads and cars; adopting a capital budget and program that furthers land use and transportation policies; etc.)</p> | <p>The land use policies in Chapter 2, the Future Land Use Map and Future Land Use Recommendations all call for guiding growth and development to the lands within and between Northfield Village and Northfield Falls.</p>   |
| <p>B. Does the plan strongly prioritize development in compact, mixed-use centers when physically feasible and appropriate to the use of the development, or identify steps to make such compact development more feasible?<br/>(Actions could include participating in the state designation program, such as obtaining state designated village centers, downtowns, neighborhoods, new town centers, or growth centers; exploration of water or sewage solutions that enable compact development; etc.)</p>  | <p>The land use policies in Chapter 2, the Future Land Use Map and Future Land Use Recommendations all call for guiding growth and development to the lands within and between Northfield Village and Northfield Falls, and for improving or extending the infrastructure as needed to support growth and development in these areas. This is further supported by Energy Policies 1-3 on page 37, Transportation Policies 1 and 2 on page 29, Utilities, Facilities and Services Policy 1 on page 33, Housing Policies 1 and 2 on page 43, and Economic Development Objectives 1, 2 and 4 on page 47. Priority Action 10 on page 55 is to maintain the state designations for Northfield Village and Northfield Falls. Long-Term Action 2 on page 57 is to improve/extend water and sewer in and between the villages.</p> |
| <p>C. Other<br/>(please use the notes section to describe additional approaches that your municipality is taking)</p>  | <p>n/a</p>  |
| <p>9. Does your plan's energy element contain a statement of policy on the development and siting of renewable energy resources?</p>   | <p>The Renewable Energy Project Siting Standards on page 41 and the Energy Resources, Facilities and Infrastructure Map on page 40 comprise this plan's statement of policy on the development and siting of renewable energy resources.</p>  |
| <p>A. Does the plan evaluate (estimates of or actual) generation from existing renewable energy generation in the municipality?<br/>Municipalities should be able to obtain this information from their regions.</p>   | <p>The amount of renewable energy currently generated in Northfield is evaluated in the Vermont's Renewable Energy Goal section on pages 37-38 and in the Energy Targets section on page 39-41.</p>   |
| <p>B. Does the plan analyze generation potential, through the mapping exercise (see Mapping standards, below), to determine potential from preferred and potentially suitable areas in the municipality?<br/>Municipalities should be able to obtain this information from their regions.</p>  | <p>Energy Resources, Facilities and Infrastructure Map on page 40 identifies potential areas for the development and siting of renewable energy resources and areas that are unsuitable for siting those resources or particular categories or sizes of those resources. The feasibility and constraints to renewable energy development are discussed in the Potential for Renewable Energy Generation section on pages 38-39.</p>   |
| <p>C. Does the plan identify sufficient land in the municipality for renewable energy development to reasonably reach 2050 targets for renewable electric generation, based on population and energy resource potential (from potential resources identified in the Mapping exercise, below), accounting for the fact that land may not be available due to private property constraints, site-specific constraints, or grid-related constraints? If N/A, please describe how you are working with your regional planning commission to ensure overall regional objectives are achieved.</p>   | <p>CVRPC's municipal energy data and maps, which are incorporated into the plan by reference, identify sufficient land in the municipality for renewable energy development to reach 2050 targets. The Energy Targets section notes on page 41 that it is not currently feasible for much of the land mapped under Act 174 as suitable to be developed for solar or wind due to factors that were not considered including the availability and capacity of infrastructure, road access, forest cover, land ownership/use, and lot size/patterns.</p>   |

| Checklist Question   | Response   |
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| D. Does the plan ensure that any local constraints (locally designated resources or critical resources, from 12B and 12C under Mapping, below) do not prohibit or have the effect of prohibiting the provision of sufficient renewable energy to meet state, regional, or municipal targets? If N/A, please describe how you are working with your regional planning commission to ensure overall regional objectives are achieved.  | See response to C above. Constraints shown on the Energy Resources, Facilities and Infrastructure Map on page 40 do not prohibit or have the effect of prohibiting the provision of sufficient renewable energy to meet state/regional targets.                                    |
| E. Does the plan include statements of policy to accompany maps (could include general siting guidelines), including statements of policy to accompany any preferred, potential, and unsuitable areas for siting generation (see 12 and 13 under Mapping, below)?  | The Renewable Energy Project Siting Standards on page 41 and the Energy Resources, Facilities and Infrastructure Map on page 40 comprise this plan's statement of policy on the development and siting of renewable energy resources.  |
| F. Does the plan maximize the potential for renewable generation on preferred locations (such as the categories outlined under 12E in the Mapping standards, below)?   | The Renewable Energy Project Siting Standards on page 41 support renewable energy generation on preferred locations to the maximum extent allowed under state regulations and supported by existing/proposed infrastructure.   |
| G. Does the plan demonstrate the municipality's leadership by example with respect to the deployment of renewable energy? (Actions could include deploying renewable energy to offset municipal electric use, etc.)  | Energy Policy 8 call for carbon footprint to be considered when constructing, upgrading, purchasing or replacing municipal buildings, facilities, equipment and vehicles.  |
| H. Other<br>(please use the notes section to describe additional approaches that your municipality is taking)  | n/a  |
| 10. Does your plan contain one or more maps that address 11-13 below, as provided by your Regional Planning Commission or as developed by your municipality?   | The Energy Resources, Facilities and Infrastructure Map on page 40 uses the data provided by Central Vermont Regional Planning Commission and addresses 11-13 as described below.  |
| 11. Does the plan identify and map existing electric generation sources?<br>Maps may depict generators of all sizes or just those larger than 15 kW, as long as information on generators smaller than 15 kW is summarized and provided or referenced elsewhere. It is expected that the best available information at the time of plan creation will be used. This information is available from the DPS.   | The Energy Resources, Facilities and Infrastructure Map on page 40 depicts generators larger than 15 kW and references the Energy Atlas for the most up-to-date and detailed information.  |
| 12. Does the plan identify potential areas for the development and siting of renewable energy resources and the potential generation from such generators in the identified areas, taking into account factors including resource availability, environmental constraints, and the location and capacity of electric grid infrastructure?<br>Maps should include the following (available from VCGI and ANR), and the resulting Prime and Secondary Resource Maps will together comprise potential areas:  | The Energy Resources, Facilities and Infrastructure Map on page 40 shows the potential wind and solar areas developed by Central Vermont Regional Planning Commission and the state for the purposes of energy planning under Act 174.   |
| A. Raw renewable energy potential analysis (wind and solar), using best available data layers (including LiDAR as appropriate)   | The Energy Resources, Facilities and Infrastructure Map on page 40 shows the potential wind and solar areas developed by Central Vermont Regional Planning Commission and the state for the purposes of energy planning under Act 174.   |
| B. Known constraints (signals likely, though not absolute, unsuitability for development based on statewide or local regulations or designated critical resources) to include:<br><ul style="list-style-type: none"> <li>• Vernal Pools (confirmed and unconfirmed layers)</li> <li>• DEC River Corridors</li> <li>• FEMA Floodways</li> <li>• State-significant Natural Communities and Rare, Threatened, and Endangered Species</li> <li>• National Wilderness Areas</li> <li>• Class 1 and Class 2 Wetlands (VSWI and advisory layers)</li> <li>• Regionally or Locally Identified Critical Resources</li> </ul> If areas are constrained for the development of renewable energy due to the desire to protect a locally designated critical resource (whether a natural resource or a community-identified resource), then the land use policies applicable to other forms of development in this area must be similarly restrictive; for this category, policies must prohibit all permanent development (and should be listed in the Notes column).<br>These areas should be subtracted from raw renewable energy resource potential maps to form Secondary Resource Maps. | The Energy Resources, Facilities and Infrastructure Map on page 40 shows the potential wind and solar areas developed by Central Vermont Regional Planning Commission and the state for the purposes of energy planning under Act 174, which reflect the listed known constraints. |

| Checklist Question   | Response   |
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| <p>C. Possible constraints (signals conditions that would likely require mitigation, and which may prove a site unsuitable after site-specific study, based on statewide or regional/local policies that are currently adopted or in effect), including but not limited to:</p> <ul style="list-style-type: none"> <li>• Agricultural Soils</li> <li>• FEMA Special Flood Hazard Areas</li> <li>• Protected Lands (State fee lands and private conservation lands)</li> <li>• Act 250 Agricultural Soil Mitigation areas</li> <li>• Deer Wintering Areas</li> <li>• ANR's Vermont Conservation Design Highest Priority Forest Blocks (or Habitat Blocks 9 &amp; 10, for plans using regional maps in regions whose plans will be submitted for adoption at the regional level by March 1, 2017)</li> <li>• Hydric Soils</li> <li>• Regionally or Locally Identified Resources</li> </ul> <p>If locations are constrained for the development of renewable energy due to the desire to protect a locally designated resource (whether a natural resource or community-identified resource, like a view), then the land use policies applicable to other forms of development must be similarly restrictive (and should be listed in the Notes column).<br/>These areas should be subtracted from Secondary Resource Maps to form Prime Resource Maps.</p> | <p>The Energy Resources, Facilities and Infrastructure Map on page 40 shows the potential wind and solar areas developed by Central Vermont Regional Planning Commission and the state for the purposes of energy planning under Act 174, which reflect the listed possible constraints.</p>   |
| <p>D. Transmission and distribution resources and constraints, as well as transportation infrastructure. (Including three-phase distribution lines, known constraints from resources such as Green Mountain Power's solar map, known areas of high electric load, etc.)</p>  | <p>The Energy Resources, Facilities and Infrastructure Map on page 40 shows existing three-phase distribution lines and transmission and distribution constraints are discussed in the Distributed Power Generation and Storage section on page 38. Transportation infrastructure is shown on the Transportation Map on page 32.</p>   |
| <p>E. Preferred locations (specific areas or parcels) for siting a generator or a specific size or type of generator, accompanied by any specific siting criteria for these locations Narrative descriptions of the types of preferred areas in accompanying plan text are acceptable, though mapping of areas and especially specific parcels (to the extent they are known) is highly encouraged, to signal preferences to developers, particularly for locally preferred areas and specific parcels that do not qualify as a statewide preferred location under i. below. The locations identified as preferred must not be impractical for developing a technology with regard to the presence of the renewable resource and access to transmission/distribution infrastructure.</p>   | <p>The Renewable Energy Project Siting Standards on page 41 provide guidelines for site selection including a description of preferred and unsuitable sites.</p>   |
| <p>i. Statewide preferred locations such as rooftops (and other structures), parking lots, previously developed sites, brownfields, gravel pits, quarries, and Superfund sites</p>   | <p>The Renewable Energy Project Siting Standards on page 41 align with the listed statewide preferred locations.</p>   |
| <p>ii. Other potential locally preferred locations<br/>For example, customer on- or near-site generation, economic development areas, unranked and not currently farmed agricultural soils, unused land near already developed infrastructure, locations suitable for large-scale biomass district heat or thermal-led cogeneration, potential locations for biogas heating and digesters, etc. These are particularly important to map if possible, as a specific location in a duly adopted municipal plan is one way for a net metering project to qualify as being on a preferred site.</p>  | <p>The Renewable Energy Project Siting Standards on page 41 provide guidelines for site selection including a description of preferred and unsuitable sites.</p>   |
| <p>13. Does the plan identify areas that are unsuitable for siting renewable energy resources or particular categories or sizes of those resources? Either Yes or No (No if the plan chooses not to designate any areas as unsuitable) is an acceptable answer here. Resources is synonymous with generators.</p>  | <p>The Energy Resources, Facilities and Infrastructure Map on page 40 shows specific unsuitable locations for renewable energy generation projects. The Renewable Energy Project Siting Standards on page 41 provide guidelines for site selection including a description of preferred and unsuitable sites.</p>  |
| <p>A. Are areas identified as unsuitable for particular categories or sizes of generators consistent with resource availability and/or land use policies in the regional or municipal plan applicable to other types of land development (answer only required if Yes selected above, indicating unsuitable areas have been identified)?<br/>If areas are considered unsuitable for energy generation, then the land use policies applicable to other forms of development in this area should similarly prohibit other types of development. Please note these policies in the Notes column.</p>  | <p>The Energy Resources, Facilities and Infrastructure Map on page 40 shows specific unsuitable locations for renewable energy generation projects. The Renewable Energy Project Siting Standards on page 41 provide guidelines for site selection. The siting standards are consistent with the overall land use policies and recommendations found in Chapter 2. The plan seeks to support continued agricultural use and maintain working lands, so siting of energy projects should avoid permanent conversion and loss of productive farmland. The plan seeks to minimize fragmentation of forest blocks and maintain upland forest cover, so siting of energy projects should avoid clearing those areas. The plan seeks to minimize forest clearing and soil disturbance in high elevations to protect water quality and attenuate downstream flooding.</p> |
| <p>B. Does the plan ensure that any regional or local constraints (regionally or locally designated resources or critical resources, from 12b-12c above) identified are supported through data or studies, are consistent with the remainder of the plan, and do not include an arbitrary prohibition or interference with the intended function of any particular renewable resource size or type?<br/>Please explain in the Notes column.</p>  | <p>This plan relies upon constraint data provided by the state and Central Vermont Regional Planning Commission. As such, the identified constraints are assumed to not include an arbitrary prohibition or interference with the intended function of any particular renewable resource size or type.</p>   |
| <p>14. Municipalities seeking a determination of energy compliance from the Department and not using their region's maps only: Does the plan ensure that its approach, if applied regionally, would not have the effect of prohibiting any type of renewable generation technology in all locations?</p>   | <p>n/a</p>   |