

# TOWN OF HARTFORD

## TOWN PLAN

Adopted by the Hartford Selectboard

June 4, 2019

Prepared by the

Hartford Planning Commission

with the assistance from the

Hartford Department of Planning and Development Services

and the

Town Plan Steering Committee

## ADOPTION STATEMENT

This revised Town Plan was adopted by the Town of Hartford Selectboard, pursuant to 24 V.S.A. Chapter 117, Section 4385(c). The Town Plan was prepared by the Hartford Planning Commission with the assistance of the Hartford Department of Planning and Development Services, the Two Rivers-Ottawaquechee Regional Commission, Community Workshop LLC, Energy Commission, Conservation Commission and the Hartford Town Plan Steering Committee. The Hartford Planning Commission held public hearings on March 25, 2019 and April 1, 2019. The Hartford Selectboard formally adopted the Town Plan on June 4, 2019 after holding public hearings on May 21, 2019 and June 4, 2019.

The following people participated in the 2019 Town Plan development and adoption:

### **Selectboard**

Simon Dennis, Chair  
Richard Grassi, Co-Chair  
Dennis Brown, Clerk  
Alan Johnson  
Kim Souza  
Jameson C. Davis  
Dan Fraser

### **Planning Commission**

Bruce Riddle, Chair  
John Reid, Vice-Chair  
Toby Dayman, Clerk  
Peter Merrill  
Robin Adair Logan  
Jacques Harlow  
David Sherman

### **Hartford Department of Planning and Development Services**

Lori Hirshfield, Director  
Matt Osborn, AICP Planner  
Geoff Martin, Energy Coordinator  
Brenda Lamphere, Administrative Assistant

### **Town Plan Steering Committee**

Bruce Riddle, Chair, Planning Commission  
Toby Dayman, Planning Commission  
Angela Emerson, Conservation Commission  
Dylan Kreis, Resilient Hartford  
Robin Adair Logan, Planning Commission  
Lynn Luczkowski, Hartford Area Chamber of Commerce  
Chris Lowe, Zoning Board of Adjustment  
Martha McDaniel, Energy Commission  
Peter Merrill, Planning Commission/School Board  
John Reid, Planning Commission  
David Sherman, Planning Commission  
P.J. Skehan, Hartford Area Chamber of Commerce  
Kim Souza, Selectboard  
Pat Stark, Hartford Historic Preservation Commission

# TABLE OF CONTENTS

## HARTFORD TOWN PLAN

<b>INTRODUCTION.....</b>	<b>1</b>
<i>Introduction to Town Planning .....</i>	<i>1</i>
<i>Hartford's Geography .....</i>	<i>1</i>
<i>Hartford's Assets - What Makes it a Special Place .....</i>	<i>1</i>
<i>Town Plan Update and Steering Committee .....</i>	<i>2</i>
<i>Public Input and Guiding Principles .....</i>	<i>2</i>
<i>Town Planning Goals .....</i>	<i>2</i>
<i>Authority .....</i>	<i>3</i>
<i>What is Included in a Town Plan .....</i>	<i>3</i>
<i>Format of the Town Plan .....</i>	<i>3</i>
<i>History of Hartford's Municipal Plans .....</i>	<i>4</i>
<b>CHAPTER I HISTORIC RESOURCES .....</b>	<b>5</b>
<i>Introduction.....</i>	<i>5</i>
<i>Results from the Town Plan Community Forums.....</i>	<i>5</i>
<i>Preservation Tools .....</i>	<i>5</i>
<i>Downtown/Village Revitalization .....</i>	<i>9</i>
<i>Threats to Historic Resources .....</i>	<i>10</i>
<i>Resource List.....</i>	<i>10</i>
<i>Potential Archaeological Areas .....</i>	<i>11</i>
<i>Cemeteries.....</i>	<i>12</i>
<i>Overview of Town History.....</i>	<i>12</i>
<i>Goals, Strategies and Actions .....</i>	<i>14</i>
<b>CHAPTER II LAND USE .....</b>	<b>18</b>
<i>Introduction.....</i>	<i>18</i>
<i>Results from the Town Plan Community Forums.....</i>	<i>18</i>
<i>Community Vision .....</i>	<i>18</i>
<i>Existing and Historic Land Use .....</i>	<i>19</i>
<i>Development and Our Natural Resources .....</i>	<i>21</i>
<i>Overlay Districts .....</i>	<i>24</i>
<i>Hartford's Villages and Rural Areas .....</i>	<i>25</i>
<i>Recent Land Use Trends .....</i>	<i>35</i>
<i>Vision for the Future of Hartford .....</i>	<i>41</i>

<i>Land Use Plan</i> .....	42
<i>Goals, Strategies and Actions</i> .....	47
<b>CHAPTER III POPULATION.....</b>	<b>56</b>
<i>Introduction</i> .....	56
<i>Results from the Town Plan Community Forums</i> .....	56
<i>Hartford and the Upper Valley</i> .....	56
<i>Population Trends</i> .....	57
<i>Population Change within Hartford</i> .....	58
<i>Natural Increase and Migration</i> .....	58
<i>Household Size</i> .....	59
<i>Age Distribution</i> .....	60
<i>Race</i> .....	62
<i>Seasonal Population</i> .....	62
<i>Population Projections</i> .....	63
<i>Goals, Strategies and Actions</i> .....	63
<b>CHAPTER IV HOUSING.....</b>	<b>65</b>
<i>Introduction</i> .....	65
<i>Results From The Town Plan Community Meetings</i> .....	65
<i>Housing Patterns</i> .....	66
<i>Housing Characteristics</i> .....	66
<i>Hartford Population In Housing</i> .....	71
<i>Cost Of Housing</i> .....	73
<i>Housing Affordability</i> .....	75
<i>Housing As A Regional Issue</i> .....	84
<i>Challenges To The Development Of New Housing</i> .....	86
<i>Housing Opportunities</i> .....	88
<i>Recommendations</i> .....	91
<b>CHAPTER V ECONOMIC DEVELOPMENT.....</b>	<b>94</b>
<i>Introduction</i> .....	94
<i>Demographic and Economic Analysis</i> .....	94
<i>Development Issues and Opportunities</i> .....	103
<i>Economic Development Assets</i> .....	105
<i>Economic Development Challenges</i> .....	106
<i>Economic Development Vision and Goals</i> .....	108
<i>Economic Development Implementation and Recommendations</i> .....	109
<b>CHAPTER VI COMMUNITY FACILITIES AND SERVICES .....</b>	<b>114</b>



<i>Introduction</i> .....	114
<i>Goals</i> .....	114
<i>Results from the Town Plan Community Forums</i> .....	114
<i>Town Hall</i> .....	116
<i>Department of Public Works Facility</i> .....	116
<i>Police Department</i> .....	116
<i>Fire Department</i> .....	117
<i>Parks and Recreation</i> .....	120
<i>Education</i> .....	129
<i>Child Care</i> .....	136
<i>Libraries</i> .....	137
<i>Solid Waste</i> .....	141
<i>Human Services</i> .....	143
<i>Cemeteries</i> .....	143
<i>Capital Improvement Plan</i> .....	144
<i>Community Facilities and Services Goals, Strategies and Actions</i> .....	147
<b>CHAPTER VII UTILITIES</b> .....	<b>157</b>
<i>Introduction</i> .....	157
<i>Results from the Town Plan Community Forums</i> .....	157
<i>Water Supply</i> .....	157
<i>Wastewater Disposal</i> .....	163
<i>Telecommunications</i> .....	166
<i>Goals, Strategies and Actions</i> .....	168
<b>CHAPTER VIII TRANSPORTATION</b> .....	<b>169</b>
<i>Introduction</i> .....	169
<i>Results from the Town Plan Community Forums</i> .....	169
<i>Transportation Planning</i> .....	170
<i>Regional Transportation Planning</i> .....	171
<i>Project Development</i> .....	171
<i>Upper Valley Transportation Management Association</i> .....	174
<i>Traffic Data</i> .....	174
<i>Public Road System</i> .....	175
<i>Local Road Surface Condition</i> .....	177
<i>Local Public Road Deficiencies</i> .....	177
<i>State-Controlled Road System</i> .....	177
<i>Local Public Gravel Roads</i> .....	178

<i>Class IV Roads</i> .....	179
<i>Development Review Road Standards</i> .....	179
<i>Access Management</i> .....	180
<i>Bridges and Culverts</i> .....	181
<i>Bicycle Transportation</i> .....	182
<i>Pedestrian Transportation</i> .....	183
<i>Traffic Calming</i> .....	184
<i>Parking</i> .....	185
<i>Park and Ride Facilities</i> .....	186
<i>Public Transportation</i> .....	186
<i>Air Transportation</i> .....	189
<i>Rail Transportation</i> .....	189
<i>Roadways and Ecology</i> .....	191
<i>Goals, Strategies and Actions</i> .....	192
<b>CHAPTER IX NATURAL RESOURCES .....</b>	<b>196</b>
<i>Introduction</i> .....	196
<i>Results from the Town Plan Community Forums</i> .....	196
<i>Setting</i> .....	196
<i>Air Quality</i> .....	198
<i>Geographic Features</i> .....	198
<i>Water Resources</i> .....	203
<i>Forest Resources</i> .....	206
<i>Working Landscape: Agricultural and Forestry Resources</i> .....	210
<i>Climate Change</i> .....	212
<i>Biological Diversity</i> .....	213
<i>Invasive Species</i> .....	216
<i>Scenic Resources and Rural Character</i> .....	217
<i>Open Space and Greenways</i> .....	221
<i>Goals, Strategies and Actions</i> .....	224
<b>CHAPTER X ENERGY .....</b>	<b>229</b>
<i>Introduction</i> .....	229
<i>Structure of This Chapter</i> .....	230
<i>Results from the Town Plan Community Forums</i> .....	231
<i>Transportation</i> .....	231
<i>Building Integrity</i> .....	236
<i>Renewable Energy</i> .....	243

<i>Commercial Scale Renewable Energy Siting .....</i>	<i>248</i>
<b>CHAPTER XI FLOOD RESILIENCE.....</b>	<b>250</b>
<i>Types and Causes of Flooding .....</i>	<i>250</i>
<i>Flood Events in Hartford .....</i>	<i>251</i>
<i>Flood Hazard and River Corridor Areas .....</i>	<i>252</i>
<i>National Flood Insurance Program (NFIP).....</i>	<i>253</i>
<i>Hartford Infrastructure .....</i>	<i>253</i>
<i>Building Community Resilience .....</i>	<i>254</i>
<i>Goals, Strategies and Actions .....</i>	<i>255</i>
<b>CHAPTER XII RELATIONSHIP OF PLAN TO DEVELOPMENT TRENDS AND PLANS FOR ADJACENT TOWNS AND REGION .....</b>	<b>259</b>
<b>APPENDIX A SUMMER 2018 COMMUNITY FORUMS GOALS, STRATEGIES &amp; ACTIONS</b>	
<b>APPENDIX B MUNICIPAL SUMMARY</b>	
<b>APPENDIX C INVESTMENT ANALYSIS OF NET ZERO BUILDING</b>	
<b>APPENDIX D LAND USE ESTIMATES FOR SOLAR (PV) GENERATION</b>	

**2019 Town Plan Update  
Table of Maps**

Map 1 Historic Districts.....	17
Map 2 CLU 1 (White River Junction & Hartford Village).....	30
Map 3 CLU 2 (Wilder) .....	31
Map 4 CLU 3 (Quechee & West Hartford) .....	33
Map 5 CLU 4 (Rural North) .....	34
Map 6 CLU 5 (Rural South) .....	36
Map 7 FLU-1 (Future Land Use).....	51
Map 8 (Current Zoning).....	52
Map 9 (Current Zoning Overlay Districts ) .....	53
Map 10 (Downtown Districts) .....	54
Map 11 (State Designations).....	55
Map 12 (Community Facilities).....	115
Map 13 (Sewer & Water Service Areas) .....	165
Map 14 (Transportation).....	173
Map 15 (Traffic Volumes).....	176
Map 16 IX-1 (Aerial Base) .....	197
Map 17 IX-2 (Agricultural and Habitat Features) .....	200
Map 18 IX-3 (Slopes) .....	202
Map 19 IX-4 (Water Features).....	205
Map 20 IX-5 (Wildlife Habitat Fragmentation).....	214
Map 21 IX-6 (Interior Forest Blocks).....	215

# **INTRODUCTION**

## **INTRODUCTION TO TOWN PLANNING**

According to the book, “Essentials of Land Use Planning and Regulation” by the Vermont Land Use Education and Training Collaborative, “the municipal plan is the visionary document that assesses the current status of a community and lays out a vision for the future.” Used interchangeably with the term “Town Plan”, it is an in-depth, comprehensive, long range study that provides the framework for future decisions regarding land use, transportation, community facilities and services, utilities, natural resources, historic resources, and housing. It is a guide that establishes a strategy on how to grow while managing the community’s resources and maintaining a high quality of life. The Town Plan provides the basis for public and private investment. It also establishes an implementation program that provides a means of achieving the community vision.

## **HARTFORD’S GEOGRAPHY**

Hartford, Vermont is located at the confluence of the White and Connecticut Rivers and includes a third river, the Ottauquechee. It is also at the junction of Interstate Highways 89 and 91 and the junction of U.S. Highways 4 and 5 on the eastern side of Vermont about halfway up the state. The Town shares a boundary with New Hampshire and is part of the Upper Valley region of Vermont and New Hampshire. Hartford is approximately 46 square miles. Like many other eastern Vermont towns, Hartford consists of narrow river valleys and hillsides. It ranges in elevation from a low of 340’ on the Connecticut River at the Hartland town line to a high of 1,575’ along a ridge on the Quechee/Pomfret border. Hartford, along with Norwich and Lebanon and Hanover, New Hampshire, represent the core of the Upper Valley region. Hartford is located about a two-hour drive northwest of Boston and a three-hour drive southeast of Montreal, Quebec. With a population of 10,000, Hartford serves as the regional center of the Two Rivers-Ottawquechee Regional Commission (TRORC), a thirty-town region in east central Vermont.

## **HARTFORD’S ASSETS - WHAT MAKES IT A SPECIAL PLACE**

Hartford is part of a thriving Upper Valley region. The quality of life, jobs, and a well-managed Town with abundant educational, recreational and cultural resources are some of the assets that draw people and businesses to the Town. What makes Hartford special is shaped in part by its rich history and its ability to adapt to changing conditions over time. The Town was established by Charter in 1761 as an agricultural community with several settlement areas. Today, the Town is principally comprised of five villages (White River Junction, Wilder, Quechee, West Hartford and Hartford Village) each with its unique character and identity, heritage and a strong sense of place. Where Hartford’s three rivers provided water power that spurred the construction of mills in Hartford, Quechee and Wilder Villages, today they provide recreational and aesthetic value as well as generate power for hydroelectric dams in Wilder and Quechee and the Simon Pearce Glass, Pottery and Restaurant. Where White River Junction was once a bustling railroad and retail center that experienced economic decline beginning in the 1960s, it now is reinvigorated downtown with a thriving arts community and unique mix of commercial development and housing. Hartford also has several commercial districts throughout town which contribute to this diversified and robust Upper Valley economy.

Hartford prides itself as a place with excellent public and private recreational, social and community facilities and services, and a commitment to public safety. It has a strong public and private pre-K

through post graduate educational system; multimodal transportation systems; a diverse housing stock with a mixture of single family and multi-family housing, owner-occupied and rental housing; and access to quality health care.

These are the many assets that contribute to an exceptional quality of life that make Hartford a great place to live, work and visit.

## **TOWN PLAN UPDATE AND STEERING COMMITTEE**

In early 2018, a Town Plan Steering Committee was formed to work with Town staff and the Planning Commission on the development of the Town Plan update. The Steering Committee is comprised of representatives from Hartford boards and commissions as well as the Hartford Area Chamber of Commerce.

## **PUBLIC INPUT AND GUIDING PRINCIPLES**

During the summer of 2018, five public forums were held to obtain input from the community about Hartford, what makes it special and what is important to the community as the Town plans for the future. From the forums, the following guiding principles were developed to provide direction for the Town Plan update:

- Affordability: Ensure that all socioeconomic groups can live here.
- Inclusion: Ensure that different groups are welcome in Hartford and our community is inviting for families to move here.
- Sustainability: Ensure that Hartford is economically, environmentally and socially healthy, and resilient.
- Town Assets: Consider all of Hartford's physical, social and governmental assets.
- Collaboration & Creativity: Seek to encourage collaboration and creativity with all groups, associations, companies and other governmental bodies in addressing Hartford's challenges and opportunities.

## **TOWN PLANNING GOALS**

To be successful in achieving these five guiding principles, the Town Plan includes the following overarching goals:

- Ensuring Viability – This Town Plan recognizes that a viable community depends on the strengths of its physical properties and social systems across multiple sections of the Plan. Hartford is and will remain an attractive place to live and work with up-to-date and well-maintained public infrastructure as well as public and private social and community services and infrastructure that support a vibrant community.
- Encouraging Growth and Change – This Town Plan recognizes that growth and change are important elements of a vibrant community dependent on a continual engagement within the community that brings ideas and energy.
- Preserving Our Heritage – This Plan recognizes that Hartford has a rich history reflected in the Town's villages and rural areas, which contributes to the Town's special character and sense of

place. This history can be a part of Hartford’s future as it continues to be a thriving and inclusive community.

- Emphasize People, Relationships and Community – This Plan recognizes that the people who generously volunteer their time to serve on Town boards, coach youth supports, maintain public gardens and work in numerous non-profits are important Town assets. As the Town faces the challenges of the 21<sup>st</sup> Century, it will require collaboration, developing relationships that involve trust, and a willingness to work together.

## **AUTHORITY**

The authority for developing and adopting a plan for the municipality comes from state statutes, specifically V.S.A. 24, Chapter 117 §4382-4387. The Planning Commission is responsible for the preparation of the Town Plan and the Selectboard is charged with adopting it. Although Town Plans are optional in Vermont, a municipality with an expired Town Plan cannot amend its bylaws and capital budgets and programs until the Town Plan is in effect. In addition, there are some grant programs that do not allow applications from municipalities with an expired Town Plan. To comply with State statutes, the Town Plan must be updated every five years.

State statutes also require that the development of municipal bylaws, such as Zoning Regulations and Subdivision Regulations conform with the Town Plan. In addition, the Town Plan has standing in the Act 250 process.

## **WHAT IS INCLUDED IN A TOWN PLAN**

The following are the required elements of a Town Plan as stated in Section 4382 of Chapter 117 of Vermont State Statutes.

	<b>Required Element per 24 V.S.A. §4382</b>	<b>Addressed in Current Town Plan</b>
<b>1</b>	Objectives, Policies & Programs	Each chapter
<b>2</b>	Land Use Plan	Primarily Chapter II & other chapters
<b>3</b>	Transportation Plan	Chapter VIII
<b>4</b>	Utility & Facility Plan	Chapters VI & VII
<b>5</b>	Policies on Preservation of Special Resources	Chapters I & IX
<b>6</b>	Education Plan	Chapter VI
<b>7</b>	Implementation Program	Chapter XII
<b>8</b>	Relationship to Adjacent Towns/Region	Chapter XII
<b>9</b>	Energy Plan	Chapter X
<b>10</b>	Housing Element	Chapter IV
<b>11</b>	Economic Development Element	Chapter V
<b>12</b>	Flood Resiliency Plan	Chapter XI

## **FORMAT OF THE TOWN PLAN**

The Town Plan is organized into chapters, which include the statutory required elements of a Town Plan. Each chapter has specific goal, strategies and actions defined as:

- Goal: The state of affairs that a plan is intended to achieve.
- Strategy: An expression of how to meet a goal.

- Action: A means by which to implement a strategy, through an action by a person or group.

## **HISTORY OF HARTFORD’S MUNICIPAL PLANS**

For sixty years, Hartford has demonstrated a commitment to municipal planning. The first official Municipal Plan (Master Plan or Town Plan) was prepared by planning consultant Carl Stelling Associates through the federal Urban Renewal Administration Grant Program in 1959. The Plan led to the adoption of Hartford’s first Zoning Regulations in 1962. Subsequent revisions to the Municipal Plan have occurred in 1965, 1974, 1980, 1987, 1993, 1998, 2003, 2007, 2012 and 2014.



# **CHAPTER I HISTORIC RESOURCES**

## **INTRODUCTION**

A plan for the future is incomplete without a look into the past. Historic structures and sites from earlier periods are the visual record of a town's history. They contribute to the individuality of each town and village and help create a sense of place and continuity. Historic resources are irreplaceable, contribute to the Town's heritage and tourism base, enhance the Town's quality of life, and must be preserved.

Hartford's historic resources illustrate a range of architecture from the village center concentrations of impressive 19th century commercial buildings and residences to the modest one and two story 18<sup>th</sup> century frame dwellings of early settlers that dot the rural rolling landscape. Hartford's access to three major rivers and the industrial potential afforded by them, along with the extensive impact of the railroad industry, distinguish the Town and its historic resources from other communities in the region. The individual village centers of White River Junction, Quechee, West Hartford, Wilder, and Hartford all retain distinct identities as do the hamlets of Dothan, Jericho, Dewey's Mills, Centerville, Russtown and Center of Town.

The purpose of this chapter is to discuss existing historic resources, with recommendations for their continued preservation. It is the responsibility of the community to plan a program of historical and cultural protection based on local needs and interests. This chapter does not attempt to be a complete and comprehensive inventory of Hartford's historic resources but is intended as a brief introduction.

## **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

## **PRESERVATION TOOLS**

In order to ensure that Vermont communities can preserve their historic heritage, the State of Vermont has enacted a variety of programs and laws that, if applied to the Town, should assist in successfully preserving historic resources. The various vehicles available at the private, local, state, and federal levels are summarized below and should be considered.

### **Private Citizens and Organizations**

Much of the responsibility for historic preservation is undertaken by private individuals or groups. Considering the Town's high proportion of older housing units, pride in ownership and regular maintenance alone can produce remarkable results. Unfortunately, improvement work undertaken

with good intentions can often result in techniques or materials inconsistent or insensitive to an older building. As a result, the integrity of the building is sometimes compromised, and work done may damage the historic features of the building it was intended to preserve. A wealth of specialized information relating to the needs of older buildings, including the pros and cons of vinyl and aluminum siding, stripping paints, window replacement, and repointing brick, is available from the Vermont Division for Historic Preservation, the Preservation Trust of Vermont, the National Trust for Historic Preservation and the National Park Service.

In addition to the activities of private citizens, the Hartford Historic Preservation Commission, the Hartford Historical Society and other organizations enhance the public's awareness of the importance of preserving the Town's historic quality through slide and video shows, research, lectures, interpretive signs, walking tours, pamphlets, and publications.

### **Certified Local Governments**

The Certified Local Governments (CLG) program is designed to provide an opportunity for local governments to become more directly involved in identifying, evaluating, and protecting local properties of historical, architectural, and archaeological significance. The CLG Program provides matching grants from the CLG share of the state's annual Historic Preservation Fund. Hartford became a CLG in 1993. The Hartford Historic Preservation Commission (HHPC) serves as an advisory body to the Selectboard and Planning Commission and is the coordinating body for community preservation activities. Over the last twenty-five years, the HHPC has utilized matching CLG grants to fund community preservation activities such as historic surveys, National Register nominations, preservation planning and educational projects.

### **Historic Resources Survey**

Preservation through documentation is perhaps the most basic, essential, and non-controversial of preservation strategies. There are several advantages in undertaking an historic resources survey. In addition to providing a permanent written and photographic record of the Town's architecture, a good inventory is the foundation for other preservation tools and can be used to establish zoning for historic districts or to prepare nominations for the listing of historic structures and districts in the National Register of Historic Places. Data gathered in a survey may encourage greater local citizen appreciation of the built environment. Historic resource assessments are also necessary for accomplishing environmental reviews required in projects receiving federal funding. Information gathered from a comprehensive historic preservation strategy acts as a firm basis for future decision-making, by identifying buildings suitable for and worthy of rehabilitation.

Since the late 1960s, the Vermont Division for Historic Preservation has conducted the State Historic Sites and Structures Survey on a town-by-town basis. In 1973, the Division prepared a survey of about thirty individual structures and two districts in Hartford that were determined to have historical and architectural significance.

In recent years, the Hartford Historic Preservation Commission (HHPC) has utilized CLG grants to conduct Historic Sites and Structures Surveys. The 2013 Survey focused on properties not previously surveyed from the late 18<sup>th</sup> century to the 1920s. The 2015 survey focused on properties from the

1920s to the 1960s. In 2010, the HHPC utilized a CLG grant to conduct an agricultural building census.

**National Register of Historic Places**

The National Register of Historic Places is the official list of the Nation's cultural resources worthy of preservation. Established by the National Historic Preservation Act of 1966 and administered by the National Park Service within the Department of the Interior, the Register lists properties of local, state and/or national significance in the areas of American history, architecture, archaeology, engineering and culture. Resources may be nominated individually or in groups, as districts, or as multiple resource areas and generally must be older than 50 years. Properties in Vermont are nominated to the National Register by the Vermont Division for Historic Preservation. Property owners or Town officials may request that a potential property or district be reviewed for National Register eligibility.

Individual Nominations to the National Register of Historic Places

The following is a list of individual nominations within the Town of Hartford. Additional properties were originally listed individually and later incorporated into one of the Town’s many historic districts.

**Table I-1  
Individual Nominations to the National Register of Historic Places**

<u>BUILDING/SITE/STRUCTURE</u>	<u>LOCATION</u>
Jedediah Strong House	694 Quechee Main Street, Quechee
Marshland Farm	1161 Quechee Main Street, Quechee
Theron Boyd Homestead	11 Hillside Road, Quechee
The Dewey House	505 Deweys Mills Road, Quechee
Quechee Gorge Bridge	Route 4, Quechee

Many other buildings, sites, and structures within the Town are eligible for listing in the National Register.

Historic District Nominations to the National Register of Historic Places

The Hartford Historic Preservation Commission has been actively pursuing historic district nominations over the past two decades utilizing Certified Local Government grants to prepare the nominations. The following is a list of the district and the year it was listed.

**Table I-2  
Historic District Nominations to the National Register of Historic Places**

<u>DISTRICT</u>	<u>YEAR LISTED</u>
1. White River Junction	Originally listed 1980, updated & expanded in 2002
2. Quechee Mill	1997
3. Hartford Village	1998
4. Wilder Village	1999
5. Jericho Rural	2001

6. Christian Street Rural	2003
7. West Hartford	2004
8. Terraces (White River Junction)	2012
9. Advent Camp Meeting Grounds (White River Junction)	2017

In addition, the Taftsville Historic District is a multi-town district (Woodstock, Hartland, and Hartford) that includes three contributing structures in Quechee.

**Scenic Roads**

The designation of scenic roads can also aid a town in the preservation of rural environs of its historic structures. There are no scenic roads designated in Hartford at present.

**Design Review Districts**

Under state law, the most comprehensive preservation tool available to local governments is the creation and administration of a design review district, established through the Planning Commission. According to 24 VSA 4414(E), prior to the establishment of a design review district, the Planning Commission shall prepare a report describing the particular planning and design problems of the area and setting forth the recommended planning and design criteria to guide development. The White River Junction Design Plan and the White River Junction Design Guidelines were completed in 2001. In 2006, a bylaw amendment was enacted establishing a design review district for Downtown White River Junction. This was followed by the establishment of the Downtown White River Junction as a Designated Downtown under the Vermont Downtown Program.

A design review district can be created for any area containing structures of historical, architectural, or cultural merit. Many Vermont communities have specifically applied the design review district concept to protect areas of historical significance. Within such a district, no structure may be erected, altered, restored, moved, demolished or changed in use or type of occupancy without review by the Design Review Committee and the Planning Commission.

**Townscape Preservation**

State legislation also enables Vermont municipalities to set up local historic districts for the purpose of ensuring the preservation of historically and architecturally significant buildings and areas. By adopting a local historic district ordinance, standards could be applied to judge the appropriateness of proposed changes to buildings and sites within a historic district. A local historic district ordinance could be established for a village or hamlet if sufficient interest is shown by residents. Such an ordinance would recognize individual landmark buildings or sites worth preserving for their architectural, historical or cultural significance.

If a local historic district ordinance is adopted, business owners could be encouraged to make improvements to the exteriors of their buildings through a series of incentives such as low-cost loans, free technical assistance, and tax abatement for such improvements. These incentives have been successfully applied in other Vermont towns.

## **Federal Investment Tax Credits**

The Tax Reform Act of 1986 offers tax incentives of a 20% Investment Tax Credit for substantial rehabilitation of income-producing, certified historic structures. This means that investors can receive a 20% federal tax credit on qualified rehabilitation expenses (i.e. \$100,000 in rehabilitation costs can earn a \$20,000 federal tax credit). Projects must meet preservation guidelines found in the "Secretary of the Interior's Standards for Rehabilitation."

All buildings listed individually on the National Register are certified as historic for the purposes of the Tax Act. Those that contribute architecturally or historically to a National Register Historic District are eligible to obtain certification from the National Park Service through the Vermont Division for Historic Preservation. The Rehabilitation Investment Tax Credit can be combined with standard means or methods of depreciation.

## **State Grants**

In 1985, the State of Vermont, through the Division of Historic Preservation, established a program for matching grants to assist non-profit organizations and communities in improvement projects that promote the public enjoyment of Vermont's historic resources. Another source of funding established by the Division is the Barn Preservation Grant Program.

Technical assistance and small grants for project organization may also be available from the Preservation Trust of Vermont. Foundation funding should also be explored for worthy projects.

## **DOWNTOWN/VILLAGE REVITALIZATION**

Properly treated and maintained, the historic structures of Downtown White River Junction, Quechee Village, Hartford Village, Wilder Village, West Hartford Village and several hamlets throughout Hartford contain tremendous potential for economic benefit. In some cases, preservation could prove to be the seed for the rebirth of these areas. Many of the buildings retain significant features, including elaborate brickwork, decorative glass and metal work, intact parapets, and other decorative details absent from buildings constructed today. The rehabilitation of older buildings is sometimes less expensive than new construction. Often taken for granted by those who have grown accustomed to their appearance, Main Street areas present a strong, attractive historical image to tourists and others passing through Town. The quaint Main Street image within Hartford's villages has become a proven formula for attracting tourists, seasonal residents and shoppers from nearby communities. Careful building renovation will erase the signs of deterioration that can undermine an otherwise healthy downtown. Building rehabilitation or renovation does not necessarily mean major changes or expenses, nor should it be confused with restoration, in which the appearance of a building is returned to the condition in which it existed at a particular point in time.

Not every building needs major work. Minor repairs, repainting and the removal of coverings that detract from a building can make a big difference. The best renovations are contemporary solutions that respect the architectural features that enhance a building. The scale, proportions, materials, textures, and details of a building should be examined carefully before any renovation. Old photos can be very helpful in assessing a building's potential, uncovering changes that it has seen through time and making decisions about changes to undertake. A well-executed renovation project

frequently will act as a catalyst for similar work along the street, enhancing the overall image of a downtown or village center. However, it should be remembered that structures remodeled in a manner incompatible with their surroundings and departing from the character of the downtown or village center can cause serious visual harm to the entire streetscape.

One such program intended to encourage downtown revitalization is the Vermont Downtown Program, which was established in 1998. The program enables Towns to pursue designation of their downtowns as Development Districts, thereby affording them access to a series of tax credits, priority for funding under certain state programs, special grant programs, technical assistance, and other benefits. In 2006, Downtown White River Junction received Downtown Designation. In 2002, the State Legislature amended the Downtown Program to include Village Centers. The Town applied for and received Village Center Designation for Quechee Village (2012, renewed in 2017) and Hartford Village (2017). The Town should pursue Village Center Designation for Wilder Village and West Hartford Village.

## **THREATS TO HISTORIC RESOURCES**

### **Demolition**

Since the formation of the Hartford Historic Preservation Commission in 1993, the number of National Register Historic Districts in Hartford has increased from one to nine. Combined, there are presently over 500 contributing buildings listed on the National Register in Hartford. A contributing building must be at least fifty years old, retain most of its original architectural character and contribute to the historic district.

Since 1993, many historic buildings in Hartford have been demolished. The loss of historic buildings has a significant effect on a village or neighborhood's historic character. Presently, only the Downtown White River Junction Design Review District has a review process that requires approval prior to demolition of a contributing property listed on the National Register. The review process provides an opportunity to discuss alternatives to demolition and recognition of the historic contribution of a building. An ordinance requiring review prior to demolition or additional design review districts that have a demolition review process are worth consideration.

### **Lack of Design Elements**

Development that does not consider design elements can have a negative effect on the town's historic resources and the character of a village or a neighborhood. A design review district, as noted earlier, is an option to ensure that new development is sensitive to the historic character of an area. In addition, for projects that require a Conditional Use Permit, character of the area is one of the review criteria. It is important that this criterion is met when development occurs in close-proximity to historic structures.

## **RESOURCE LIST**

The following is contact information regarding sources identified in this chapter



Hartford Historic Preservation Commission  
c/o Dept. of Planning & Dev. Services  
171 Bridge Street  
White River Junction, VT 05001  
(802) 295-3075

Hartford Historical Society  
P.O. Box 547  
Hartford, VT 05047  
(802) 296-3132

Vermont Division for Historic Preservation  
National Life Building, Drawer 20  
Montpelier, VT 05620-0501  
(802) 828-3213

Preservation Trust of Vermont  
104 Church Street  
Burlington, VT 05401  
(802) 658-6647

US Department of the Interior  
National Park Service  
P.O. Box 37127  
Washington, D.C. 20013-7127

## **POTENTIAL ARCHAEOLOGICAL AREAS**

Long before European settlers arrived in the eighteenth century, Native Americans inhabited the Upper Valley. Although archaeological research in the Connecticut River Valley is somewhat limited, our proximity to rivers and streams indicates a high potential for Native American artifacts. To date, several Native American archaeological sites have been documented in Hartford. This may be an indication that more are likely to be discovered in the future.

After European settlement, Hartford's rivers were utilized to harness water power to run mills and factories. Throughout the Town, cellar holes bear silent witness to early settlers, their houses abandoned as the families moved or in other cases were destroyed by fire. Investigation of these areas, as well as mill and dock sites that once lined the banks of the White and Connecticut Rivers and prehistoric sites, could yield useful information relating to the lifestyles of Hartford's early settlers.

In Quechee, old stone fence posts and quarries still exist, remnants of a past industry of this area. Centerville was also an area of industrial activity. The railway station in downtown White River Junction was the connection stop for vacationers taking the old Woodstock Railroad (now the Route 4 corridor) to the station in Woodstock.

The old stone retaining wall and iron rings on stone posts near Wilder Dam, an old gold prospecting site in Wilder, old copper prospecting site in West Hartford, and the Lyman Park Railroad abutment are examples of historic remnants that have archaeological possibilities. Another potential area of interest is the original Center of Town.

The record of these ancient times is fragile, and no doubt much has already been lost through vandalism, building, farming, road construction, and from the acidic nature of waterfront soils. Investigation by qualified archaeologists is necessary to determine the actual potential of these areas. Several Phase I archaeological investigations (which identify potential archaeological sensitive areas

and determine if the proposed project design may impact cultural resources) have been conducted in Hartford. However, to date, no comprehensive survey of archaeological resources has been prepared. For more information on archaeology, contact the Vermont Division of Historic Preservation.

## **CEMETERIES**

Hartford has numerous cemeteries, both private and public, many of which are quite old and are an historic resource. For a complete list of cemeteries, please refer to Chapter 6, Community Facilities and Services. Cemeteries inform us about our past and the lives of earlier inhabitants and are an important landscape feature. In recent years, there has been an effort to ensure that cemeteries and their historic headstones are properly maintained. This has been a challenge given dwindling resources to pay for cemetery maintenance.

## **OVERVIEW OF TOWN HISTORY**

After the French and Indian War, settlers flocked to the open territory west of the Connecticut River. Responding to this influx, Benning Wentworth, the Royal Governor of New Hampshire, chartered Hartford and neighboring towns in 1761. According to the charter, grantees were obligated to till five acres of land for every fifty they owned. In this way, the governor hoped to stimulate settlement rather than land speculation and owner absenteeism. Boundary disputes between New Hampshire and New York jeopardized settlers claims until 1777, when Vermont became an independent colony. In 1791, Vermont entered the Union as the fourteenth state.

Traditionally, the Town of Hartford has been divided into distinct villages and hamlets, each of which contributing to the unique character and economic well-being of the Town. Today, the Town recognizes five villages. White River Junction, the largest village, has been the economic hub of the town since the second half of the nineteenth century. Its location at the confluence of the Connecticut and White Rivers made White River Junction a natural center for river, rail and highway transportation and commerce. With the construction of the Connecticut River Railroad, and the Connecticut and Passumpsic Rivers Railroad in 1848, the Northern New Hampshire Railroad in 1849 and the Woodstock Railroad in 1863, White River Junction became the most important railroad junction in northern New England. Colonel Samuel Nutt, a renowned river boat captain, responded to this industrial expansion brought by the railroad by opening the Junction House in White River Junction, a hotel and public house on the site of the present Hotel Coolidge. Lured by efficient rail transportation and abundant water power, mills and factories flourished along the White River in Hartford Village, the Ottauquechee River in Quechee, and the Connecticut River in Wilder.

North of White River Junction, on the Connecticut River, is Wilder Village. Originally named Olcott, the village changed its name to Wilder in 1899 when a wealthy citizen bequeathed money for a bridge across the river on the condition that the village take his name. In the late nineteenth century, the Olcott Falls Paper Company used the river to power its pulp mill, which manufactured



newsprint for city papers. In 1950, the Wilder Hydroelectric Dam was built, replacing earlier dams constructed by the paper company.

Hartford Village, just west of White River Junction, was the town's earliest business center. During the 1880s and 1890s, a farm implement factory, a box shop, a chair factory and a hotel made Hartford Village a thriving community. Several fires and floods around the turn of the century crippled Hartford's commercial sector to the extent that it never fully recovered.

Quechee Village, west of White River Junction, developed as another busy manufacturing center during the nineteenth century. The Ottauquechee River, which gives the village its name, also provided abundant water power and a remarkable scenic landscape. In 1836, at the head of the Quechee Gulf, Albert Dewey founded the first woolen mill in the United States to produce shoddy, a textile woven from recycled wool.

During the nineteenth century, West Hartford, located up river from Hartford Village, was primarily an agricultural center and stage stop, in sharp contrast to the villages to its east and south.

Much valuable information concerning local and area history is contained in two books by John St. Croix: *Pictorial History of the Town of Hartford, Vermont* (1963) and *Historical Highlights of the Town of Hartford, Vermont* (1974). Other sources of local history include the *History of Hartford* by William Howard Tucker (1889) *The Gateway of Vermont: Hartford and Its Villages* by the University of Vermont (1904) and the *History of Windsor County* by Frank R. Holmes and Lewis Cass Aldrich (1891). For other sources, please refer to the bibliography in the Appendix.

## Hartford Timeline

YEAR	EVENT
1704	Local Abenaki had villages in several locations around town for centuries.
1761	Town Charter was signed by Governor Benning Wentworth of New Hampshire, July 4-5.
1763	Benjamin Wright believed to be the first permanent settler in the town, living at Lyman Point.
1768	Israel and John Gillett of Lebanon, Connecticut built the first house near Olcott Falls.
1769	A sawmill was built in Quechee Village.
1769	The first bridge was built near the Quechee Sawmill.
1771	A Gristmill and fulling mill was added to the property in Quechee.
1775	Elias Lyman III and his brother Justin started a river trade from the Point to Hartford, Connecticut.
1778	Colonel Joseph Marsh of Quechee was elected first Lieutenant Governor of Vermont.
1779	The first church services in town were held in the Thomas Hazen kitchen until 1796.
1783	The Meeting House at the Center of Town opens.
1795	The first school in the Town opened in Reuben Hazen's dwelling in West Hartford.
1810	Dam and two canals with locks were built at Olcott Falls.
1812	The first brick Woolen factory was built in Quechee.
1848	The first passenger train in Vermont left White River Junction for Bethel.
1849	First railroad station was built in White River Junction.
1854	First locomotive built in Vermont at Latham's Iron Works in White River Junction.
1875	The Woodstock Railroad opened from White River Junction to Woodstock and ran until 1933.
1883	Wilder Brothers built the first dam & footbridge across the Connecticut River.
1884	Hartford's Samuel Pingree was elected Governor of Vermont and served until 1894.
1884	Hartford High School (current Town Hall) built on Bridge Street.
1887	Railroad disaster on the White River.
1890	The first state fair held at Billings Park with a branch line from the Woodstock Railroad.

1893	First Firehouse was built in White River Junction.
1894	First telephone office opened in the Junction House.
1920	D. W. Griffith filmed segments of <i>Way Down East</i> with Lillian Gish on the White River.
1927	The famous state-wide flood destroyed most of West Hartford Village.
1928	The Twin State Fair ceased operating and became the Twin State Airport.
1938	Veterans Administration Hospital built.
1950	Wilder Dam and hydro power plant began operations.
1950	The Twin State Airport closed after 21 years of service.
1952	Hartford Memorial Middle School was erected in response to overcrowding.
1962	The High School off Taft Flat was started. All grades moved in by 1964.
1968	I-89 & I-91 opened in Hartford.
1972	First Condominiums in Quechee Lakes were built.
1978	New Fire Station built on VA Cutoff Road
1980	Simon Pearce purchased the old Quechee Mill.
1981	Gates-Briggs Opera House reopened.
2000	The Tip Top Bakery building renovated for art studios and a café.
2004	Old Firehouse on Bridge Street renovated for art studios & Main Street Museum.
2011	Hurricane Irene flooded much of Hartford and Vermont.
2012	Quechee Covered Bridge demolition and rebuilding began, July 18. It reopened December 29.
2015	Hartford Town Hall renovation completed.

## **GOALS, STRATEGIES AND ACTIONS**

**Goal 1: Protect Hartford’s historic resources: Protect and restore Hartford’s historic buildings and facades, facilities, traditions and oral history.**

**Strategy 1 Prevent the loss of historic buildings and historic character.**

Actions:

1. Articulate and define Hartford’s rural and historic character.
2. Ensure that design and development policies support Hartford’s historic and rural character.
3. Develop policies and incentives to encourage restoration and re-use of historic buildings.
4. Develop practical building standards that balance historic preservation while meeting modern development needs.
5. Provide information to property owners about historic preservation resources and techniques.
6. Fundraise to support historic preservation efforts on critical buildings.
7. Develop partnerships for historic preservation.
8. Consider the adoption of a Demolition Ordinance that would require a review process in order to demolish a historic structure.

**Strategy 2 Protect the historic character of Hartford’s village centers.**

Actions

1. Continue to support the revitalization of Hartford's village centers.
2. Market and promote the historic and architecturally significant features of the Town's village centers to encourage tourism and the rehabilitation and reuse of existing historic structures and sites.
3. Continue working toward qualifying Hartford’s villages as designated villages under the Vermont Downtown Program.

4. Encourage public off-site, off-street parking in the Village centers to ensure that the landscaped areas around historic structures are conserved to the greatest extent possible.
5. Consider the development of a guide to assist business owners in village center historic districts on creating appropriate signage.
6. Consider the adoption of design review districts for village centers.
7. When new buildings within historic areas are proposed, encourage a design that is compatible and sensitive to the character of the neighborhood.

**Goal 2: Balance historic preservation and modern needs: Develop practical guidelines that preserve historic character while allowing for modern upgrades and uses.**

**Strategy 1: Encourage reuse of historic resources including adaptive reuse.**

Actions

1. Provide incentives for reuse of historic structures.
2. Use Community Development Block Grant Funds and other grants to rehabilitate the Town's older housing stock.
3. Utilize the Vermont Barn Grant Program for barn restorations.
4. Assist landowners who wish to evaluate the potential of historic buildings to be used for new uses by applying for "pre-development grants" for architectural plans and specifications, historic structures reports, engineering studies, archaeological testing, and feasibility studies, etc.

**Goal 3: Increase visibility and appreciation of local history: Showcase local history through education and stories, programs and tours, signage and interpretation.**

**Strategy 1: Increase historical interpretation, programming and signage.**

Actions:

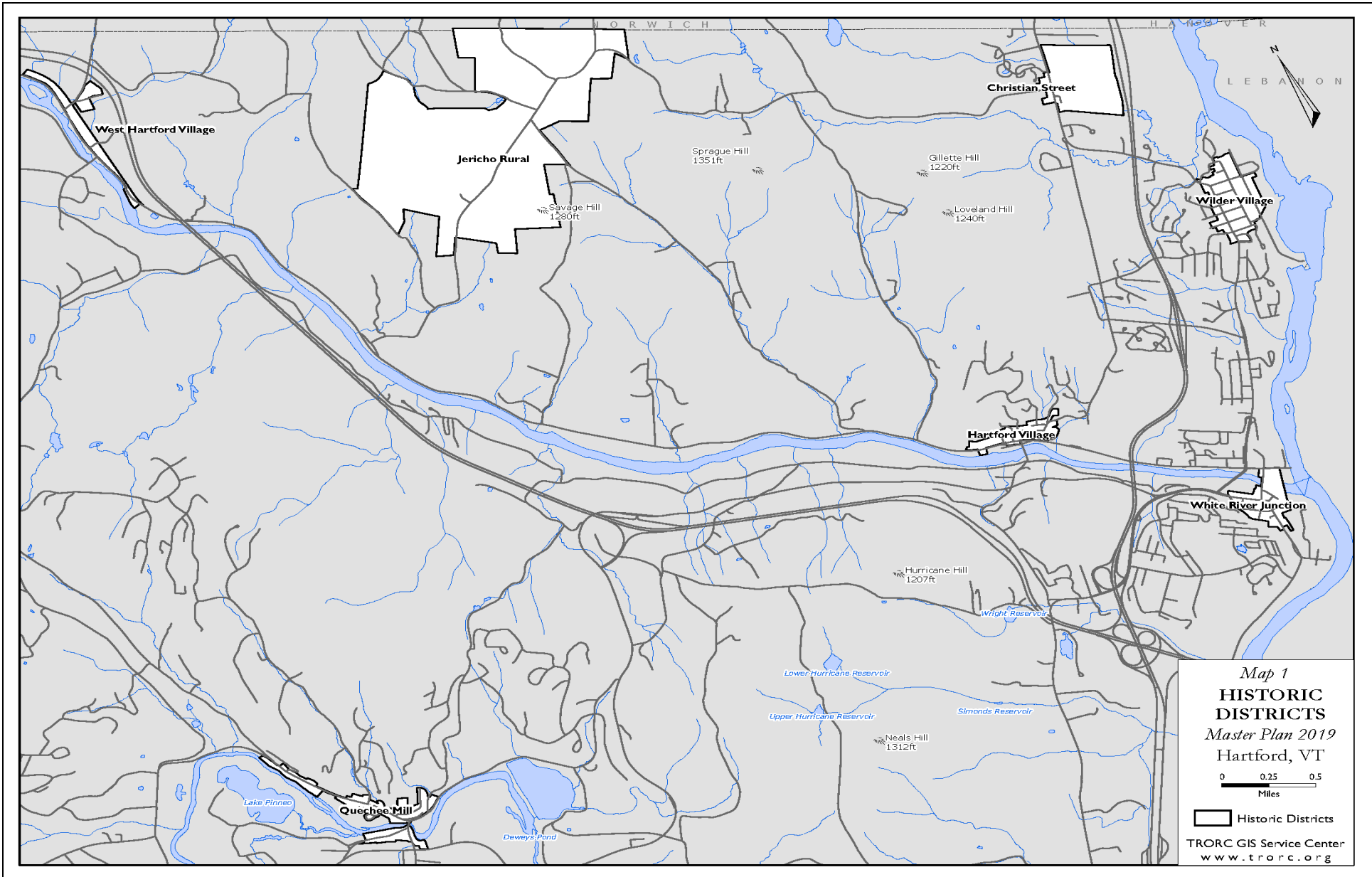
1. Educate the public and property owners about the location and purpose of historic districts.
2. Develop and promote programming and information that showcases Hartford's rich history.
3. Develop new, visible signage and multimedia content to highlight important historic sites.
4. Develop school curricula and enrichment programs to educate students about local history.
5. Provide village and school libraries with materials on the Town's historic resources. Encourage the public's interest in the Town's historic resources through a variety of methods.
6. Work with the Hartford Historic Preservation Commission, Hartford Historical Society, Preservation Trust of Vermont and the Vermont Division for Historic Preservation to promote the preservation, recognition, enhancement, and appropriate use of the Town's historic resources.

**Goal 4: Inventory, protect and maintain historic resources throughout Hartford.**

**Strategy 4: Continue Participation in the Certified Local Government (CLG) Program.**

## Actions

1. Continue to survey Hartford's historic resources.
2. Continue listing eligible historic structures, sites and areas on the National Register of Historic Places.
3. Periodically update existing historic districts and consider expansion.
4. Develop a long-term plan to inventory, interpret, and preserve the Town's archaeological sites and foster public awareness and appreciation of those sites.



## **CHAPTER II LAND USE**

### **INTRODUCTION**

Existing land use patterns are the physical expression of numerous public and private decisions that have been made in the past. In turn, these patterns have a substantial impact on the rate, location, and type of growth that will occur in the future.

Land use considerations are closely related to all other facets of community planning. All the chapters of the Town Plan relate in some way to land use. For example, the economic development or housing recommendations are, in part, land use recommendations since those sections recommend the allocation of land for commercial, industrial, or housing use.

Much of Hartford's land use planning and decision-making revolves around the appropriate use of our manmade and natural resources. Manmade resources include public water and wastewater systems, the road network, parking lots, public and private buildings, farms, and recreational facilities. Hartford's natural resources include forests, agricultural lands, surface and ground water, scenic views, clean air, wildlife, minerals, and soils. They present both opportunities for and constraints on development and must be conserved so as not to preclude their continued use. Over time, development in Hartford has shown that some areas are naturally better suited for a particular use than others. If Hartford is to use its resources wisely and provide a high quality of life for its citizens, the capacity of Hartford's natural and manmade resources to accommodate development must be respected.

Four major considerations have informed the analysis of land use and projections for the future. As described in this chapter, they are: (1) community vision, (2) existing and historic land use patterns, (3) natural constraints on development, and (4) strategies and recommendations for guiding future development.

### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

### **COMMUNITY VISION**

#### **Public Participation Process**

Through various public participation processes over the past twenty years, the following have repeatedly risen to the top as major themes:

1. Increase density in already developed areas with infrastructure (water & wastewater, close to community facilities & services and served by public transit).
2. Manage density of future development.
3. Protect scenic areas, open space, and wildlife corridors.
4. Preserve Hartford's historic settlement pattern, defined by compact villages surrounded by rural countryside.
5. Maintain the character of Hartford's rural countryside and support agriculture, forestry, and recreational uses in these areas as well as carefully planned low-density residential uses.
6. Maintain and enhance Hartford's heritage of working farm and forest lands as part of a sustainable, environmentally sound, local resource-based economy.
7. Maintain and enhance the open space and recreational "infrastructure" important for long-term health and quality of life of Hartford residents.

## **EXISTING AND HISTORIC LAND USE**

The development of the Town's land has gone through several changes as the economic emphasis has shifted from one period to another. Until the 1830s, the population was sparse and mainly limited to certain areas adjacent to the Town's three rivers. Over 90% of the land area was undeveloped woodland. During the next fifty years, roads were made into undeveloped acreage for lumber and for the clearing of land for pastures, which greatly increased the percentage of developed land. With the growth of industry, the population shifted to the five compact villages, many outlying farms were abandoned, and much of the cleared land was taken over by second growth forest. The mills were active until the 1950s.

During the 1960s, the interstate highways were built. This stimulated commercial growth around the interchanges of I-89 and I-91 and Route 4. It also resulted in increased residential development throughout the Town and region. During this period, there also was a corresponding decrease in economic activity in Downtown White River Junction and the Quechee Lakes Development began in the late 1960s.

Hartford currently has zoned 82.2% of its lands as Rural Lands, 10.1% as Residential, 4.2% as Industrial-Commercial/Highway Commercial and 3.5% as mixed-use districts. In rural districts, much of the land is farmland and woodlands. Maps 2-6 present the Town's current land use patterns by geographical area.

### **Developed Land**

About 20% of Hartford's land area is developed. The term "developed" is defined as lands containing built structures or infrastructure such as roads, parking lots, railroads and recreation facilities. All remaining land is categorized as "undeveloped." Although agricultural uses modify the state of natural lands, they are included in the undeveloped land classification. Once abandoned, agricultural lands generally revert to natural forests within a decade.

### **Undeveloped Land**

About 80% of Hartford's land area remains undeveloped. The large amount of undeveloped land is a reflection of a number of factors, including natural constraints of the land that inhibit development, large landholdings in public and private ownership, and limited demand for



development. More than one-third of the land in Hartford is on slopes greater than 15% and is therefore not easily developable. However, if the real estate market pushes the cost of land upward, it is likely to result in more development on steep slopes and other sensitive or marginally developable lands. In addition to higher site preparation costs, such development can result in higher levels of erosion, sedimentation, and flooding if not properly designed.

Undeveloped lands can be separated into a number of categories. While sufficient data is not available to estimate the acreage for each category, a discussion of the importance of these uses of land is provided below.

### Forests

The major portion of Hartford's land area lies under forest cover. Like most communities throughout the Upper Valley Region, Hartford's forests represent an important natural resource and serve a wide range of functions and benefits, including:

- A renewable supply of fuel, lumber, and other wood supplies;
- An effective natural system that stabilizes soil, particularly on steep hillsides;
- Natural habitats for wildlife;
- Areas for outdoor recreational opportunities and educational and ecological research;
- Natural buffers between incompatible land uses;
- Systems for purification of the air and water; and
- Scenic views.

Over the last three decades, the demand for lumber and finished wood products, as well as high heating costs and the availability of wood as an abundant, alternative fuel, has increased the attractiveness of timber harvesting to woodlot owners. Much of the commercially marketable forest land in Hartford is located on steep topography, posing a significant problem not only to the logistics of timber harvesting but also to the environmental stability of these lands. Policies concerning forestry management are discussed in Chapter IX (Natural Resources).

### Agricultural Lands

As many Vermont communities have experienced, farming in the Town of Hartford has undergone dramatic changes over the last century. Farmers have moved from sheep to cattle to dairy industries, and agriculture acreage has diminished greatly as farms and fields have been sold for residential development and commercial use. These changes have caused the loss of considerable prime agricultural soil. Still, Hartford contains substantial deposits of agricultural soils throughout the Town. These deposits have been classified by the U.S. Natural Resources Conservation Service (NRCS) as prime agricultural soils based on a combination of texture, nutrient, and moisture content capable of producing high crop yields. The Town has a prime agricultural soils layer on the natural resources map. The NRCS completed soils identification maps for the Town in 1992. Information may be obtained at the NRCS White River Junction office or viewed at the Hartford Department of Planning and Development Services.

Hartford's agricultural reserves are limited. Any additional loss of existing or potential farmland, especially the breakup of large contiguous parcels of agricultural lands, could undermine the future logistic and economic viability of farming in Hartford.



## **DEVELOPMENT AND OUR NATURAL RESOURCES**

Steep slopes, flood-prone areas, wetland soils, and the presence of bedrock at or near the surface can serve as major constraints on development. While it is, at times, possible to overcome such natural constraints through intensive engineering, this is often a costly and elaborate process. Efficient and environmentally sound planning seeks to guide growth into those areas already having adequate natural capacity to support development. More detail regarding each of the topics below is included in Chapter IX.

### **Surface Drainage**

Understanding the direction of water flow and knowing the size of natural drainage areas is another important factor in the analysis of Hartford's land capability. Manmade development that alters the natural drainage and filtering of rainwater can lead to increased soil erosion and can adversely affect water quality and wildlife. Such effects may be the result of catastrophic single events or long-term cumulative effects of seemingly minor changes in surface drainage associated with land use.

### **Wetlands**

Wetlands are Vermont's most productive ecosystem and serve a wide variety of functions beneficial to the health, safety and welfare of the community. Important considerations for land use and zoning decisions include: (1) retaining stormwater runoff, reducing flood peaks, delaying flood crests, and thereby reducing flooding; (2) protecting the quality and quantity of ground water; (3) improving surface water quality by storing organic materials, chemically breaking down or removing pollutants, and by filtering eroded sediments and organic matter from the surface runoff; (4) providing a wide diversity of habitat for wildlife, including waterfowl, birds, mammals, fur-bearers, amphibians and reptiles; (5) providing habitats that are critical for the survival of rare, threatened, or endangered species of plants and animals; and (6) providing spawning, breeding, and general habitat for fish.

### **Floodplains**

Floodplains, as distinct from surface drainage, are the periodically inundated flatlands adjacent to rivers and streams. Development in floodplains presents some specific problems, including: (1) a high probability of property damage during flooding, (2) restriction of periodic water storage resulting in potentially greater flooding, and (3) increased likelihood of erosion and sedimentation. The latter factor can cause increased turbidity of water in rivers and streams. This involves avoiding development in flood-prone areas, protection of and restoration of floodplains and upland forested areas and flood emergency preparedness and response planning.

Effective July 1, 2014, municipalities in Vermont were required to have a Flood Resilience Plan as a component of the Municipal Plan. The State allows the use of a local Hazard Mitigation Plan to meet this requirement. Hartford first adopted a Hazard Mitigation Plan in 2008. In 2013, Hartford embarked on a much more involved planning process that resulted in a more detailed Hazard Mitigation Plan that was adopted in 2014. The Town hereby incorporates the Hazard Mitigation Plan into the Town Plan by reference. In addition, a Flood Resilience Chapter, based on the 2014 Hazard Mitigation Plan, is now a part of this Plan (Chapter XI). The policies of the

Hartford Town Plan, including the Flood Resilience chapter and the Hartford Hazard Mitigation Plan meet State requirements.

## **Steep Slopes**

Much of Hartford's natural beauty derives from the Town's hilly terrain. Poorly designed development on highly visible steep-sloped areas could adversely affect a scenic vista and detract from the surrounding beauty.

The slope or steepness of land is defined as a change in elevation over a given distance and is expressed as a percentage. The degree of slope has a clear impact on the suitability of a particular site for development. Generally, as the slope of the land increases, the range of the appropriate land uses diminishes.

Areas having low to moderate slopes (0 - 8%) are considered to have minor limitations for most types of development. Higher density uses such as commercial and industrial development, apartment complexes, and roads and highways are usually best suited for lands that are moderate or low in slope.

Slopes between 8 and 15% may have moderate limitations to certain types of development that require more land clearing and coverage by impervious surface. For example, residential use may be well suited on these slopes, where most commercial and industrial uses would not. Certain site improvements may be required on these lands in order to minimize environmental problems related to erosion, runoff, and drainage.

Slopes above 15% have more serious limitations for development. Many of these areas in Hartford also serve as important natural and scenic resources, particularly on those slopes above 20%. Areas of land with grades over 15% equal 10,840 acres in Hartford. This is a little over one-third of the entire Town. Steep slopes are typically characterized by a thinner layer of soil, limited soil absorption capacity, and higher volumes and velocity of surface water runoff. Steeply sloped areas also may be inaccessible to most construction or emergency equipment and often require substantial site improvement costs such as residential sprinkler systems to retard fires, limited removal of vegetation and trees, and underground utility service.

Slopes above 20% should be reserved for open space uses such as wildlife habitat, watershed protection, passive recreation, and other conservation purposes. Where the above uses involve construction on these slopes, adequate site improvements should be made to avoid excessive runoff and erosion, contaminated surface water supplies, and silted streams.

## **Scenic Areas**

The protection of the Town's scenic beauty is not just important to Hartford resident's quality of life but also to visitors who contribute to the sizeable tourism economy. The Town has been successful in maintaining much of its scenic beauty over several decades of residential and commercial growth, due partly to the historic development of Hartford into five villages largely separated by countryside and to the preservation of over 2,600 acres, which include the Quechee Lakes Landowner's Association (QLLA) open space, the Army Corps of Engineers property (Quechee Gorge), National Park Service (Appalachian Trail) lands, land with conservation

easements, protected deeryards and Town properties. A complete section on Scenic Areas is found in Chapter IX (Natural Resources).

## Parcelization

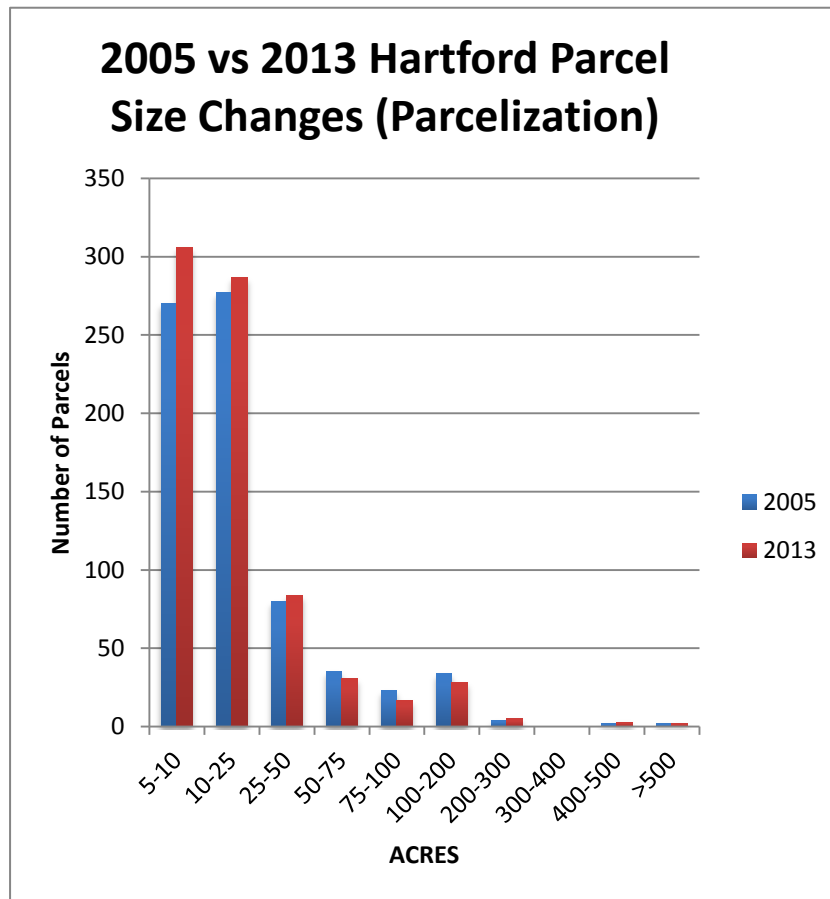
Parcelization refers to land use development patterns where the landscape is made up of many parcels of land. Subdividing larger parcels into smaller parcels usually leads to the broader landscape being fragmented. Areas with many parcels often have more roads, driveways, buildings and lawns which break up the continuity of our naturally forested landscape. While this development pattern may be attractive to individual owners, it is hard on wildlife and ecological processes that take place over many acres or square miles. Roofs, driveways and roads cause precipitation to run off rapidly instead of being absorbed, speeding erosion and contributing to floods. Landscaping introduces exotic plants that may invade and harm native ecosystems. Roads are barriers to some species, such as migrating salamanders, cutting off their ability to spread out, thrive and pass on their genes. Scenery, where the land has been subdivided and then developed (often for housing, lawns and roads), is less attractive than the wooded or open hillsides that traditionally make up the backdrop for our lives.

The following table and graph show that over time, Hartford is becoming more parcelized. In the eight years between 2005 and 2013, the number of 75 to 100-acre parcels decreased by 26%, from 23 to 17, while the number of parcels between 5 and 10 acres in size increased from 270 to 306, an increase of 13%. On a positive note, the number of parcels larger than 200 acres in size increased from 8 to 10 as some owners acquired adjacent lands.

<b>Table II-1 Hartford Parcel Size Changes (Parcelization) 2005-2013</b>				
<b>ACRES</b>	<b>2005</b>	<b>2013</b>	<b># CHANGE</b>	<b>% CHANGE</b>
5-10	270	306	36	13%
10-25	277	287	10	4%
25-50	80	84	4	5%
50-75	35	31	-4	-11%
75-100	23	17	-6	-26%
100-200	34	28	-6	-18%
200-300	4	5	1	25%
300-400	0	0	0	0%
400-500	2	3	1	50%
>500	2	2	0	0%

Source: Hartford Lister's Office

Chart II-1 Hartford Parcel Size Changes



Source: Hartford Lister's Office

## OVERLAY DISTRICTS

An overlay district is a special zoning district that encompasses one or more underlying zoning districts and provides supplemental development standards above that required by the underlying zoning district. Overlay districts are typically used to protect important features of a particular area that extend beyond a single underlying zoning district. In 2008, the Town established three overlay districts which implemented the 2007 Town Plan recommendations. These overlay districts consider the protection of important natural resources (discussed in the previous section), including unfragmented forested areas, the working landscape and the preservation of the rural character of Hartford. The overlay districts are the Rural Lands, Agriculture and Wildlife Connector Overlay Districts as described below.

### Rural Lands Overlay District:

The purpose of this district is to promote the preservation of the rural character, sensitive features and natural resources, including prime agricultural soils, wetlands, steep slopes, important wildlife habitat, scenic views, ridgelines and hillsides in the Rural Lands (RL) and Forest Conservation Zoning Districts. Development should be laid out to integrate carefully into the natural resources while protecting and minimizing the fragmentation of land, and adverse visual and environmental impacts on natural resources.

### **Agriculture Overlay District:**

The purpose of this Overlay District is to promote the continuation of agriculture; retain the maximum possible amount of agricultural lands which often provide important scenic views; protect historically viable farmland and prime and statewide agricultural soils; and preserve Hartford's rural character, scenic characteristics, including open lands, views, and working landscape qualities. Development should be clustered and avoid impacts on existing farmland and productive agricultural soils. There are three Agriculture Overlay Districts in Hartford. They include:

- Jericho Area
- Route 5 South/Neal Road/Connecticut River Road Area
- Christian Street Area

### **Wildlife Connector Overlay District:**

The purpose of this Overlay District is to provide sufficient area for animals to move freely between conserved lands, undeveloped private lands, contiguous forest habitat, and other important habitat, land features, and natural communities within and beyond the boundaries of the Town in order to meet their necessary survival requirements. Development should be directed close to existing roads and/or developed areas and provide a suitable buffer for wildlife to travel through the corridor. There are four Wildlife Connector Overlay Districts in Hartford. These include:

- Pomfret town line to Quechee Lakes Section 5D
- Quechee Lakes Section 5D to the Norwich town line
- Quechee Lakes Section 5D to the Hartford Town Forest
- Hartford Town Forest to Hartland town line

## **HARTFORD'S VILLAGES AND RURAL AREAS**

Located on the eastern boundary of Vermont nearly halfway up the State, Hartford has three major rivers (Connecticut, White and Ottauquechee) with their associated valleys and rising hillsides. The elevation ranges from a low of 340' along the Connecticut River at the Hartland town line to approximately 1,575' along the Pomfret town line in Quechee. Hartford covers an area of 46 square miles. Like many other Vermont towns, Hartford has a mixture of densely settled villages surrounded by open countryside. Hartford has always served as a major gateway to the State, first via the Connecticut and White Rivers, then the railroads and most recently the interstate highways. There are five core villages in Hartford and several smaller rural hamlets, each with its unique character and functions. The following is a description of each village and rural area along with some historical information.

### **White River Junction**

White River Junction became the economic center for the Town with the arrival of the railroad in the late 1840s. Today, White River Junction is made up of two different but important commercial areas (the Downtown Central Business District and the Sykes Mountain Avenue/Route 5 Commercial area), as well as several nearby residential neighborhoods. The

Downtown has traditionally served as the major commercial center of the Town. This role evolved from the freight and passenger train junction at the confluence of the White and Connecticut Rivers. At one time, at least fifty passenger trains a day stopped in White River Junction, attracting retail and personal services, wholesale trade, and manufacturing industries.

When the interstate highway system and convenient long-distance air travel came to the Upper Valley in the 1960s, the railroads declined, cutting the economic heart out of White River Junction. White River Junction continued to lose its identity as the major retail and commercial center of the Upper Valley as shopping malls began springing up in nearby Lebanon, New Hampshire (no sales tax there). Most new commercial activity in Hartford during the last three decades has occurred in close proximity to the I-89/91 interchanges on Sykes Mountain Avenue and Route 5 South. This area is expected to experience continued growth. In 2000, the *Sykes Mountain Avenue Study* was completed. The land use and traffic study recommended a new vision for future development in this important growth center, one that would change the predominant pattern of strip commercial development to a better planned and coordinated rectilinear grid pattern that has suitable infrastructure and will be more aesthetically pleasing.

In the late 1990s, after several decades of economic decline, Downtown White River Junction began to experience a wave of revitalization as it emerged as a center for community services, commercial offices, the visual and performing arts, educational attractions, restaurants and specialty shopping. In 2006, a design review district was established and the downtown was accepted into the Vermont Downtown Program. In 2011, Hartford's WRJ Tax Increment Financing District and Finance Plans were approved by the state. The District includes the historic area as well as the Pine Street, Maple Street and Prospect Street area north of the White River. Downtown commercial, residential and mixed-use development continues and is expected to continue for the foreseeable future.

Since 1991, there have been several studies that have focused on the Downtown, which are incorporated into this Town Plan by reference:

- *River City Revival* (1991)
- *Railroad Row Historic District Plan* (1994).
- *White River Junction Design Plan* and *White River Junction Design Guidelines* (2001).
- Expansion of the *White River Junction Historic District Nomination* (2002)
- *Downtown Municipal Parking Lot Conceptual Re-Design Study* (2005)
- *White River Junction Village Revitalization Plan* (2009)
- *Hartford White River Junction Tax Increment Financing District and Plan* (2011)
- *Downtown White River Junction Parking Study* (2017)

## **Hartford Village**

Hartford Village, formerly known as White River Village until the 1850s once served as the economic center of the Town. It has evolved from a manufacturing center to a predominantly residential area. Housing development over the last few decades expanded from the compact village along Maple Street to the former hillside farms of Roger's Hill along Campbell Street and Christian Street.

In 1991, the Hartford Village Community Association (HVCA) was created by a grass-roots neighborhood group composed of Village residents and persons with a special interest in Hartford Village. Largely initiated to address safety issues for children and the elderly in the neighborhood, the Association grew to include social events, fundraisers, and an intensive volunteer effort to develop a comprehensive Village Plan and to implement the Plan following adoption. Projects included rezoning the village to reflect the goals of Village residents, planting new trees along Maple Street, and new curbing, sidewalks, lighting, and intersection improvements on Maple Street and improvements to Watson Park. The planning process strongly indicated that the social fabric of the Village requires primary attention. Future physical enhancements should continue to focus on improving social conditions, pedestrian safety, and increasing river access and access to public transportation. Twenty years later in 2011, the community and Town staff took another look at the village's assets and needs through the Town's Village Center planning process. Hartford Village became a Designated Village Center in 2017.

## **Wilder**

Wilder is the youngest of Hartford's five villages. The village originally was named Olcott, and then changed in 1898 to Wilder in honor of Charles Wilder, who built a dam and paper mill that employed many local residents. Mr. Wilder also contributed generous support to the Wilder Club and Library, and other community groups. An iron bridge that crossed the Connecticut River to New Hampshire was built by Wilder's estate, but that bridge, and Wilder's dam and paper mill were demolished in 1950 to make way for the Wilder Dam hydroelectric project.

Wilder includes the historic Wilder Village to the east and the more recent residential areas to the west and extending north to the Norwich Town line including newer residential and commercial development. Wilder has experienced a significant amount of development over the past few decades. For the most part, this has been due to a large amount of developable land, its accessibility to major employment centers, and the existence of Town water and wastewater service. While a large amount of undeveloped land still remains along Christian Street, much of it contains prime agricultural soils and outstanding views and is protected by an Agriculture Overlay District created in 2008. Elsewhere in Wilder, there are opportunities for infill development. Wilder also has experienced a large amount of condominium development, including Briars, Ledgestone Commons, Woodhaven, Hemlock Ridge, and, most recently, Stony Creek and Silver Brook.

Wilder has three commercial parks: "A" Street Commerce Park, Olcott Office Park, and Billings Commerce Park. Over the last three decades, there has been a great deal of commercial development in the three commercial parks. Today, these commercial parks are approaching complete build-out.

The Dothan Brook School (elementary) was built in 1993 on the north side of Wilder on Christian Street. Hartford's first and only multi-use path was constructed in the late 1990s and connects Wilder Village to the Dothan Brook School.

In 1997, the Friends of Wilder Village was created as a grass roots neighborhood group. "The Friends" successfully worked on re-use of the Wilder Elementary School and relocation of the Wilder Post Office within the Village. In 2011, the Wilder community also worked with Town



staff on the Town's Village Center planning process. The goal is to revive the planning process and pursue state Village Center designation.

## **Quechee**

Quechee has undergone the most significant change of all the villages over the past half century. In its earlier days, Quechee was a rural farming community. In the nineteenth century, the village developed around manufacturing activities as mills were established on the Ottauquechee River that utilized the available water and associated power. Eventually, the mills declined, and during the 1950s and 1960s and Quechee lost its economic vitality. However, in the late 1960s, a broad master development plan for most of the historic village and areas surrounding the village was created by the Quechee Lakes Corporation. Today, the Quechee Lakes Planned Development is one of the largest planned residential communities in Vermont. It encompasses 5,170 acres, nearly 1/5 of the Town's 29,434 acres. The initial Master Plan for this development was approved by the Town and received an Act 250 permit in 1971, detailed in the Quechee Lakes Master Plan (QLMP). When built out, it will include up to 2,154 residential units at a density of 2.4 acres per unit. In addition, 50% of the total land must be dedicated to common use. Extensive recreational facilities are included, as well as some commercial parcels. The last major update of the QLMP occurred in 1988.

The developer, Quechee Lakes Corporation (QLC), has had several owners over the years. In collaboration with independent developers, QLC is following a traditional process to create this large residential/recreational community. The QLC, which commenced during the 1970s, has had by far the largest impact on revitalizing the village. A community organization, Quechee Lakes Landowner's Association (QLLA) was created to govern the development and own and manage the common land and amenities, including the two golf courses, downhill and cross-country skiing facilities, a beach, tennis and paddle courts, plus a large number of buildings, including a clubhouse. Property owners within the Landowner's Association are responsible for annual base membership dues and are bound by deed and QLLA bylaws. For example, the QLLA Review Board (RB) has authority to approve all building plans, tree removal, exterior painting and landscaping. The obligations of QLLA membership, as well as the benefits, are not in place of, but are in addition to those that apply to a Hartford property owner.

During the 1970s and 1980s, over 1,000 new housing units were built as part of Quechee Lakes, with the objective of having about 40% of the residences owned by full-time residents. However, during most of the 1990s, very little development occurred at Quechee Lakes. That changed in the late 1990s, and between 2000 and 2005, Quechee once again experienced a fairly high rate of residential development. Since 2006, however, residential development in Quechee has slowed down significantly following the national recession. As of April 2013, of the 2,154 residential units conceptually approved in the QLMP, 1,275 units or 59.2% were completed, and 519 vacant single-family residential lots were approved but awaited zoning permits. (These 1,794 properties represent the current maximum number of QLLA memberships, of which about 1,400 are actually in use; membership only begins when the developer sells the property). Of the vacant lots, 304 lots or 58.6% were owned by QLC. The remaining 360 units (a mixture of single family and multi-family units) had conceptual approval, but still required Site Development Plan approval by the Hartford Planning Commission.

With respect to Quechee Lakes commercial parcels, there is little room for further development on Quechee Main Street, although the area is experiencing some redevelopment. Other Quechee



Lakes commercially zoned properties exist along Woodstock Road (Route 4) and West Gilson Street. In 2008, this area was rezoned from Industrial/Commercial (I-C) to Highway Commercial (HC) to eliminate industrial type uses that were considered incompatible with the existing residential and commercial uses already in the area and in the QLMP. The objective of the HC District is “to provide for well-planned and coordinated development of commercial facilities and services that can be effectively integrated with the existing village and/or scenic character along major transportation corridors.”

Common lands governed by the QLMP include greenbelts and recreational lands as well as several large parcels that are restricted to wildlife and conservation areas covered by the District 3 Environmental Commission and by a "Deer Yard Agreement" between QLC and the Vermont Department of Fish and Wildlife.

In addition to the Quechee Lakes Planned Development, Quechee Gorge and Quechee State Park are major factors in determining land use in Quechee. Commercial development near the I-89 interchange and along Route 4 near the Gorge and the Waterman Hill intersection serve the large number of visitors to the area. Several enhancements to the Gorge area were proposed in the 1996 *Quechee Gorge Master Plan*. Through the joint leadership of the Quechee Gorge Management Committee, strong public process and cooperative intergovernmental effort, several grants were obtained to successfully implement the Plan’s recommendations, culminating in the construction of the Quechee Gorge Visitors Center, sidewalk, streetscape, and river access improvements in the summer of 2005.

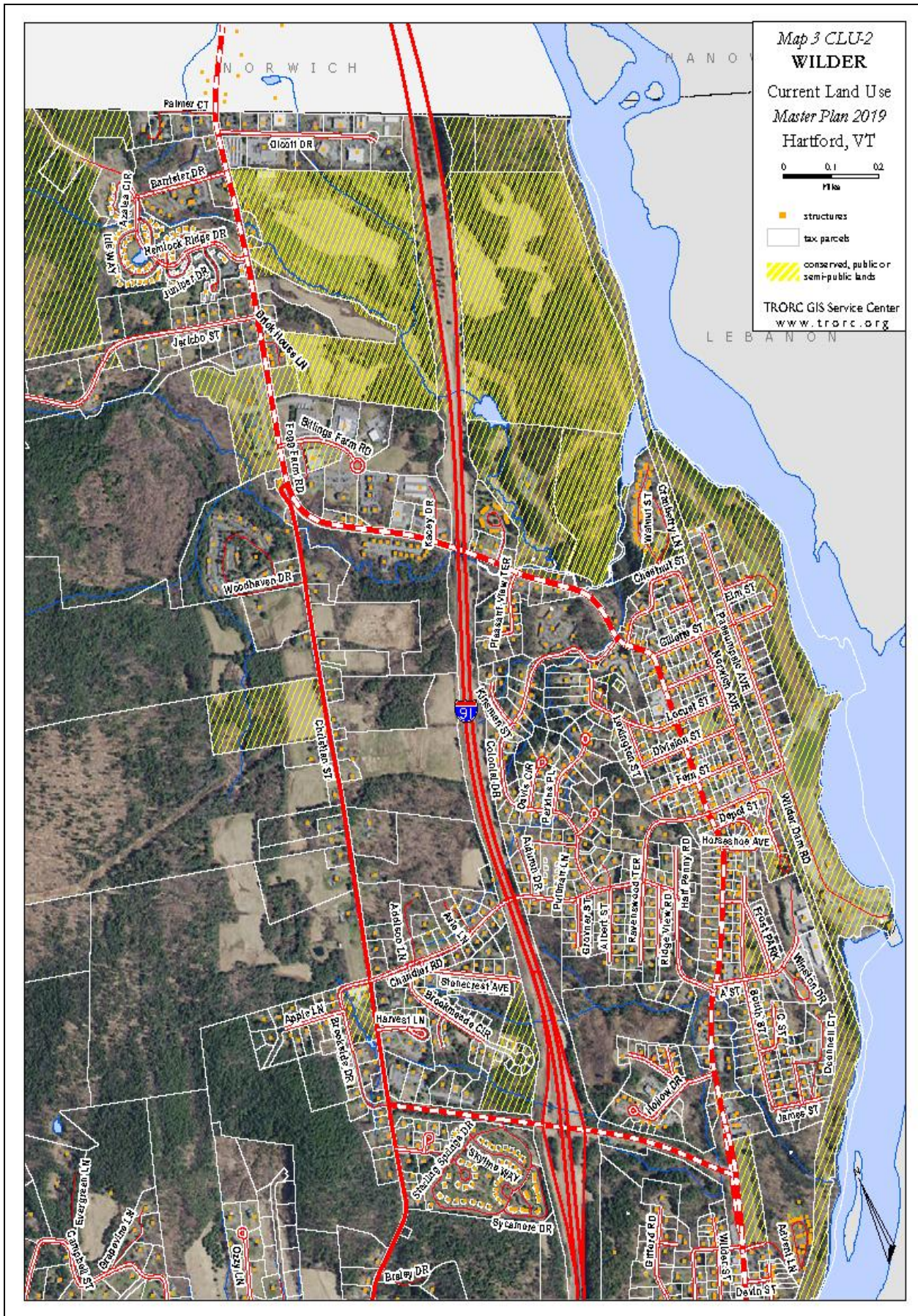
Exit 1 on Interstate 89, located as it is on the Route 4 Scenic Byway is a major gateway to Quechee and Central Vermont. In 2005, part of the area was rezoned from Residential/Commercial 2 (RC-2) to the Quechee Interstate Interchange (QII) Zoning District to promote land uses that were more compatible with the surrounding area and encourage more compact development rather than the strip commercial development pattern that was emerging. Hence, the objective of the QII District is “to provide for well-planned and coordinated development (commercial facilities/ services and residential) that can be effectively integrated with the scenic character of the I-89/Route 4 gateway while maintaining safe and efficient traffic flow. This district will balance the needs of the community and those of the traveling public.” In 2008, the remaining RC-2 zoning was changed to QII.

Quechee Village received Village Center designation in 2012. The designation was renewed in 2017.











## **West Hartford**

West Hartford is the most remote and rural village in Town, characterized by rolling hills and a low population density. It is the only village that is not served by Town water and wastewater. Located along Central Vermont Railway, Route 14, and the White River, West Hartford was primarily a stage stop connecting the Central Vermont Railway and other rural townships. Interstate 89 was built in the late 1960s and contains the core of the village between the railroad and the White River. Today, West Hartford Village is primarily residential with some commercial and civic uses. Of the four public libraries in Hartford, the West Hartford Library is the only one actually owned by the Town. Clifford Park lies on the south side of the White River. Although some residential development has occurred on land previously used for farming, much of the surrounding area remains in forest and open lands. Natural constraints to development, such as steep slopes, soil suitability and lack of Town water and wastewater service, have prevented significant growth in West Hartford.

The Appalachian Trail passes through West Hartford, and a total of 251 acres of land has been acquired by the National Park Service to protect the trail corridor. In 2011, West Hartford received extensive damage from flooding by Tropical Storm Irene. Several buildings were destroyed and many others were badly damaged. In 2011, the West Hartford community also worked with Town staff on the Town's Village Center planning process. The goal is to revive the planning process and pursue state Village Center designation.

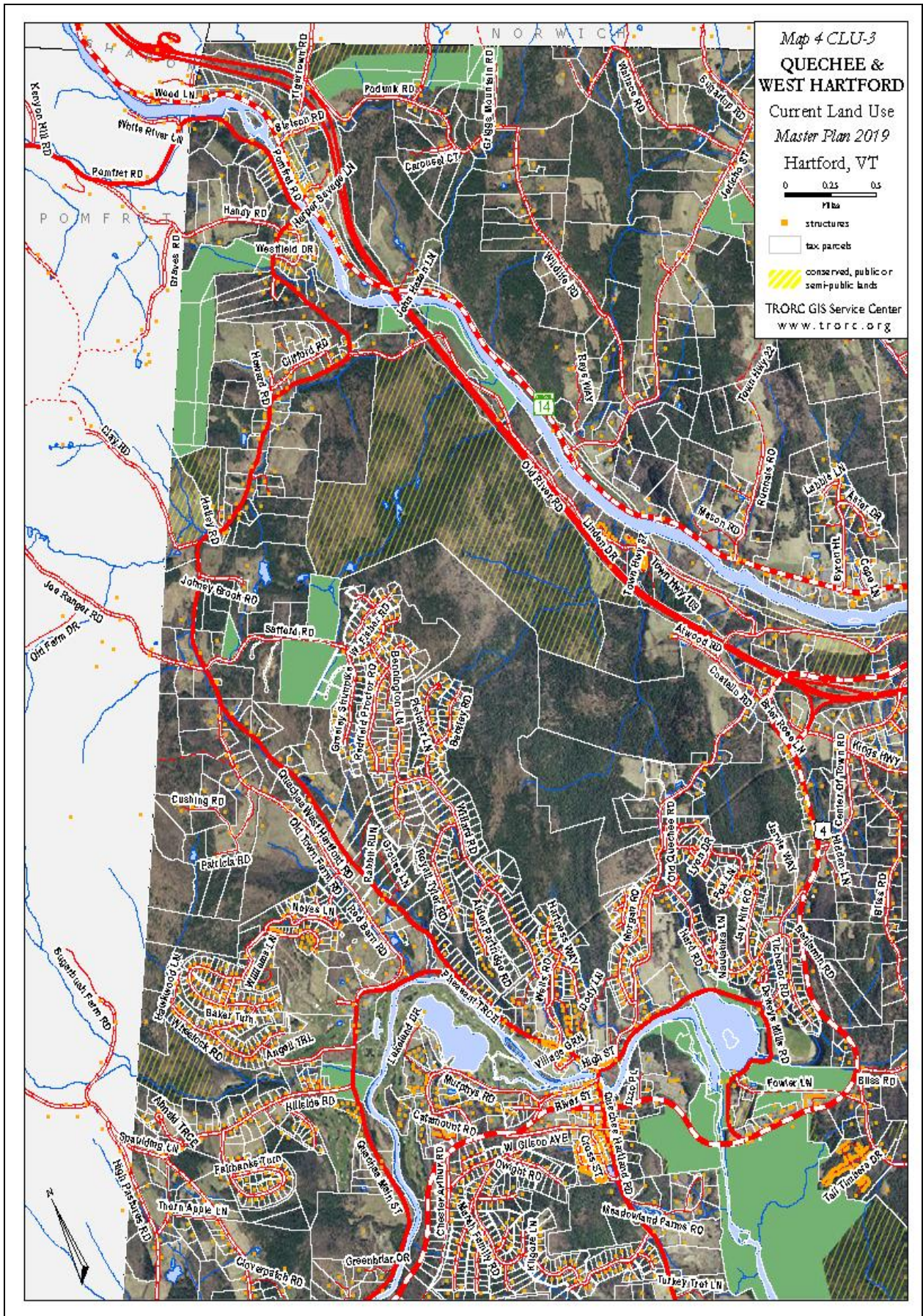
## **Rural North**

The Rural North section of Hartford is comprised of the rural hillside hamlets of Jericho, Dothan and the former Centerville. Historically, much of the area was farmed. Although there still are large amounts of open meadows, there are only a few remaining full-time farming operations. In 2001, the Jericho Rural Historic District was established, documenting two centuries of hillside farming. In recent decades, there has been a trend of increasing land subdivision and housing development in these areas. A sizeable Industrial/Commercial zoning district exists along Route 14 between Hartford Village and West Hartford that was once farmland. This district has experienced a great deal of development over the last thirty years. The district lacks town water and sewer, and development has been in the form of contractor shops and yards, auto-related businesses, trucking and warehousing. In 2008, several zoning changes were made in the Rural North area; much of the land was rezoned from Rural Lands 5 (RL-5) to Rural Lands 10 (RL-10), an Agriculture Overlay District was established around the Jericho Rural Historic District and a Wildlife Connector Overlay District was established between Jericho and West Hartford.

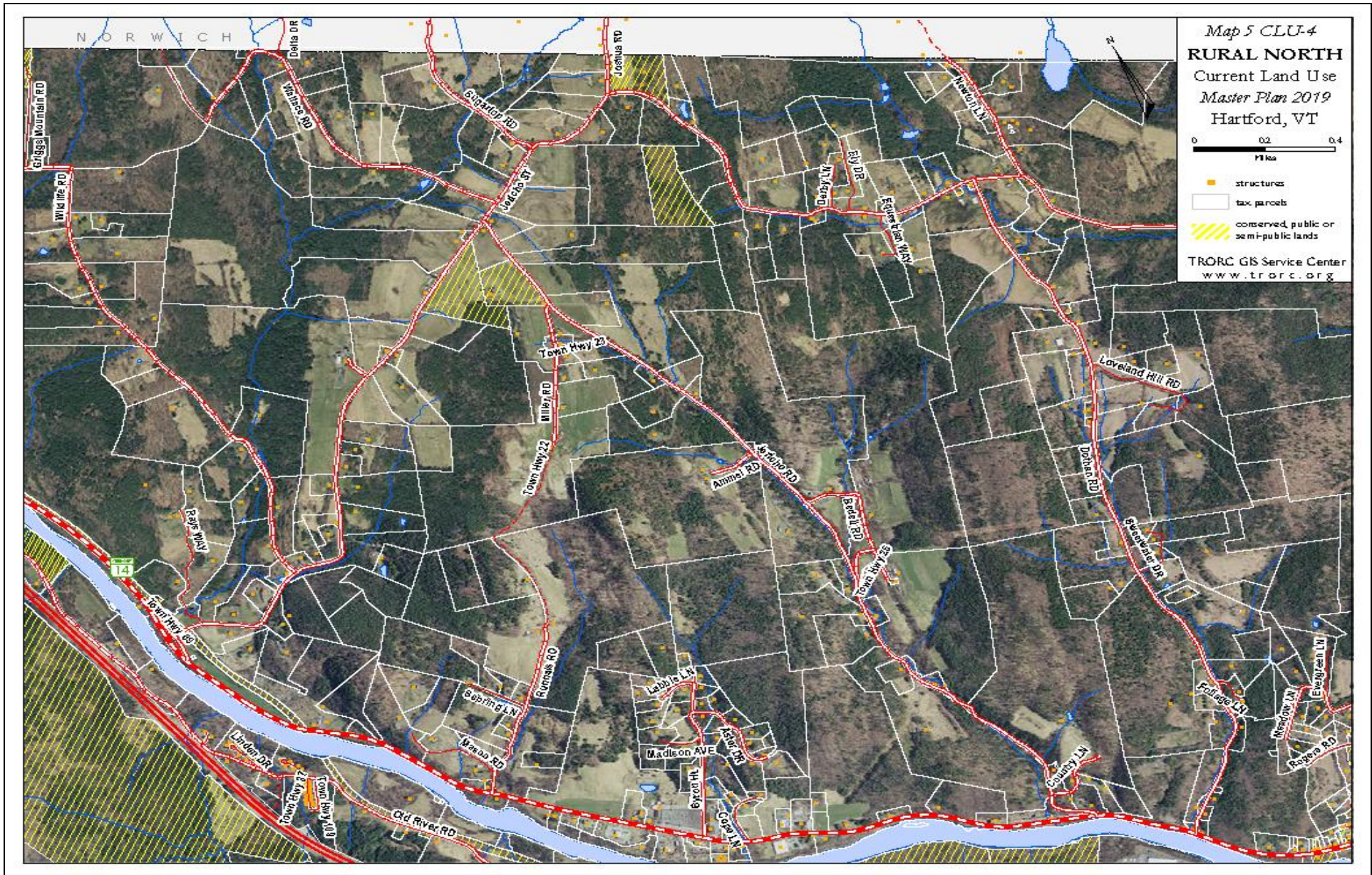
## **Rural South**

The Rural South section of Hartford encompasses the rural hillside hamlets of Center of Town and the Neal Road areas. It also includes the Connecticut River Road and Route 5 South areas, and the Woodside Manor Mobile Home Park. Other large tracts of land in this section of town include the 423-acre Hartford Town Forest, 142-acre Hurricane Forest Wildlife Refuge, Hartford Transfer/Recycling Center, Army National Guard Facility and the Maxfield sports complex. Like the Rural North, the area has historically been farmed, and very few full-time farming operations remain today. The area also has experienced a trend of increasing land subdivision and housing development similar to other rural areas of the Town. In 2001, the Route 5 South











Study was completed, which recommended limiting intensive commercial development to the north end of the study area as a means of protecting the rural character of this section of the Route 5 Scenic Byway, and to reduce public infrastructure costs. In 2008, zoning changes were made to implement the recommendations of the Route 5 South Study and reduce impacts on this corridor. These involved reducing the size of the Industrial/Commercial (I-C) Zoning District and changing the zoning to Highway Commercial (HC) to eliminate certain industrial uses. Other zoning changes made in 2008 included establishing a Forest/Conservation zoning district, an Agriculture Overlay District and a Wildlife Connector Overlay District.

## **RECENT LAND USE TRENDS**

### **Residential Development**

During the 1970s and 1980s, Hartford experienced its largest net increase in population than at any other time in the Town's long history. With the new interstate highway system completed, an expanded water system, and a new municipal wastewater system, Hartford had the infrastructure in place to accommodate a large amount of new development. As a result, the Town grew by nearly 3,000 people in twenty years (from a population of 6,477 in 1970 to 9,404 in 1990). During this period, residential development in Hartford averaged nearly 150 new housing units per year. The 1970s and 1980s also resulted in a mix of single-family and multi-family housing.

The rapid growth of the 1970s and 1980s was followed by the recession of the early 1990s, which resulted in a sharp decrease in new housing for the decade (47 units per year), the vast majority of which were single-family housing. The 2000s started with a modest rate of housing growth. However, between 2002 and 2005, housing growth increased to more than 100 units per year, with nearly an even split between single family and multi-family housing. Following the rapid rise in new housing 2002-2005, housing starts decreased to levels of the 1990s in 2006 and 2007. From 2008-2012, there was a rapid drop in housing starts as the national recession took hold. This resulted in the lowest rate of new housing in the last fifty years (12 new units per year). In 2013, new housing starts rebounded and since then housing has increased considerably to an average of 50 units per year from 2013-2018. Also, since 2013, the percentage of multi-family housing has increased to 81%.



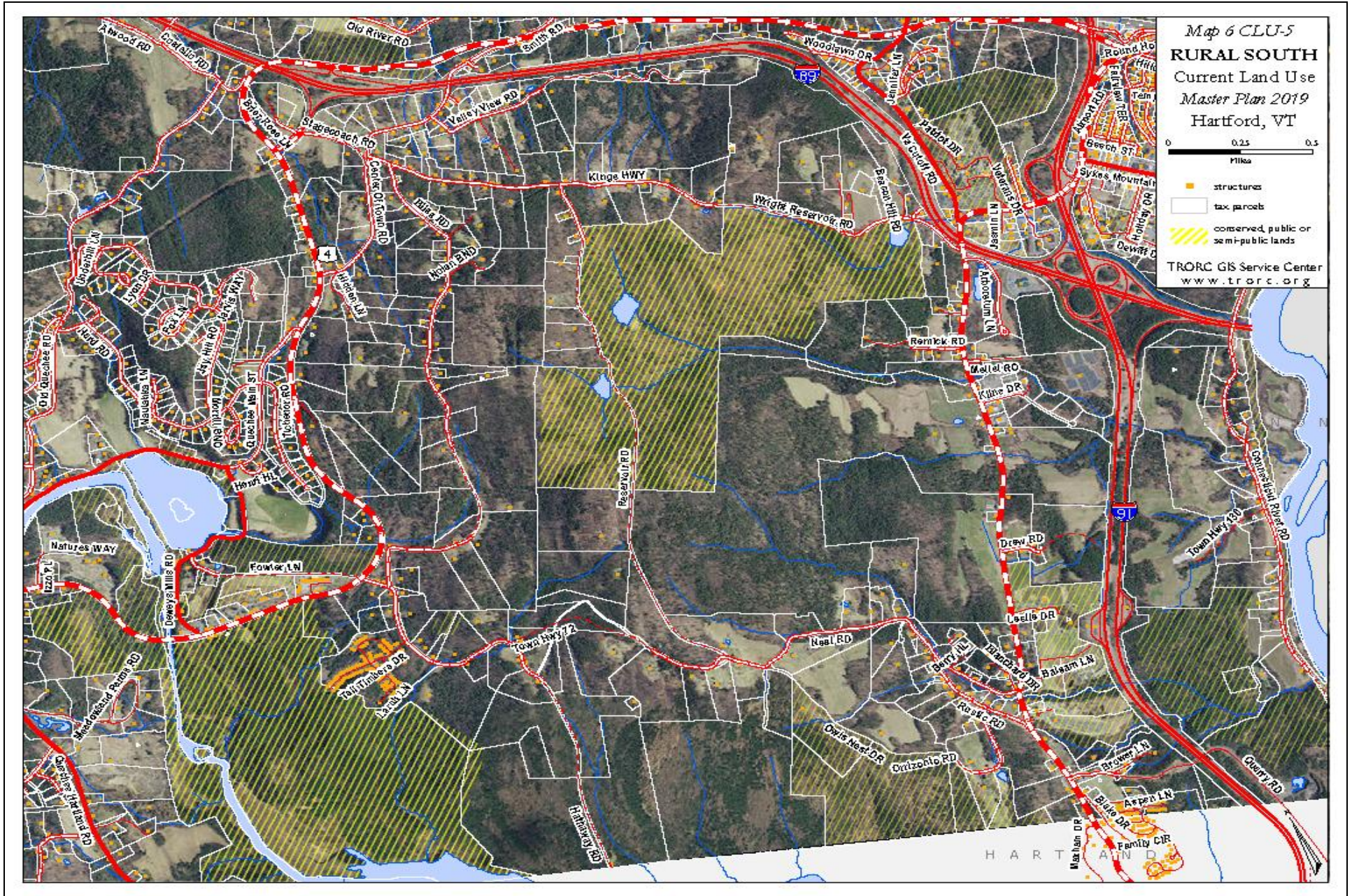




Table II-2 and Chart II-2 summarize the number and type of new housing by year from 2000-2018.

**Table II-2 New Residential Development by Year, 2000–2018**

<b>Year</b>	<b>Single Units</b>	<b>Family</b>	<b>Multi-Family Units</b>	<b>Total Units</b>	<b>Housing</b>
2000	22		2	24	
2001	39		4	43	
2002	63		75	138	
2003	50		28	78	
2004	49		71	120	
2005	50		44	94	
2006	31		10	41	
2007	25		16	41	
2008	11		7	18	
2009	9		4	13	
2010	4		7	11	
2011	6		6	12	
2012	3		2	5	
2013	11		13	24	
2014	6		37	43	
2015	7		2	9	
2016	13		136	149	
2017	12		41	53	
2018	9		12	21	
<b>Total</b>	<b>420</b>		<b>517</b>	<b>937</b>	
<b>Average</b>	<b>22.1</b>		<b>27.2</b>	<b>49.3</b>	
<b>Percentage</b>	<b>44.8%</b>		<b>55.2%</b>	<b>100.0%</b>	

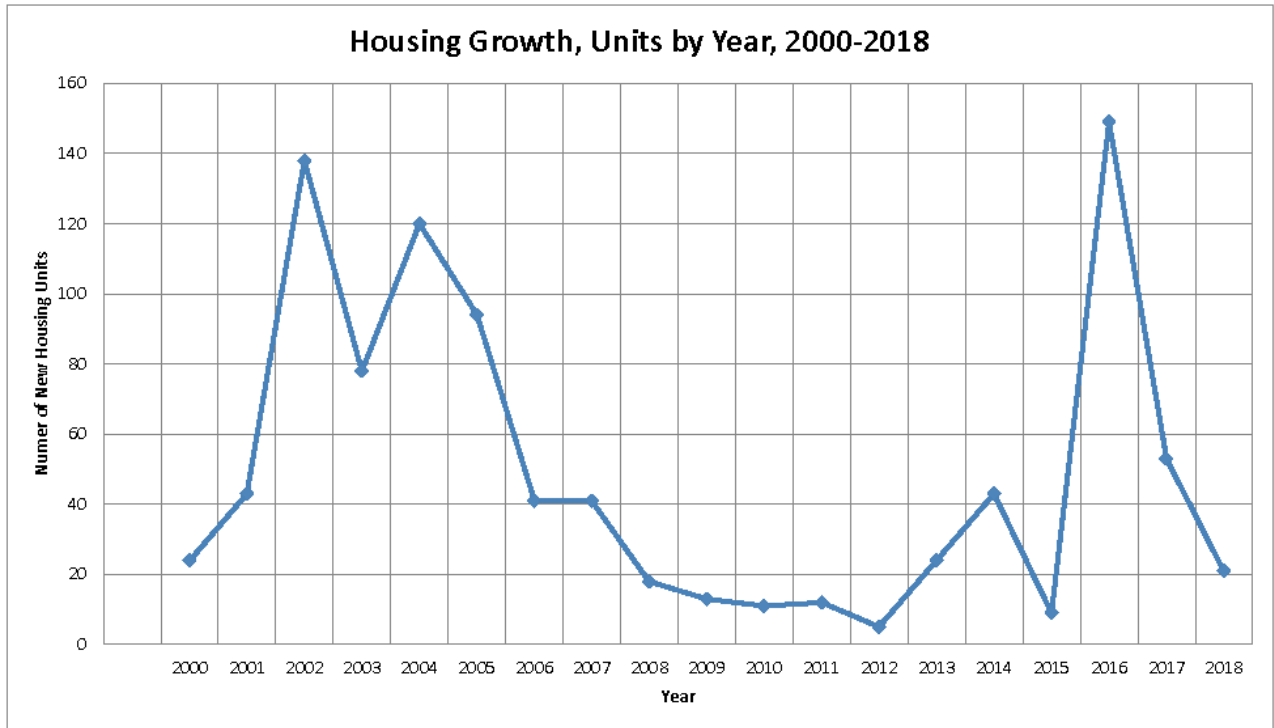
Source: Town of Hartford Zoning Permits, 2000-2018

From 1998-2012, 71% of housing was built in Quechee and Wilder. An additional 11% of housing was built in White River Junction, which also is served by town water and sewer.

From 2013-2018, 72% of housing was built in White River Junction with most of it occurring in Downtown with three large residential projects. Of the remaining areas of Town, 10% of new housing was built in Quechee, 4% in Wilder, 2% in the Rural South and 1% each in Hartford Village, West Hartford and Rural South.

In recent decades, there has been residential growth in the rural outlying areas of Town although the rate has been much lower than the village/in-town areas served by town water and sewer. Many farms have been subdivided and the agricultural land has been converted to rural residential use served by on-site wells and septic systems. This can be seen by the spread of population moving into areas such as Jericho, Dothan, Center of Town, Christian Street, Route 5 South, and West Hartford. From 1998-2005, 80% of new housing occurred in areas served by town water and/or wastewater. From 2006-2012, that figure dropped to 71% indicating that there was a slight increase in development in the rural areas of Hartford. From 2013 to 2018, 87% of new residential development occurred in areas served by town water and/or sewer.

**Chart II-2 Total Housing Growth, 2000-2018**



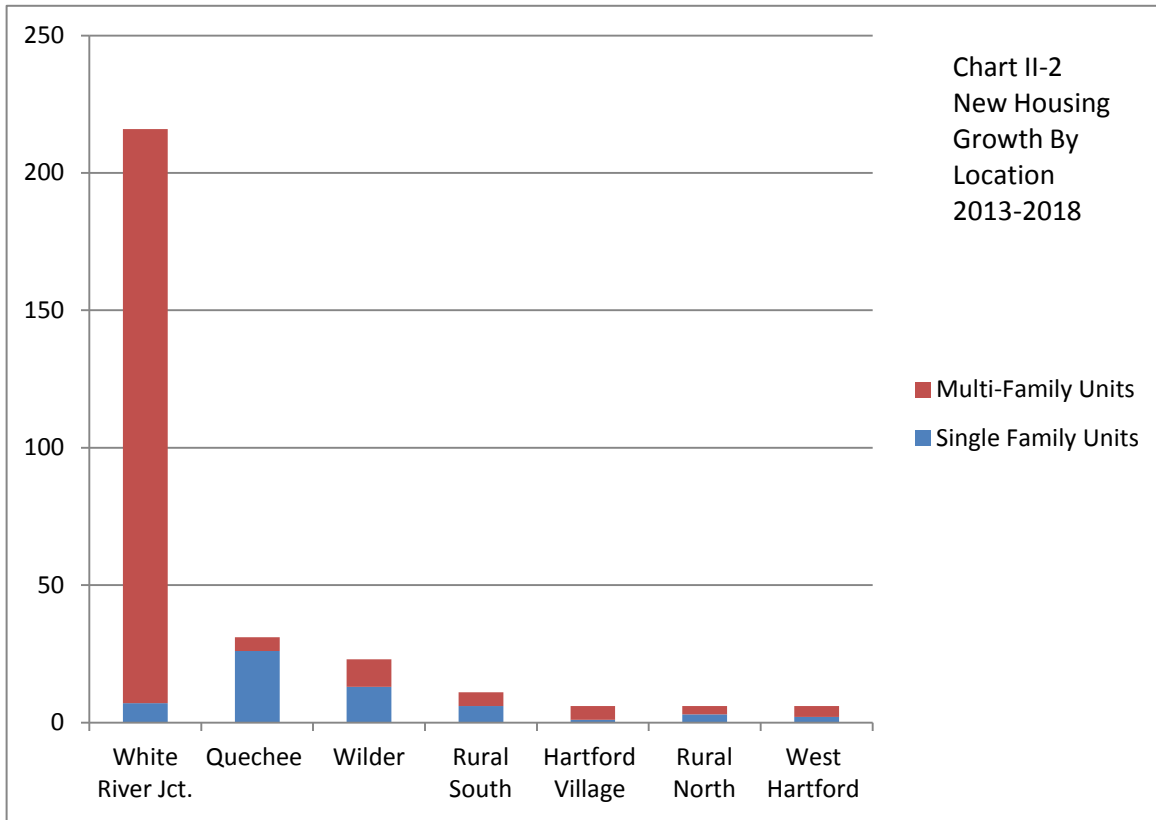
Source, Town of Hartford Zoning Permits, 2002-2018

**Table II-3 Total Housing Growth, 2013-2018**

	Single Units	Family	Multi-Family Units	Total Units	Housing
White River Jct.	7		209	216	
Quechee	26		5	31	
Wilder	13		10	23	
Rural South	6		5	11	
Hartford Village	1		5	6	
Rural North	3		3	6	
West Hartford	2		4	6	
<b>Total</b>	<b>58</b>		<b>241</b>	<b>299</b>	
<b>Percentage</b>	<b>19.4%</b>		<b>80.6%</b>	<b>100.0%</b>	

Source: Town of Hartford Zoning Permits, 2013-2018

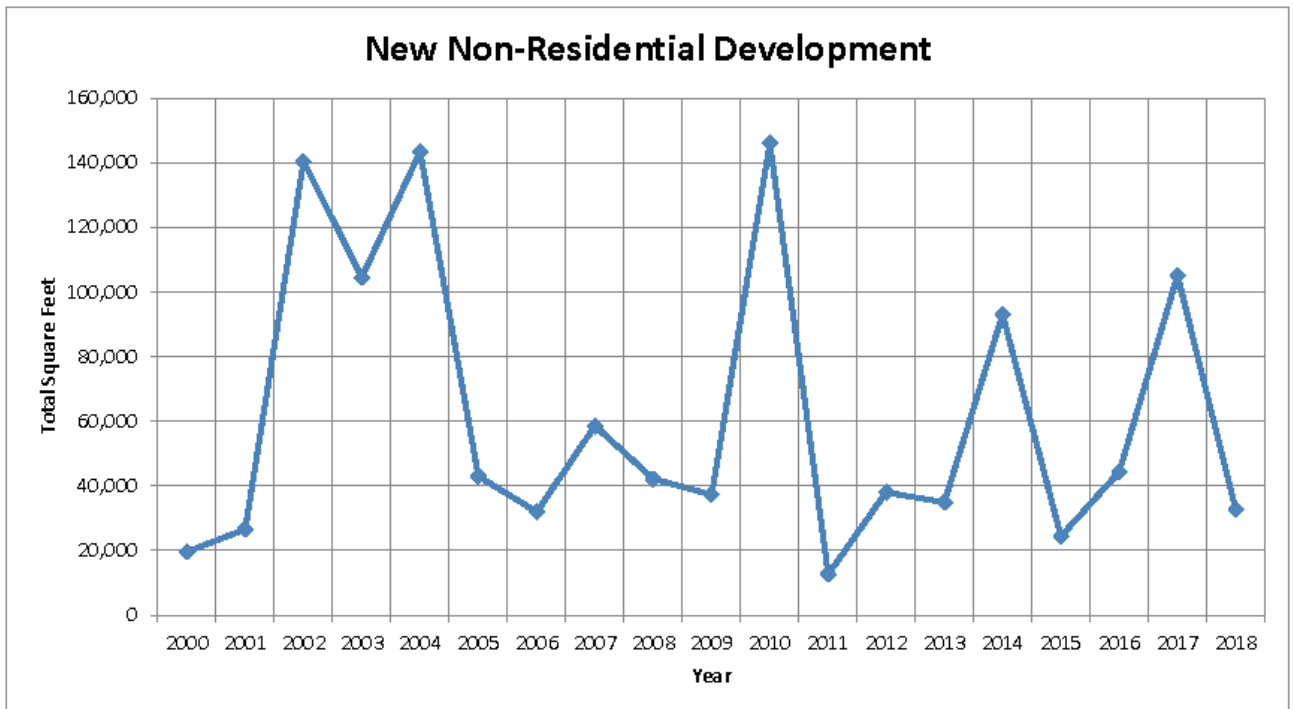
**Chart II-3 New Housing Growth by Location, 2013-2018**



## Non-Residential Development

The trend for non-residential development in Hartford differs from residential development over the past three decades. In the 1990s, while there was a significant decrease in the rate of residential development in town, new non-residential growth continued at a steady rate. Non-residential development includes commercial, industrial, and public/quasi-public development. Further, the 2008 recession resulted in a dramatic decrease in residential development. However, the rate of non-residential development decreased at a much lower rate. There was a 30% drop in non-residential development between 2006 and 2012 as compared to the 1998 to 2005 period. The average square footage of new development decreased from nearly 75,000 to 52,392 square feet per year. For the decade of the 2000s, new non-residential development averaged 64,736 square feet per year, while for the 2010s through 2018, the average was 59,058 square feet per year.

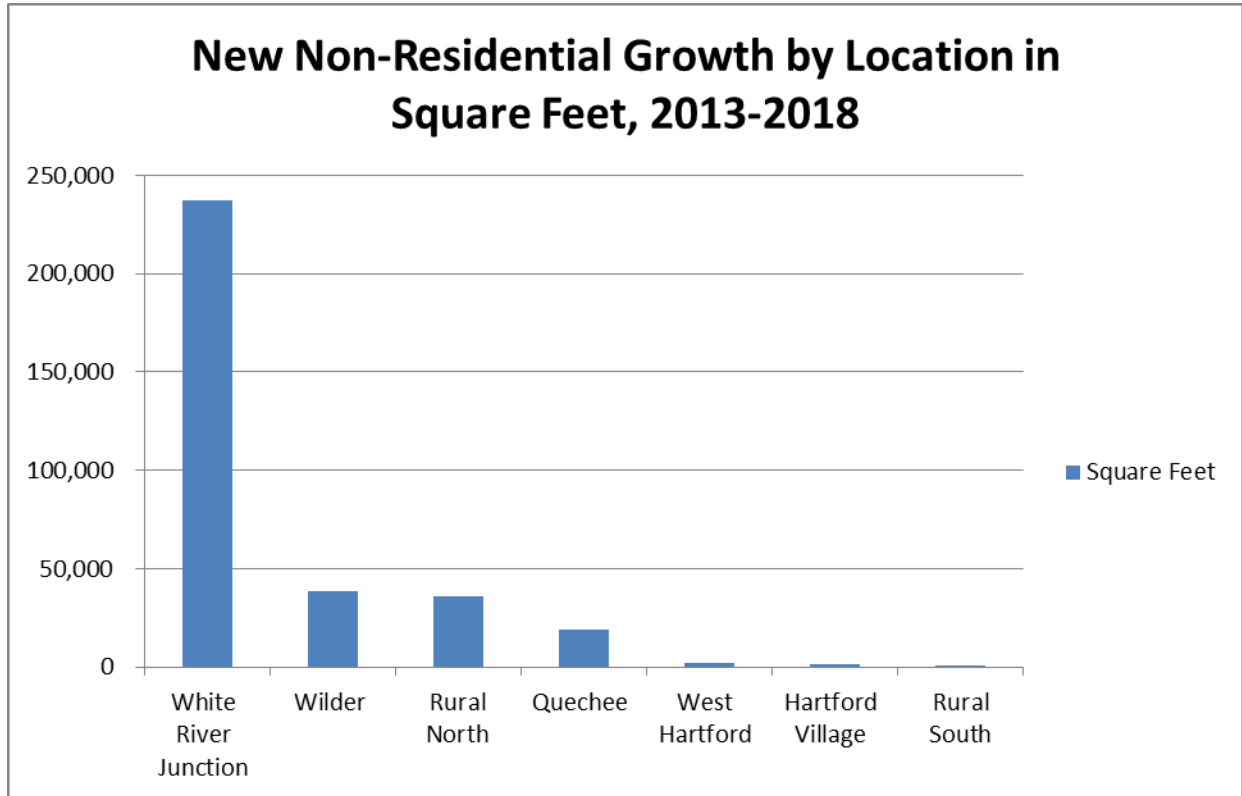
**Table II-4 New Non-Residential Development by Year, 2000-2018**



Source: Town of Hartford Zoning Permits, 2000-2018

As for location, between 1998 and 2005, the majority of new non-residential development occurred in White River Junction (55%) followed by Wilder (29%) and Quechee (12%). The remaining 3.7% occurred throughout the rest of Hartford. Table II-4 and Chart II-3 summarize the location and growth of non-residential development from 1998-2005. From 2013-2018, 71% of new non-residential development occurred in White River Junction, 11% in Wilder, 11% in the Rural North (Route 14 commercial district) and 6% in Quechee.

Chart II-4 New Non-Residential Growth by Location, 2013-2018



## VISION FOR THE FUTURE OF HARTFORD

Through various public participation processes over the past twenty years, the following have repeatedly risen to the top as major themes:

1. Increase density in already developed areas with infrastructure (water & wastewater, close to community facilities & services and served by public transit).
2. Manage density of future development.
3. Protect scenic areas, open space, and wildlife corridors.
4. Preserve Hartford's historic settlement pattern, defined by compact villages surrounded by rural countryside.
5. Maintain the character of Hartford's rural countryside and support agriculture, forestry, and recreational uses in these areas, as well as carefully planned low-density residential uses.
6. Maintain and enhance Hartford's heritage of working farm and forest lands as part of a sustainable, environmentally sound, local resource-based economy.
7. Maintain and enhance the open space and recreational "infrastructure" important for long-term health and quality of life of Hartford residents.

In putting together the land use recommendations, the Town Plan Steering Committee reviewed the following:

- Existing zoning regulations
- Current development patterns and neighborhoods

- Traditional size of lots
- Natural resource maps
- Large areas of forest and agricultural land
- Infrastructure (roads, wastewater/water systems)
- Balance development needs with rural character, wildlife habitat, views, farm & forest land

## **LAND USE PLAN**

### **Village Areas and Growth Centers**

Hartford's traditional settlement pattern has consistently concentrated development in five unique and historic compact villages surrounded by rural countryside. To serve this growth pattern, Hartford has directed investment in Town water, wastewater, roads, public transit, etc., to the four larger villages of White River Junction, Wilder, Hartford and Quechee. Town wide, this amounts to 2,659 acres or 9% of the land area of Hartford being served by Town water, 4,013 acres or 13.6% of the land area being served by Town wastewater and 2,357 acres, or 8.0% of the land area being served by Town water and wastewater.

The Town encourages this pattern of development to continue and to put in place mechanisms to direct growth to these areas. By doing this, the Town will ensure fulfillment of the community vision and promote more efficient use of the Town's existing infrastructure, public facilities and services, resulting in a beneficial effect on the municipal tax base.

The primary purpose of the Land Use Plan is to ensure that future growth and development matches the vision of the community. This vision as described throughout this chapter, is to reinforce Hartford's traditional settlement pattern of concentrated development surrounded by rural countryside, while recognizing opportunities for growth that serve local and regional needs which are sustainable over time. The Town has identified the following eight Land Use Categories. Each category provides a historic context as well as the recommended amount, intensity and character of future development for that area.

1. Downtown
2. General Industrial and Commercial
3. Gateway Commercial
4. Mixed-Use Lands
5. Residential Lands
6. Rural Residential Lands
7. Rural Lands
8. Forest/Conservation Lands

The eight categories are identified on the Future Land Use Map (Map #16).

### **Downtown Lands**

From the second half of the 19<sup>th</sup> century, Downtown White River Junction has served as the town center of Hartford and the retail and service center of the Upper Valley. With the construction of the interstate in the 1960's, a period of decline began that continued for the next three decades. In the late 1980s, early 1990's, a renewal effort began with the relocation of a state courthouse on Railroad Row, and parking, sidewalk and streetscape improvements. Private

reinvestment continued to be limited until the early 2000s when White River Junction emerged as the home of the “creative economy” leading to a period of revitalization that continues today.

Downtown Lands are characterized as historic, compact development that is well integrated with the streetscape at a pedestrian scale. It functions as the town’s urban center, served by public parking, town water and sewer service, pedestrian accessibility and public transportation. The Downtown occupies a fairly small geographic area, approximately 141 acres. Since land in this area is limited, development should make use of high lot coverage ratios (up to 90%) and maximize building heights (between 40 and 60 feet) provided it is compatible with the scale and design of existing structures. (Lot coverage refers to the portion of the lot that is covered by buildings or other impervious surfaces.) To fit in with the historic character of the downtown, development in the Design Review District section of the Downtown must comply with the *White River Junction Design Plan* and the *White River Junction Design Guidelines*. Development should emphasize mixed-uses and be consistent with a center for retail, services, civic, cultural arts, tourism and high-density housing. There is a focus on facilities for pedestrians, bicyclists, and bus and rail patrons. Residential density in the Downtown will be the highest in Hartford and is intended to be flexible. It will be calculated by square feet per lot (“Floor Area Ratio”) as opposed to the number of units per acre. Allowable density should be two and a half times the size of the lot. (Relevant zoning districts: CB, CB2)

### **General Commercial and Industrial Lands**

General Commercial and Industrial Lands historically were developed during the industrial revolution as heavy industry related to mills along the Town’s three rivers and the railroad. Over time, these commercial and industrial areas expanded along town, state and interstate highways and the railroad lines. These areas have evolved into strong commercial and industrial centers. Today, Hartford does not have an exclusive industrial zoning district; rather, it is coupled with commercial as the IC (Industrial-Commercial zoning district). Several general commercial and industrial areas exist throughout Hartford. Each area has developed a different mix of uses and its own unique character. Some areas, such as Kline Drive, A Street, Harrison Avenue, Route 14 and Old River Road are more industrial in nature, while Billings Farm and Olcott Drive have evolved into office/business parks. Sykes Mountain Avenue and Route 5 have developed a mix of general commercial uses, VA Hospital, US Postal Service Processing Facility, lodging, visitor services and automobile dealerships. Together, Hartford’s general commercial and industrial areas have developed a broad range of uses that have contributed to the creation of a strong economic base in Hartford and the region. Some of the commercial and industrial parks in Hartford have or are approaching build-out.

New development should continue to include a broad range of uses such as general manufacturing, light manufacturing, large offices, business parks, hotels, transportation-related businesses, hospitals and institution, and take advantage of the public transit and town water and sewer that services the majority of the lands. Since there is a limited supply of commercial and industrial land in Hartford, development should make use of high lot coverage ratios (up to 90%) and maximize the multi-story building heights (between 40 and to 60 feet). For commercial and industrial projects served by town water and sewer, development should incorporate a design which directs development toward the streetscape, with parking and related infrastructure located in rear and/or side yards. Facilities for pedestrians, bicyclists and bus patrons are important transportation features. For commercial and industrial projects not served by town water and sewer which are more rural in nature, development should be of a lower

intensity with lower lot coverage, building heights, mass and scale. On-site open space should connect to the surrounding rural landscape. Driveway and road access to state and town highways should be minimized. (Relevant zoning districts: I-C, I-C2)

### **Gateway Commercial Lands**

Gateway Commercial Lands are high profile transition areas along state highways from more rural areas to more developed areas. Three state highways (Route 4, 5 and 14) pass through Hartford, of which two are located on scenic byways: the Connecticut River Scenic Byway through White River Junction and Wilder on Route 5, and the Crossroad of Vermont Scenic Byway passes through White River Junction and Quechee on Route 4. Several commercial areas are located along the two scenic byways and represent gateways to Hartford: three commercial areas along Route 4 in Quechee (Waterman Hill, Quechee Gorge and the Quechee Interchange Area) and one commercial area along Route 5 in White River Junction (Route 5 south of the I-89 overpass). In general, these corridors are characterized by a rural scenic area, and a mixture of residential and nonresidential uses serving the traveling public, immediate neighborhoods and surroundings areas, with pockets of commercial development which have developed over time. Given the unique nature of each Gateway Commercial Area, not all types, scale or intensities of development may be appropriate in all locations. Therefore, in order to keep the character of these areas distinct, it may be necessary to vary the regulatory controls of each area.

The Gateway Commercial Lands should encourage a diverse mix of uses made up of (but not limited to) commercial (including retail), professional offices, light manufacturing and residential (including multi-family). In some instances, the scale of development is capped, and when possible development should reflect the scale of existing development, and be designed and configured to protect the rural character of these areas. Clustering is encouraged to preserve adjacent open space and rural character. New development also should incorporate a design which minimizes visual impact and is oriented towards the streetscape, with parking and related infrastructure located in rear and/or side yards. Driveway and road access to state and town highways should be minimized. Facilities for pedestrians, bicyclists and bus patrons should be considered. Moderate to high lot coverage (up to 75%) is encouraged as well as building heights up to 40'. Density of residential development, where allowed, is dependent upon municipal infrastructure, ranging from 1 dwelling unit per acre without town water and sewer service to 5.4 dwelling units per acre with town water and sewer service. (Relevant zoning districts QG, QII, and HC)

Regarding the Quechee Interstate Area, the Town desires well-planned and coordinated development that is effectively integrated into the scenic character of this transition area around the Route 4 and I-89 interchange, referred to as the Quechee Interstate Interchange. As an important gateway to the Town and Vermont, it warrants a balance between the needs of the traveling public and the community. In consideration of regional goals surrounding interstate interchanges and specifically the area around Exit 1 of I-89, development in this area should focus on general commercial and residential uses with retail as an accessory use only. Accessory use is defined as a use that is of a nature customarily incidental and subordinate to, the principal uses allowed within the area. The Town also is sensitive to development fitting in with the character of the surrounding area as well as the impact that some travel-oriented businesses may have. Therefore, development should be done in a manner that protects natural resources, including scenic views and the Quechee to Hartford Town Forest Wildlife Corridor (designated by the Vermont Fish and Wildlife Department as an “ecologically important crossing area”);



preserves existing vegetation whenever possible; applies access management principles; addresses traffic safety; and includes building design that integrates with the character of the site with attention to mass and scale. Also, discussions over the past few years have brought to light that some of the Town's, Two Rivers-Ottawaquechee Regional Commission's and State's long term visions for this interchange area are divergent and warrant further discussion. To ensure consideration of these different views, the Town advocates the creation of a joint study group to focus on creating a clear vision for this area balancing the needs of the varying constituencies.

### **Mixed-Use Lands**

With five historic villages, Hartford has a rich history of mixed-use areas (a combination of residential and commercial uses). Mixed-Use Lands in Hartford include four compact village centers (Quechee, Wilder West Hartford and Hartford Village) and other Mixed-Use Lands, most of which are located in close proximity to village centers. These lands are characterized by a mixture of residential and nonresidential uses with varying levels of densities and intensity of uses. These areas include a mix of housing types and a variety of commercial uses which typically serve the immediate neighborhood and surrounding area.

Most of these areas are served by town water and sewer which provide opportunities for medium to high density residential development. Many of these areas are also served by transit and have sidewalks. With town water and sewer service, residential densities will be 12.5 to 21.5 dwelling units per acres. Without town water and sewer service, residential densities will be a maximum of 1.5 dwelling units per acre. Compact development including infill development is encouraged. Maximum lot coverage for the Mixed-Use Lands should vary from 65% to 90%, and maximum building height should be 40 feet.

For mixed-use areas served by town water and sewer, development should incorporate a design which directs development toward the streetscape, with parking and related infrastructure located in rear and/or side yards. Facilities for pedestrians, bicyclists and bus patrons should be considered. For mixed-use areas that are not served by town water and sewer, development should be designed and configured with appropriate transitions to the surrounding rural landscape and minimize driveway and road access to state and town highways. (Relevant zoning districts: VB, VR-C, RC-2)

### **Residential Lands**

In Hartford, four of the five villages (excluding West Hartford) have town water and town sewer. This allows higher density development and has resulted in compact village centers surrounded by rural countryside. Residential Lands in Hartford are characterized by a mixture of single family and multi-family housing with varying densities. Historically, residential development occurred in the heart of the villages with a mixture of single family and multi-family housing (on small lots) and during the last several decades, newer housing (primarily single family housing on larger lots) expanded out from village centers. The town water and sewer service area expanded to accommodate this growth. In turn, expanded water and sewer service has allowed higher density multi-family housing outside of village centers, particularly in Quechee and Wilder. Today, most of these residential areas remain fairly close to Hartford's village centers. Several residential areas are served by public transit.

Residential Lands provide opportunities for newer housing and limited non-residential uses that primarily serve the local neighborhood. Development should be compact with a well-defined streetscape and interconnected network of streets with access to public transit, adequate sidewalks and facilities for bicyclists and transit. Infill development is encouraged. Residential development should have moderate to high densities which allow for some neighborhoods as primarily single-family housing, while others are a mixture of single-family and multi-family housing. Residential densities should range from 3.5 to 11 units per acre. Maximum lot coverage should be 65%, and maximum building height should be 40 feet. Non-residential development should take into consideration compatibility with the existing neighborhood, the residential character and existing development patterns including mass and scale. (Relevant zoning districts: R-1, R-1M, R-2, R-3, VR-1)

### **Rural Residential Lands**

Rural Residential Lands are characterized by low density residential development in rural areas located on open and forested land along the valley floor and along forested hillsides and typically without town water and sewer, with a few areas in Quechee that are served by town water and/or town sewer. In recent decades, these areas have experienced a higher concentration of residential development than other rural areas of Hartford. Residential density ranges from 1-2 dwelling units per acre. Lands in this designation tend to be located in close proximity to traditional village centers such as Quechee and West Hartford. Other Rural Residential Lands are located along Route 14 in the Rural North area and a section along Route 5 in the Rural South area.

Development in Rural Residential Lands should protect sensitive lands, be designed and configured to reinforce the rural character and historic working landscape of these districts, characterized by forested hillsides and hilltops, open fields/agricultural lands, and low-density residential development taking into consideration opportunities for agricultural use and forestry, and connectivity of undeveloped land. Non-residential uses are limited to those that complement the rural nature of the area, such as small scale farms, recreational agriculture, agri-tourism, farm stands, home businesses, and recreational and public facilities. (Relevant zoning districts: VR-2, RL-1)

### **Rural Lands**

During the last century, hillside farming in Hartford and throughout Vermont declined and much of farmland transitioned to forest land. Rural Lands represent the traditional working landscape that makes up much of rural Hartford, characterized by open, agricultural and forested land along the valley floor, forested hillsides and hilltops, hillside farming, and low-density residential development. Some areas are more isolated with further distances from traditional village centers, while other areas border Rural Residential Lands.

Development may be difficult and/or limited due to natural resource constraints, and lack of public water and sewer services. Residential densities range from one lot per three acres to one lot per ten acres and nonresidential uses are very limited. Development should be designed and configured to protect sensitive lands, reinforce the rural character and historic working landscape of these lands, with residential and nonresidential development taking into consideration opportunities for agricultural use, including farms, recreational agriculture, agri-tourism, and farm stands, and forestry. Development should be clustered and designed to minimize

encroachment into unfragmented areas and maintain the connectivity of undeveloped land to continue to support wildlife habitat and the working landscape. (Relevant zoning districts: RL-3, RL-5 and RL-10.)

### **Forest Conservation Lands**

During the last century, hillside farming in Hartford and throughout Vermont declined and much of farmland transitioned to forest land. Forest Conservation Lands represent the traditional working landscape of the southeastern part of Hartford. These are the Town's most rural areas, historically characterized by many large minimally developed parcels on upland forests and ridges, with wildlife habitat, agriculture, steep slopes, limited residential development and several unimproved roads.

Development may be difficult and/or limited due to natural resource constraints. It should be designed and configured to reinforce the rural character and historic working landscape, protect sensitive lands, and minimize encroachment into unfragmented areas so connectivity of undeveloped land is maintained. Residential development density is very low with a maximum of 1 dwelling unit per 28 acres. Nonresidential uses are predominantly agriculture, forestry, conservation and recreation. (Relevant zoning districts: FC)

## **GOALS, STRATEGIES AND ACTIONS**

### **Goals, Strategies and Actions for Village Areas and Growth Center**

**Goal 1:** Increase density in already developed areas with infrastructure (water & wastewater, close to community facilities & services and served by public transit).

**Strategy 1: Continue to designate the villages of White River Junction, Wilder and Hartford as part of the Town's growth center (see Map 19 State Designations).**

Actions:

- a. Encourage mixed-use development in the village centers.
- b. Provide tax incentives for higher density development in designated growth areas.
- c. Continue to regularly evaluate the water and wastewater systems to ensure that improvements are planned and funded to accommodate anticipated growth for the foreseeable future.

**Strategy 2: Enhance pedestrian accessibility in village areas.**

Action:

- a. Assure that zoning districts in the village centers retain adequate pedestrian orientation. Such areas should have clear sets of standards regulating traffic flow, preservation of greenspace and the development of sidewalks or walkways where appropriate.

**Strategy 3: Encourage the development of multi-family housing on a scale and design compatible with existing neighborhoods.**

Action:

- a. Allow a density bonus of up to 25% for affordable housing projects in areas served by Town water and wastewater.
- b. Ensure that development does not detract from the historic character of Hartford’s villages and the downtown.
- c. Review the regulations, policies, and procedures for amending the Quechee Lakes Master Plan in recognition of changing roles, technologies, and community attitudes.

**Goals, Strategies and Actions for Rural Areas**

**Goal 1:** Maintain the character of Hartford’s rural countryside and support agriculture, forestry, and recreational uses in these areas as well as carefully planned low-density residential uses.

**Strategy 1: Maintain and enhance Hartford’s heritage of working farm and forest lands as part of a sustainable, environmentally sound, local resource-based economy.**

Actions:

- a. Cluster residential development on the most suitable sites that minimize impact on natural resources and fragile features: These include prime agricultural soils, wetlands, streams, steep slopes, scenic views, ridgelines, and important wildlife habitat.
- b. Consider utilizing zoning and subdivision regulations to limit development on slopes exceeding 20%, on ridgelines and hilltops and on open meadows/agricultural land.

**Goals, Strategies and Actions that Affect Both Rural and Village Areas**

**Goal 1:** Maintain and enhance open space and recreational “infrastructure” important for long-term health and quality of life for Hartford residents.

**Strategy 1: Carefully plan and design new residential development in rural lands districts to protect important agricultural land and other scenic and natural resources.**

Actions:

- a. Maintain wooded buffer areas between the I-89/I-91 Interstate Highways and surrounding properties.
- b. Adopt standards to protect natural resources and fragile features: These areas include prime agricultural soils, wetlands, streams, steep slopes, scenic views, ridgelines and important wildlife habitat.
- c. Encourage appropriate uses such as agriculture, forestry, wildlife habitat conservation, and hunting and other recreational activities through incentive programs, land conservation as part of planned unit developments, purchase of development rights, and conservation easements and education.

**Goal 2: Preserve Hartford’s historic settlement pattern, defined by compact villages surrounded by rural countryside.**

**Strategy 1: Try to achieve a population balance between rural Hartford (25%) and the areas served by Town water and wastewater service (75%).**

Actions:

- a. Revise zoning, subdivision, highway, floodplain, etc. regulations to more closely reflect the Town Plan.
- b. Consider proposing/adopting basic building codes aimed at fire prevention and safety.
- c. Coordinate with the Two Rivers Ottawaquechee Regional Commission and other regional organizations and surrounding Towns to create a well-balanced region.
- d. Provide incentives for clustering housing.
- e. Encourage private and public efforts to implement the following planning studies:
  1. Sykes Mountain Avenue Study, 2000
  2. Route 5 South Study, 2001
  3. White River Junction Village Revitalization Plan, 2009
- f. Promote the use of accessory apartments as a means of increasing the availability and affordability of housing.

The following illustrations prepared by the Two Rivers-Ottawaquechee Regional Commission are intended to show the difference between development utilizing five acre lots and development utilizing a more creative clustered development approach. The Jericho area was selected to illustrate the differences in the development approach.

### **ILLUSTRATION II-1 EXISTING CONDITION**





**ILLUSTRATION II-2  
DEVELOPMENT UTILIZING FIVE ACRE LOTS**

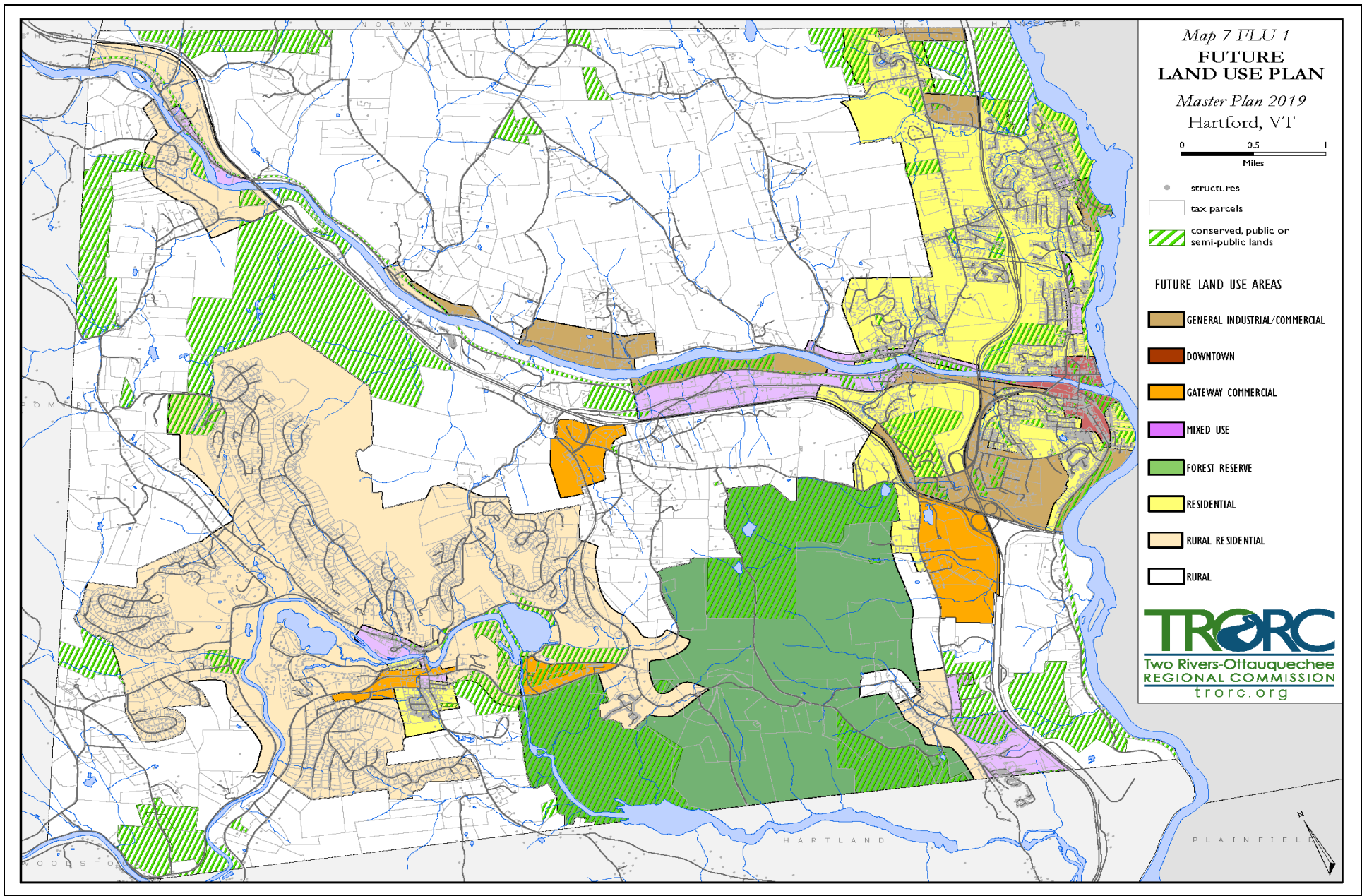


**ILLUSTRATION II-3  
DEVELOPMENT UTILIZING CLUSTERED LOTS**



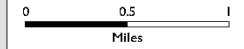
Illustrations II-2 and II-3 result in the same number of dwelling units, but the Illustration II-3 approach establishes smaller lot sizes, reduced lot width and depth requirements, and reduced setbacks resulting in less impact on the traditional rural agrarian landscape of Jericho.





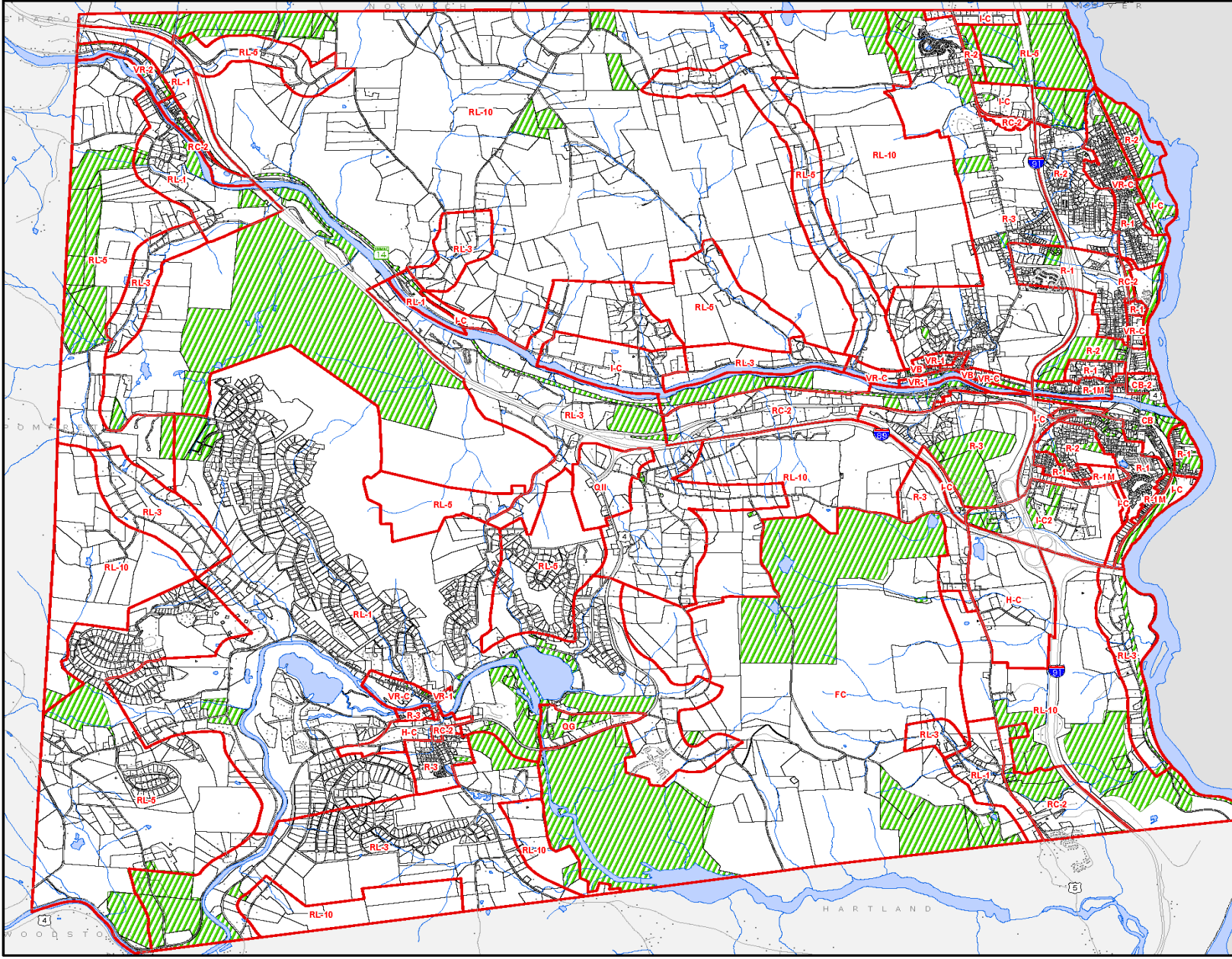


Map 8 FLU-2  
**CURRENT ZONING**  
 Master Plan 2019  
 Hartford, VT

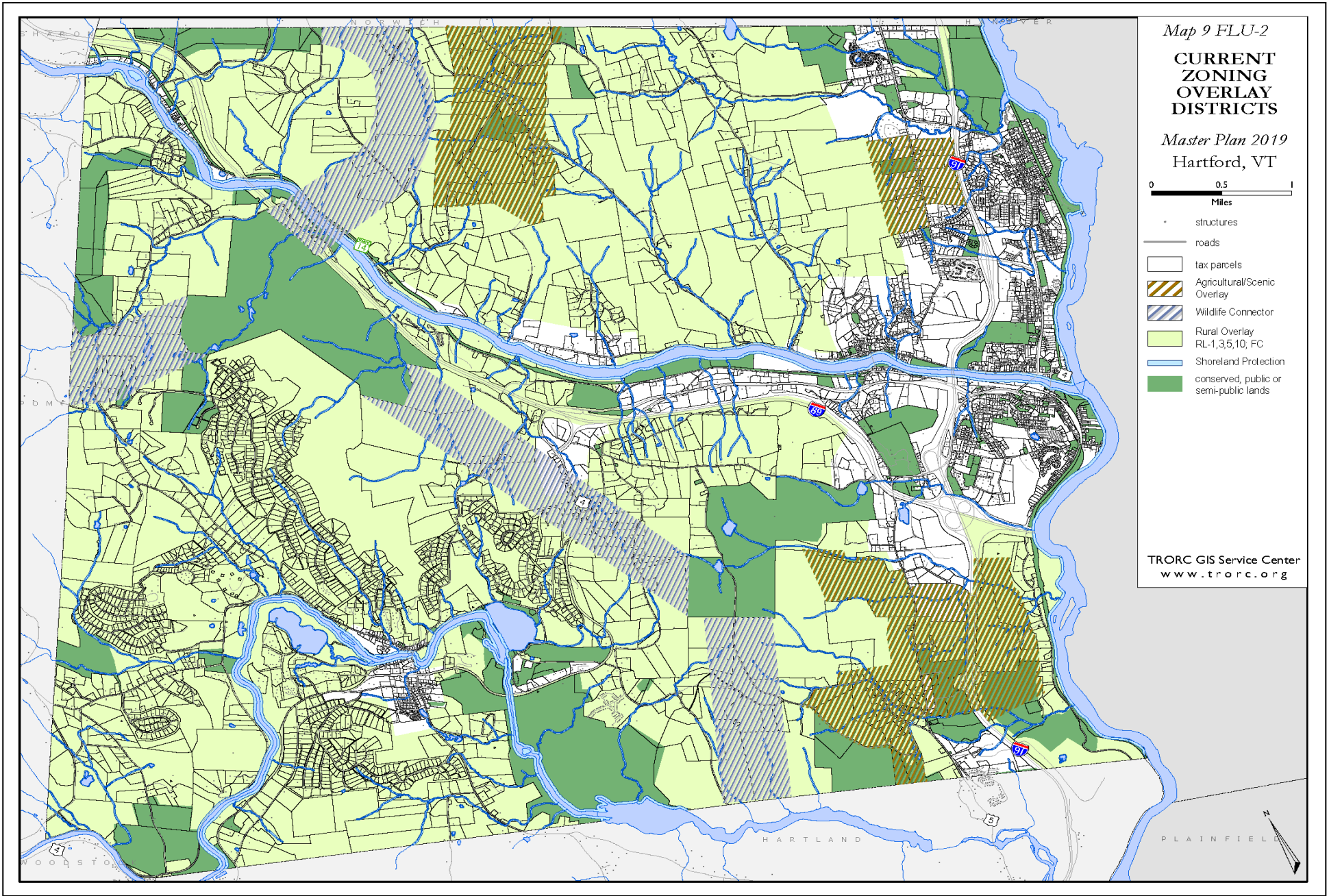


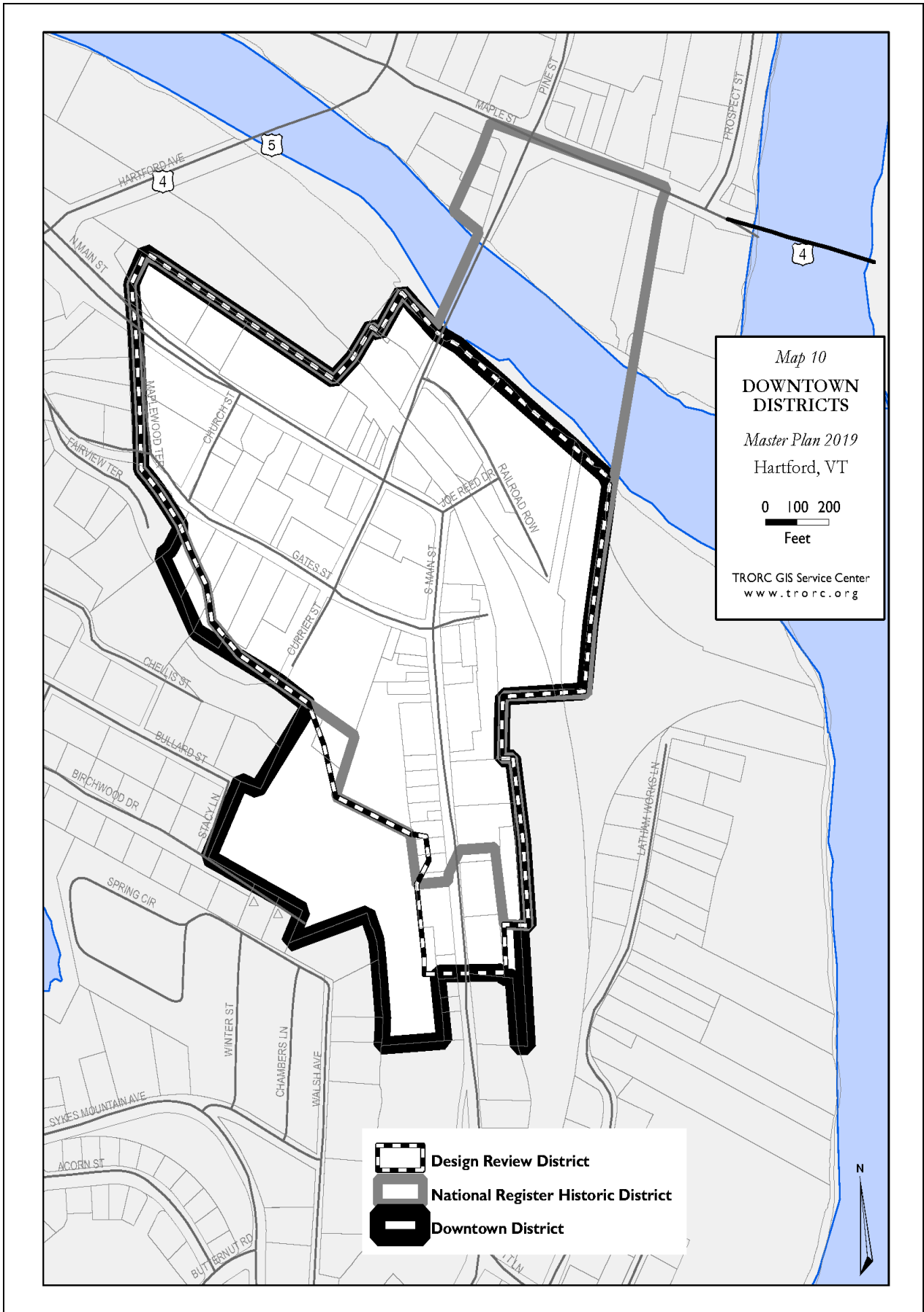
- structures
- roads
- tax parcels
- conserved, public or semi-public lands
- zoning

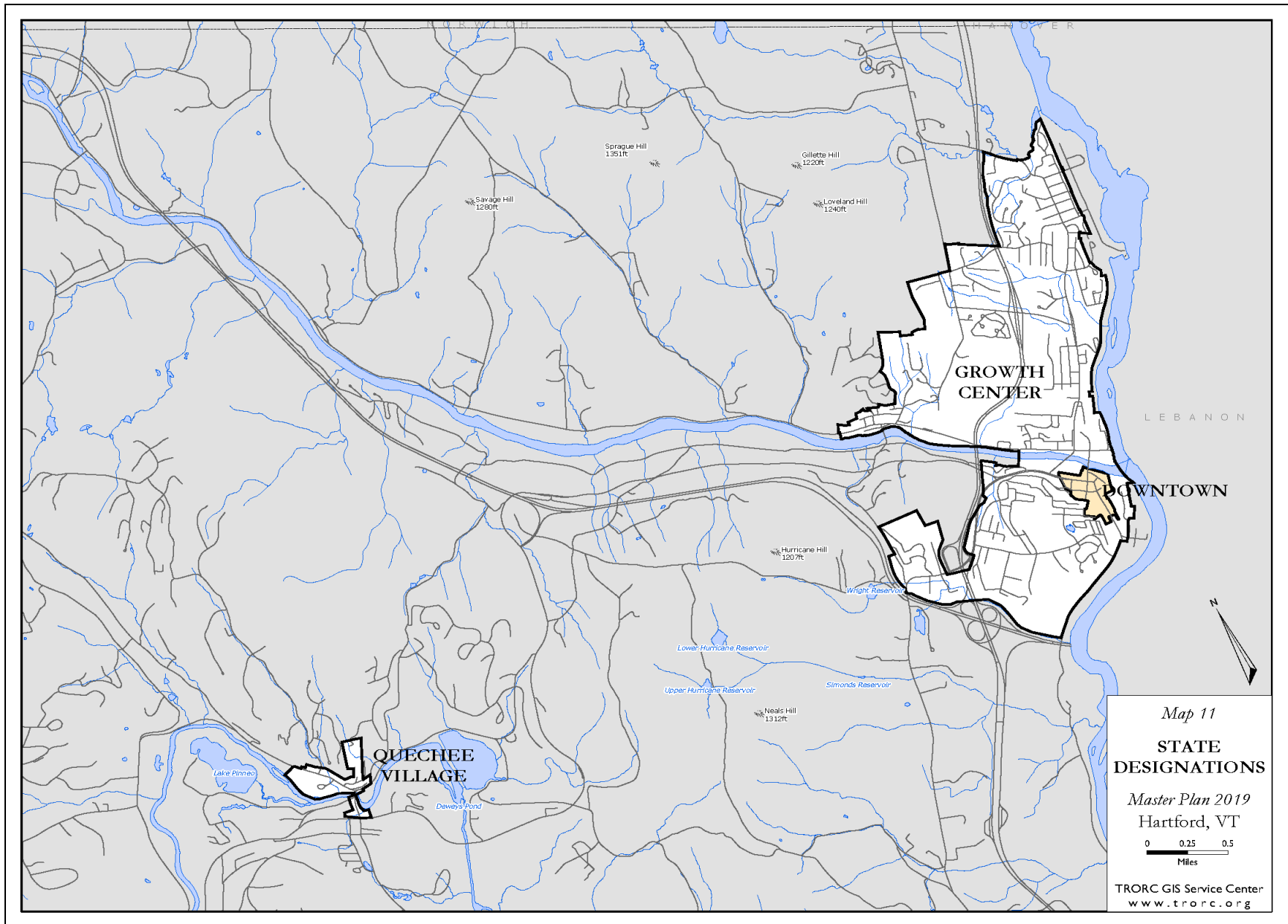
- INDUSTRIAL-COMMERCIAL: I-C
- HIGHWAY COMMERCIAL: H-C
- QUECHEE INTERCHANGE: QII
- QUECHEE GORGE: OG
- CENTRAL BUSINESS DISTRICT: CBD
- VILLAGE RESIDENTIAL COMMERCIAL: VR-C
- VILLAGE BUSINESS: VB
- RESIDENTIAL COMMERCIAL: RC-2
- VILLAGE RESIDENTIAL: VR-1, R-1, R-1M
- RESIDENTIAL: R-2, R-3
- RURAL LANDS: RL-1, RL-3, RL-5, RL-10













## **CHAPTER III POPULATION**

### **INTRODUCTION**

The examination of a Town's population is not just about the number of people in a community. Rather, it is a careful study of the components of the population that serve as the foundation of a strong and vibrant community. The study of a community's population helps us understand the present and prepare for the future. Any significant changes in the population of a community will affect land use patterns, the town's economic base, and local demand for housing, education, transportation, human services, and community facilities. Demographic shifts are important, since knowledge of changes in the school age, senior citizen, and seasonal population is a prerequisite to providing for appropriate education, senior citizen housing, and future municipal services.

Most population data are based on the U.S. Census which comes out every ten years. Population data from the American Community Survey is available more frequently, but is not as accurate as the census data. As a result, planners tend to rely on the U.S. Census. The downside of this chapter update is that it takes place one year prior to the U.S. Census. As a result, this chapter should be updated once the 2020 Census data becomes available.

### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input reflected in the Community Forum Goals and Strategies in each section. In many instances these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize that these community forums are the beginning of a process to further explore these new ideas within the Hartford community, and will take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

### **HARTFORD AND THE UPPER VALLEY**

Located in the heart of the Upper Valley, Hartford is not an isolated community. Together with Hanover, Lebanon and Norwich, the four communities had a combined population of 37,777 in 2010. The larger Upper Valley region consists of several dozen communities in Vermont and New Hampshire and a much larger population. The Two Rivers-Ottauquechee Regional Commission is a region of 30 Vermont communities with a population of 55,996 in 2010. Hartford serves the region as the largest community and the regional center.

## POPULATION TRENDS

Since the first census in 1790, the Town of Hartford has grown steadily. The decades with the highest percentage increase in population occurred in rank order are the 1790s, 1880s, 1970s and 1800s. The largest net increase in population in rank order occurred in the 1970s, 1980s, 1990s and 1940s. Table III-1 summarizes Hartford's population change by decade. Between 1960 and 2010, Hartford experienced a 57% increase in population, which is substantially higher than that of Windsor County (33%), but closer to the State of Vermont (61%). During the 1970s, there was a 23% increase in population from 6,477 persons to 7,963 in 1980, representing the largest ten-year population increase in Hartford's history and the largest percentage gain of the last century. During the 1980s, Hartford's population continued to increase at a brisk pace (18%), from 7,963 in 1980 to 9,404 in 1990.

During the 1990s, the population growth slowed down, but remained steady at 10%, adding 963 people to the Town and bringing the population above 10,000 for the first time. Hartford's growth rate was higher than Windsor County (6%) and the State of Vermont (8%) but fell below the 13% growth rate for the U.S.

**TABLE III-1  
HARTFORD'S HISTORIC POPULATION CHANGE**

**1790 - 2010**

<b>YEAR</b>	<b>POPULATION</b>	<b>NET CHANGE</b>	<b>% CHANGE</b>
1790	988	-	-
1800	1,494	506	51.2%
1810	1,831	337	22.6%
1820	2,010	179	9.8%
1830	2,044	34	1.7%
1840	2,341	297	14.5%
1850	2,159	-182	-7.8%
1860	2,396	237	11.0%
1870	2,480	84	3.5%
1880	2,954	474	19.1%
1890	3,740	786	26.6%
1900	3,817	77	2.1%
1910	4,179	362	9.5%
1920	4,739	560	13.4%
1930	4,888	149	3.1%
1940	4,979	91	1.9%
1950	5,827	848	17.0%
1960	6,355	528	9.1%
1970	6,477	122	1.9%
1980	7,963	1486	22.9%
1990	9,404	1441	18.1%
2000	10,367	963	10.2%
2010	9,952	-415	-4.0%

Source: U.S. Census

During the 2000s, Hartford experienced a 4% decrease in population while there was a 6% increase in total housing units. The population decrease was primarily due to an increase in the seasonal housing rate and vacancy rate. In 2000, 15% of housing units were classified as seasonal, while the figure increased to 18% in 2010. Also, in 2000, the homeowner vacancy rate was 1% and the rental vacancy rate was 2.5%. In 2010, the homeowner vacancy rate increased to 3% and the rental vacancy rate increased to 9%. Windsor County also experienced a population decrease (-1.3%) during the 2000s as well as many other Windsor County communities.

Since 1790, there have only been two decades when Hartford’s population declined (1840s and 2000s). Windsor County experienced six straight decreases in population between 1840 and 1890, and also experienced a decrease in population during the 2000s (-1.3%). The State of Vermont has experienced a decrease in population twice (1910s and 1930s). During the 2000s, Vermont recorded a population increase of 2.8%, considerably lower than the population increase of the 1990s (8.2%).

### POPULATION CHANGE WITHIN HARTFORD

Table III-2 breaks down the population distribution by Census Designated Places (CDP) of White River Junction, Wilder, Quechee and the remainder of Hartford. In 2010, a new CDP was established for Quechee. As shown, most of the growth in Hartford during the 1980s and 1990s was outside the villages of White River Junction and Wilder. However, during the 2000s, the Wilder CDP experienced an increase in population, while White River Junction and the remainder of the Town experienced a loss in population.

**TABLE III-2  
HARTFORD POPULATION DISTRIBUTION BY COMMUNITY**

	WRJ CDP Population	Wilder CDP Population	Quechee CDP* Population	Rest of Hartford Population	Total Population
1980	2,582	1,461	-	3,920	7,963
1990	2,521	1,576	-	5,307	9,404
2000	2,569	1,636	-	6,162	10,367
2010	2,286	1,690	656	5,320	9,952
% Change 2000-2010	-11.0%	3.3%	-	-13.7%	-4.0%

\* Quechee CDP established in the 2010 Census

Source: U.S. Census

### NATURAL INCREASE AND MIGRATION

The two components of population change are natural increase and migration. Natural increase is defined as the excess of resident births over deaths; migration refers to the number of people moving into and out of a town. If a community has little in- and out-migration, almost all changes in population are attributable to natural factors alone.

From 2000 to 2009, Hartford averaged 112 births and 99 deaths per year. Since the Town's total population decreased by 415 people during that same period, we can estimate a net out-migration of

550 persons. From 2010 to 2016, Hartford averaged 111 births and 107 deaths per year. Table III-3 illustrates the changes in population that can be attributed to natural increase and in-migration or out-migration directly reflects the changes to some residential neighborhoods in Hartford. Population gains through in-migration are generally accommodated by: (1) constructing new homes, (2) adding to the number of housing units in existing structures, and/or (3) converting seasonal homes to year-round use.

**TABLE III-3  
BIRTHS, DEATHS AND POPULATION CHANGE  
Hartford, 1990-2009**

<u>Year</u>	<u>Births</u>	<u>Deaths</u>	<u>Natural Increase</u>	<u>% Growth Due to Natural Increase</u>	<u>Total Population</u>
2000	105	88	17	0.2%	
2001	95	89	6	0.1%	
2002	91	87	4	0.1%	
2003	120	97	23	0.2%	
2004	121	105	16	0.2%	
2005	115	93	22	0.2%	
2006	119	108	11	0.1%	
2007	106	121	-15	-0.2%	
2008	128	97	31	0.3%	
2009	121	101	20	0.2%	
<b>2000s Totals</b>	<b>1,121</b>	<b>986</b>	<b>135</b>		<b>9,952</b>

<u>Year</u>	<u>Births</u>	<u>Deaths</u>	<u>Natural Increase</u>	<u>% Growth Due to Natural Increase</u>	<u>Total Population</u>
2010	111	94	17	0.2%	
2011	122	103	19	0.2%	
2012	122	103	19	0.2%	
2013	101	123	-22	0.2%	
2014	108	108	-	0.0%	
2015	103	107	-4	-0.1%	
2016	108	110	-2	0.1%	
<b>2010s Totals</b>	<b>775</b>	<b>748</b>	<b>27</b>		<b>9,952</b>

Source: State of Vermont Vital Statistics

## HOUSEHOLD SIZE

The trend for household size throughout the U.S. in recent decades has been consistently decreasing. Household size in Hartford, Windsor County and Vermont has followed that trend. Hartford also has a large number of single-person households (1,459) representing 32.8% of all households. Of those households, 553 were senior citizens and the remaining 906 were non-seniors. In addition, there were 381 single parent families in Hartford in 2010.

**TABLE III-4  
MEAN NUMBER OF PERSONS PER OCCUPIED YEAR-ROUND HOUSING UNIT  
HARTFORD, WINDSOR COUNTY & VERMONT**

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>
Hartford	3.18	2.69	2.41	2.28	2.22
Windsor County	3.08	2.63	2.47	2.35	2.25
Vermont	3.21	2.75	2.57	2.44	2.34

Source: U.S. Census

### AGE DISTRIBUTION

Understanding the age composition of a community is vital in planning for future needs. A change in the school-age population, for example, may indicate a need for modification in educational policies. Likewise, a shift to a larger senior citizen population would require that different types and ranges of services and facilities be developed, such as assisted living and extended care. As Table III-5 indicates, Hartford's median age continues to rise, along with that of Windsor County and the State. The earlier impact of the post-World War II "baby boom" that lowered the median age has reversed as the "baby boomers" have reached maturity, and they are now contributing to the aging trend. The increase in median age for Hartford in recent decades has been significant. It also is an issue throughout northern New England. In the 2010 census, Vermont, New Hampshire and Maine were among the states with the highest median age in the U.S.

**TABLE III-5  
MEDIAN AGE: HARTFORD, WINDSOR COUNTY, VERMONT**

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>
<b>HARTFORD</b>	<b>28.4</b>	<b>31.1</b>	<b>34.7</b>	<b>40.0</b>	<b>43.3</b>
<b>WINDSOR COUNTY</b>	<b>30.4</b>	<b>32.2</b>	<b>36.0</b>	<b>41.3</b>	<b>45.8</b>
<b>VERMONT</b>	<b>26.8</b>	<b>29.4</b>	<b>33.0</b>	<b>37.7</b>	<b>41.5</b>

Source: U.S. Census

The working-age group (20-64) is often referred to as the labor force, although not all persons in the group are actually employed or looking for work, and some persons not in this age group are part of the labor force. As with most other communities in the region, this group accounted for the main portion of Hartford's population increase in the 1970s and 1980s. The age group continued to grow in the 1990s and 2000s. However, in 2010, this group decreased slightly. Between 2000 and 2010, Hartford experienced some significant changes in age distribution as shown in Table III-6. Hartford had moderate decreases in 5-19 year olds, 25-34 year olds and 45-54 year olds. The largest decrease was in 35-44 year olds, a decrease of 438. This could have an economic impact as the age cohort falls in the middle of the prime working age of 25-54. Moderate increases occurred between 2000 and 2010 for the 20-24 year olds which is a good sign and the 65+ year olds which is a nationwide trend. The largest increase was in the 55-64 year olds.



**TABLE III-6  
AGE DISTRIBUTION, 2000-2010**

Age Group	2000	2000	2010	2010
	No.	%	No.	%
0-4	553	5.3%	546	5.5%
5-9	689	6.6%	556	5.6%
10-14	730	7.0%	590	5.9%
15-19	658	6.3%	561	5.6%
20-24	410	4.0%	488	4.9%
25-34	1,302	12.6%	1,207	12.1%
35-44	1,737	16.8%	1,299	13.1%
45-54	1,698	16.4%	1,573	15.8%
55-64	1,071	10.3%	1,483	14.9%
65+	1,519	14.7%	1,649	16.6%
TOTAL	10,367		9,952	

Source: U.S. Census

As with median age, the trend toward an older population is a reflection of the “baby boomers” passing from school age to the labor force and beyond. How this trend will affect the demand for services as the population ages will need to be closely monitored.

Hartford and Vermont is increasingly concerned about retaining young people in our communities as a youth exodus has been occurring in recent years. There are no easy answers to this problem, but the community must work to create solutions.

Although most senior citizens are retired, some are employed full or part-time. As is the case in Hartford, there are almost always more women than men in this age bracket. The size of this population group in Hartford continues to rise. As a percentage of total population, this group increased from 10% in 1970 to nearly 17% in 2010. Hartford has a slightly lower percentage of senior citizens than Windsor County (17.8%), but a higher percentage of senior citizens than the State (14.6%). By 2020, it is possible that Hartford seniors will represent 20% of the population and ±55% of the property-owning/taxpaying population. The population of the U.S. will likely continue to show a relative increase in the over-65 age group, as the "baby-boom" generation ages and the effect of lower birth rates is felt. Hartford, Windsor County and Vermont will, no doubt, be influenced by this population shift.

The ratio of dependent age population (young or old) to the working age population is the dependency ratio. A high dependency ratio puts a strain on a community to care for its residents. By using the census age data (under 20 and 65 and over), one can approximate the dependency ratio for a community. In the 2010 census for Hartford, the dependency ratio was 39.2%. This compares closely to 39.5% for Windsor County and 38.6% for Vermont. According to the U.S. Census report on dependency ratios using 2009 data from the American Community Survey, Vermont has a lower dependency ratio than the U.S. average. However, Vermont’s larger than average senior population

is offset by a lower than average youth population. The dependency ratio should be monitored in the future.

## RACE

Historically, Vermont has been one of the least diverse states in the U.S. According to the U.S. Census, in 2010, 95.3% of Vermont’s population was White. The percentage decreased from 96.8% in 2000. Hartford has followed the State’s trend. According to the 2010 Census, 96.7% of Hartford’s population was White, 2.2% was Asian, 1.3% was Black or African American, 1.2% was American Indian and a small percentage of the population was under other categories. Like the State, Hartford became more diverse between 2000 and 2010. Please refer to Table III-7.

**TABLE III-7  
HARTFORD POPULATION BY RACE**

	<b>2000</b>	<b>2000%</b>	<b>2010</b>	<b>2010%</b>
White	10,163	98.0%	9,623	96.7%
Black or African American	76	0.7	128	1.3%
American Indian or Alaska Native	96	0.9	123	1.2%
Asian	114	1.1	222	2.2%
Native Hawaiian or other Pacific Islander	6	0.1	11	0.1%
Some other race	33	0.3	43	0.4%

Source: U.S. Census

## SEASONAL POPULATION

Much of Vermont features recreational opportunities in relation to its lakes, rivers and mountains. The Village of Quechee is typical of this recreational orientation, and it provides a strong market for seasonal homes. Besides the seasonal residents, there are many more visitors who stay for short periods or stop on the way to and from other recreational centers in northern New England.

According to the U.S. Census, the period between 1970 and 1990 resulted in rapid growth of seasonal housing in Hartford, primarily related to the Quechee Lakes Planned Development. In 1970, there were a total of 78 seasonal housing units in Hartford. In 1980, the figure increased to 461. In 1990, the number of seasonal housing units increased to 862. However, in the 1990s, there was a slight reduction in the number of seasonal housing units to 839. This was followed by a 24% increase in seasonal units during the 2000s as the number rose by 200 to 1,039 as a result of renewed construction in Quechee. Hartford’s percentage of total housing units that were seasonal increased from 15.3% in 2000 to 17.9% in 2010. This figure is above the State rate of 15.6%, but below the rate for Windsor County (21.7%).

## POPULATION PROJECTIONS

In the past, Hartford's population growth has been irregular, as shown previously in Table III-1. Changes in the economy, such as the addition of a large industry or the closing of a major employer have had major impacts. In addition to regional job growth, household size and birth rates are among the many factors that affect population change. Therefore, estimates of future population are general guides and must be updated continually, accommodating new information and changing economic conditions. The following population projection shows a moderate population increase for the present decade followed by slower population growth for the 2020s.

**TABLE III-8  
HARTFORD POPULATION PROJECTIONS**

	U.S. Census 2010	2020	2030	% Change 2010-2020	% Change 2020-2030
Hartford	9,952	10,302	10,457	3.5%	1.5%

Source: Vermont Department of Aging and Independent Living; Analysis by Vermont Agency of Commerce & Community Development, 2013

## GOALS, STRATEGIES AND ACTIONS

**Goal 1: Understand the components of Hartford's population over time.**

**Strategy 1: Use what we know about the population components and trends to plan appropriately for the immediate, interim and long-term future across all program areas within the Town Plan.**

Action:

- a. As soon as the 2020, census data becomes available, examine the components and update this chapter.

**Goal 2: Have a more balanced age distribution with more children, young adults and families.**

**Strategy 2: Continue to plan for accommodating a changing population, including school age and senior citizens**

Actions:

- a. Evaluate actions such as zoning changes and water and sewer service area expansions to ensure the population impacts are compatible with other goals and objectives of the community.
- b. Explore opportunities and policies to encourage and promote growth in the Town's population at all age levels.

**Goal 3: Increase the diversity and inclusiveness of Hartford's population.**

**Strategy 3: Increase awareness within Town government and the community about structuring programs and services that encourage participation from all sectors of the population.**

Action:

- a. Partner with groups and organizations that have expertise in this area.



## **CHAPTER IV HOUSING**

### **INTRODUCTION**

As a community that was settled over two hundred years ago, Hartford has a long history of having a mixture of compact village centers surrounded by open countryside. Over the years, Hartford's housing stock has evolved into a diverse range of types and styles in both the more urban areas of Town as well as the rural areas. There are large single-family residences in rural areas, mobile homes on large lots, and mobile homes in mobile home parks. There are small historic homes in village centers and large and small apartment buildings, condominiums that serve year-round residents and others that serve as vacation homes. There are large-lot single-family neighborhoods and compact neighborhoods made up of a mixture of single-family, two-family, and multi-family dwellings. There are small and large senior housing complexes. The diversity of housing has been an important community resource. However, in the last decade, housing prices rose significantly and although prices have stabilized in the last few years, obtaining housing is an ever-increasing challenge for many of Hartford's residents and employees of businesses in Town, as well as employers wishing to expand or locate in Hartford. The Town is at a critical juncture, as decisions about housing that are made in the short term will impact the Town, its residents, and businesses for many years to come.

This chapter summarizes the characteristics of the present housing stock in Hartford, the increasing gap between housing costs and wages, and projections about additional housing that will be needed in the near future to serve the growing population and businesses, and outlines recommendations to encourage continued housing diversity and choice.

### **RESULTS FROM THE TOWN PLAN COMMUNITY MEETINGS**

During the fall of 2002, the Town undertook a series of community meetings to solicit input from the public regarding the update of the Town Plan. The meetings were well-attended. Several themes developed from these meetings. They included:

- Promote mixed-use in the villages and downtown.
- Prevent sprawl-like development by encouraging growth in village areas where the infrastructure is available to accommodate development.
- Identify and inventory site limitations, infrastructure constraints, density and existing zoning to determine where higher density, mixed-use development is most feasible.

The sessions also resulted in several recommendations:

- Look at adaptive reuse of older buildings instead of constructing new buildings.
- Determine where the best areas are in Town for different types of housing, taking into consideration available infrastructure and zoning.
- Plan housing in coordination with all other uses.

## HOUSING PATTERNS

Historically, the greatest concentration of housing in Hartford is in the contiguous villages of Wilder, White River Junction and Hartford Village where municipal water and sewer exist. During the last forty years, a second concentration of housing developed in Quechee, where the Quechee Lakes Planned Development was designed to blend in with the wooded hillsides, saving much of the low-lands for recreational uses. Most of Quechee Lakes is served by on-site wells and municipal sewer. With a maximum planned build-out of 2,154 units, to date, approximately 2/3 of the units have been built. Although municipal water exists in Quechee, it is limited primarily to the valley floor, the heart of the village and along Route 4.

Hartford has a long history of rural hamlets and outlying areas composed of farmland dotted with barns and farmhouses. Over the last half century, many farming operations ceased and the homes began to serve residents employed in Hartford or nearby communities. In recent decades, that trend has continued as rural areas have become attractive places for people to build. This has spurred more housing growth on the hillsides of Hartford and surrounding communities.

## HOUSING CHARACTERISTICS

Following two decades of rapid growth, the 1970s (64.2% increase) and the 1980s (30.7% increase), housing growth fell considerably during the 1990s and 2000s in large part because of two separate recessions, one in the early 1990s and the other in the late 2000s. According to the 2000 U.S. Census, Hartford had a total of 5,493 housing units. This represented a 9.3% increase since 1990. Census figures for Hartford in 2010 indicated that housing growth slowed further resulting in a 5.9% increase for the decade.

**TABLE IV-1  
HARTFORD HOUSING GROWTH  
CHANGE BETWEEN 1970-2010**

	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>	<b>1970-2010</b>
<b>Housing Units</b>	2,121	3,483	5,026	5,493	5,816	
<b>Net Change</b>	-----	1,362	1,543	467	323	3,695
<b>% Change</b>	-----	64.2%	30.7%	9.3%	5.9%	174.1%

Source: U.S. Census

The 1990s resulted in other changes as well. After two decades of sizeable growth in the seasonal and second-home market (primarily due to development of the Quechee Lakes Planned Development), the 1990s resulted in a slight decrease (2.7%) in seasonal and second homes as many of these units were absorbed as year-round housing. There also was a sizeable decrease in the number of vacant units (57.2%) as the housing market tightened during the latter part of the decade.

During the first half of the 2000s, Hartford experienced steady numbers of new housing units. Between 2002 and 2006, Hartford averaged 108 units per year. However, as a result of the national recession, housing numbers dropped considerably beginning in 2006 and have continued to fall since then. For the decade, Hartford had a 5.9% increase in the number of housing units. The decade also saw a resurgence in seasonal housing as the number of seasonal units increased 23.8% from 839 to 1,039. Another change brought on by the recession was a 128.3% increase in vacant units. As a result, there was a 1.4% drop in housing occupancy and a 4.0% loss in population.

**TABLE IV-2  
HARTFORD HOUSING GROWTH  
NUMBER AND TYPES OF HOUSING UNITS  
1970-2010**

<u>Year</u>	<u># Occupied Year-round Units</u>	<u>% Change</u>	<u># Seasonal &amp; 2<sup>nd</sup> Homes</u>	<u>% Change</u>	<u># of Vacant Units</u>	<u>% Change</u>	<u># of Total Units</u>	<u>% Change</u>
1970	2,003	--	78	--	40	--	2,121	--
1980	2,958	47.7	461	491.0	64	60.0	3,483	64.2
1990	3,825	29.3	862	87.0	339	430.0	5,026	44.3
2000	4,509	17.9	839	-2.7	145	-57.2	5,493	9.3
2010	4,446	-1.4	1,039	23.8	331	128.3	5,816	5.9

Source: U.S. Census

Another change during the 2000s was a shift back to construction of multi-family housing. From 1984 to 1989, a total of 501 multi-family units were constructed in Hartford, which was more than half of the total housing units built during that period. During the 1990s, only 75 multi-family units were constructed, reflecting a mere 16.6% of the total number of new housing units. During the early 2000s, a number of large multi-family housing developments took place in Quechee and Wilder and multi-family housing accounted for 42.9% of new housing for the decade.

**TABLE IV-3  
NEW HOUSING UNITS IN HARTFORD DURING THE 2000s**

<u>Year</u>	<u>Single-family</u>	<u>Multi-family</u>	<u>Total</u>
2000	22	2	24
2001	39	4	43
2002	63	75	138
2003	50	28	78
2004	49	71	120
2005	50	44	94
2006	31	10	41
2007	25	16	41
2008	11	7	18
<u>2009</u>	<u>8</u>	<u>4</u>	<u>12</u>
2000-2009	Total 348	261	609

Source: Department of Planning and Development Services

During the 1990s, most of the new single-family housing was owner-occupied. The growth rate of owner-occupied housing during the 1990s was 24.3%, compared to a growth rate of 6.9% for renter-occupied housing. This demonstrated a decrease in the amount of new rental housing. The percentage of owner-occupied housing increased from 63.1% in 1990 to 66.6% in 2000 while the percentage of renter-occupied housing decreased from 36.9% in 1990 to 33.4% in 2000. Still, Hartford’s share of owner-occupied housing lagged behind the State (70.6%) and Windsor County (71.5%).

During the 2000s, there was a -1.6% decrease in owner-occupied units and a .09% decrease in renter-occupied units. Overall, the percentage of owner-occupied units decreased slightly from 66.6% in 2000 to 66.4% in 2010.

**TABLE IV-4  
HARTFORD HOUSING STOCK  
NUMBER OF OWNER AND RENTER OCCUPIED UNITS AND PERCENTAGE OF  
YEAR-ROUND OCCUPIED UNITS  
CHANGE BETWEEN 1990-2010**

	<u>Owner Occupied</u>	<u>Percent Units</u>	<u>Renter Occupied</u>	<u>Percent Units</u>
1990	2,415	63.1%	1,410	36.9%
2000	3,002	66.6%	1,507	33.4%
2010	2,953	66.4%	1,493	33.6%
Total Change 2000-2010	-49		-14	
Percent Change 2000-2010	-1.6%		-.09%	

Source: U.S. Census



Table IV-5 indicates the decrease in owner-occupied housing units from 54.7% in 2000 to 50.8% in 2010, while the percentage of renter-occupied housing decreased from 27.4% in 2000 to 25.7% in 2010. Off-setting the decrease in occupied units was a significant increase in the percentage of seasonal units (23.8%) and vacant units (128.3%) over the course of the decade.

**TABLE IV-5  
HARTFORD HOUSING STOCK  
CHANGE IN PERCENT OF TOTAL 1990-2010**

	Owner Occupied <u>Units</u>	Renter Occupied <u>Units</u>	Seasonal & 2 <sup>nd</sup> Home <u>Units</u>	Vacant <u>Units</u>	Total <u>Units</u>
1990 #	2,415	1,410	862	339	5,026
1990 %	48.1%	28.1%	17.2%	6.7%	100%
2000 #	3,002	1,507	839	145	5,493
2000 %	54.7%	27.4%	15.3%	2.6%	100%
2010 #	2,953	1,493	1,039	331	5,816
2010 %	50.8%	25.7%	17.9%	5.7%	100%

Source: U.S. Census

Although Hartford experienced a slight decrease in the percentage of owner-occupied units, Windsor County and Vermont experienced slight increases. In 2000, owner-occupied units accounted for 70.6% in Vermont. In 2010, the rate increased to 70.7%. In 2000, owner-occupied units accounted for 71.5% in Windsor County. In 2010, the rate increased to 72.3%.

**TABLE IV-6  
NUMBER OF OWNER AND RENTER OCCUPIED UNITS AND PERCENT OF  
YEAR-ROUND OCCUPIED UNITS  
HARTFORD, WINDSOR COUNTY, VERMONT, 2000 AND 2010**

	Hartford			Windsor County			Vermont		
	No. <u>2010</u>	% <u>2010</u>	% <u>2000</u>	No. <u>2010</u>	% <u>2010</u>	% <u>2000</u>	No. <u>2010</u>	% <u>2010</u>	% <u>2000</u>
Owner Occupied	2,953	66.4	66.6	17,897	72.3	71.5	169,784	70.7	70.6
Renter Occupied	1,493	33.6	33.4	6,877	27.7	28.5	70,850	29.3	29.4

Source: U.S. Census

Although there are a large number of older homes in Hartford, sizeable growth in new housing over the last four decades has reduced the percentage of housing built in 1930 or earlier to 20.3% according to the American Community Survey. The percentage of housing built prior to 1960 was 30.4%. Table IV-7 shows the age of Hartford's housing stock. Compared to Windsor County and the State, Hartford's housing stock is newer. Although figures are not available for

2010, in 2000 the median year that Hartford's housing stock was built was 1975, compared to 1966 for Windsor County and 1968 for the State, indicating that Hartford has a newer housing stock.

**TABLE IV-7  
HARTFORD AGE OF HOUSING STOCK**

	<u>Number Of Units</u>	<u>Percent</u>
2005 or later	85	1.4%
2000-2004	264	4.3%
1990 to 1999	646	10.6%
1980 to 1989	1,459	24.0%
1970 to 1979	1,426	23.5%
1960 to 1969	354	5.8%
1940 to 1959	609	10.1%
1930 or earlier	1,236	20.3%

Source: U.S. Census Bureau 2006 -2010 American Community Survey

Historically, Hartford has had a fairly high percentage of rental housing including multi-family units. During the 1970s and 1980s, there was a substantial increase in the number of units in a structure. Despite those growth rates over the last few decades, single-family homes remain the predominant housing type in Hartford (Table IV-7).

**TABLE IV-8  
HARTFORD, UNITS IN STRUCTURE**

	<u>Number Of Units</u>	<u>Percent</u>
1 Unit detached	3,142	51.7%
Mobile homes	319	5.2%
1 unit attached	390	6.4%
2 units	359	5.9%
3 or 4 units	465	7.6%
5 to 9 units	1,070	17.6%
10 to 19 units	287	4.7%
20 or more units	47	.8%

The national recession of the late 2000s has had its effect on the housing market. This was evident in an increase in the number of vacant housing units in Hartford and elsewhere compared to 2000 Census figures. The vacancy rate increased from 2.6 in 2000 to 5.7% in 2010. Hartford's homeowner vacancy rate in 2010 was 3.0% and the rental vacancy rate was 9.0%. These compare to homeowner vacancy rates of 2.7% for Windsor County and 1.9% for the State, and rental vacancy rates of 10.2% for Windsor County and 6.9% for the State, as reported by the 2010 Census.

**TABLE IV-9  
HOUSING VACANCY RATES IN HARTFORD: 1990-2010**

	<u>1990</u>	<u>2000</u>	<u>2010</u>	<u>% Change 2000-2010</u>
For Rent	137	38	149	292.1%
For Sale only	105	31	93	200.0%
Rented or sold, but not occupied	38	27	19	-29.6%
Other vacant	59	49	70	42.9%
<b>Total</b>	<b>339</b>	<b>145</b>	<b>331</b>	<b>128.3%</b>

Source: U.S. Census

Housing affordability also relates to housing condition and overcrowding, as lower incomes generally do not allow for routine maintenance and often do not allow for an appropriately sized home. Often, low-income renters are paying rents that are not sufficient for adequate property maintenance. The U.S. Census found that in 2000, 59 housing units in Hartford had more than one person per room (considered overcrowded). According to the American Community Survey (2006-2010) there were 39 units with 1.01 to 1.5 occupants per room and 41 units with 1.51 or more occupants per room. In 2000, there were 21 housing units that lacked complete plumbing (one indicator of substandard condition). According to the American Community Survey (2006-2010) there were 90 units lacking complete plumbing. Problems such as leaking roofs, structural defects, and faulty wiring are often faced by those without incomes adequate to pay housing costs and properly maintain the housing unit but are not included in the Census figure. Housing age is another indicator of potentially poor condition. Although a large number of units have been added during the past three decades, 20.3% of Hartford's housing stock (1,236 units) were built in 1930 or earlier.

### **HARTFORD POPULATION IN HOUSING**

The total population of Hartford reported in the 2010 Census was 9,952. Of these, 57 live in institutions (hospitals, nursing homes, community care homes) and 20 live in non-institutionalized group quarters. The remaining 9,875 live in the 4,446 year-round occupied housing units. Of these, 6,922 live in owner-occupied units (70.0%) and 2,953 live in Rental Units (30.0%).

The trend for household size throughout the U.S. in recent decades has been a steady decrease. Household size in Hartford, Windsor County and Vermont has followed that trend, and once again the 2000s resulted in smaller households. Census figures show that the mean number of persons per year-round housing unit in Hartford dropped from 2.41 in 1990 to 2.28 in 2000 and to 2.22 in 2010. Average family size in Hartford decreased at a lower rate from 2.88 in 1990 to 2.86 in 2000 to 2.82 in 2010. Owner-occupied households average 2.34 persons per year-round housing unit, while renter-occupied households average 1.98 persons per year-round housing unit.

**TABLE IV-11**  
**MEAN NUMBER OF PERSONS PER OCCUPIED YEAR-ROUND HOUSING UNIT**  
**HARTFORD, WINDSOR COUNTY, VERMONT**

	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2010</u>
Hartford	3.18	2.69	2.41	2.28	2.22
Windsor County	3.08	2.63	2.47	2.35	2.25
Vermont	3.21	2.75	2.57	2.44	2.34

Source: U.S. Census

Another national trend is an aging population. Hartford and Windsor County have a population that is older than the State of Vermont and the U.S. average. In 1990, 1,233 or 13.1% of Hartford residents were age 65 and over. In 2000, the figure increased to 1,519 or 14.7% of the population. In 2010, the figure increased again to 1,649 or 16.6%. In 2010, Windsor County’s population 65 and over was 17.8 compared to 14.6% for the State. Hartford’s median age increased from 34.7 in 1990 to 40 in 2000. In 2010, Hartford’s median age increased to 43.3. In Windsor County, the median age was 45.8. In Vermont, the median age was 41.5 and 37.2 for the U.S. In 2010, 27.0% of Hartford households (1,205) had an individual 65 years or older. In 2010, there were 1,459 single-person households in Hartford. This represented 32.8% of Hartford households. Of the single-person households, 553 or (37.9%) were senior citizens. As the “baby boom” population approaches retirement, they are likely to have a sizeable impact on housing.

In 2010, a majority (75%) of Hartford households had no minor children and 41.1% of Hartford households were non-family households. Compared to Windsor County, Vermont, and the U.S., Hartford has a higher percentage of non-family households (see Table IV-12). Hartford also has a higher percentage of single-person households. Hartford and Windsor County have a slightly lower percentage of family households with married couples and their own children, than Vermont and the U.S.



**TABLE IV-12  
HOUSEHOLDS BY TYPE, 2010**

	<u>Town of Hartford</u>	<u>Windsor County</u>	<u>State of Vermont</u>	<u>United States</u>
% Family Households	58.9%	62.3%	62.5%	66.4%
% Family Households with Married Couple with own minor children	24.5%	24.0%	26.2%	29.8%
% Non-family Households	41.1%	37.7%	37.5%	33.6%
% Householder Living Alone	32.8%	30.0%	28.2%	26.7%

Source: U.S. Census

Of the 24.5% of Hartford households with minor children, 709 or 65% were in married couple households with two potential wage earners. Single parent households with one potential wage earner totaled 381 or 35%. Married couple households with minor children average 1.8 minor children, while single parent households with children average 1.55 minor children.

## **COST OF HOUSING**

### **Home Ownership**

During the 1980s, there was a construction boom, which was followed by a period of escalating housing prices in Hartford and throughout the State and region. This was followed by a period of relatively slow growth in housing prices during the 1990s in part due to a regional recession. According to the 1990 census, the median home price for selected owner-occupied units was \$110,500 in Hartford, which was 15.7% higher than the statewide median price of \$95,500. In the 2000 Census, the Hartford median price increased to \$120,600, 7.5% higher than the statewide median of \$111,500. Table IV-13 indicates that there were significantly fewer homes in Hartford valued under \$100,000 as compared to the County and the State.

During the first half of the 2000s, a resurgence in construction took place in Hartford and much of Vermont. This was followed by escalating housing prices. However, a national recession set in 2007 and led to a significant drop in construction and stabilized housing prices.

**TABLE IV-13  
NUMBER AND PERCENT OF OWNER-OCCUPIED HOUSING UNITS  
BY VALUE CATEGORIES  
HARTFORD, WINDSOR COUNTY, VERMONT**

Value	<u>Hartford Percentage</u>	<u>County Percentage</u>	<u>State Percentage</u>
Less than \$100,000	8.8%	13.4%	11.5%
\$100,000-\$199,999	31.4%	34.2%	33.2%
\$200,000-\$299,999	33.0%	23.2%	29.2%

\$300,000-\$499,999	20.0%	18.9%	18.9%
\$500,000+	6.7%	10.3%	7.2%
Median	\$225,900	\$209,900	\$216,800

Source: U.S. Census Bureau 2006 -2010 American Community Survey

The following housing sales data was collected by the Vermont Department of Taxes through the State property transfer tax. Census results from 1980, 1990, and 2000 indicate higher housing costs in Hartford than in Windsor County and the State. The following table shows that the State median housing sales price surpassed Hartford’s briefly in 2000 and 2001 and again in 2008. In 2010, Hartford’s median sales price was 0.5% higher than the State and 7.7% higher than Windsor County.

**TABLE IV-14**  
**MEDIAN PRICE OF PRIMARY RESIDENCES SOLD BY YEAR**  
**HARTFORD, WINDSOR COUNTY, VERMONT**  
**1999-2010**

<b>Year</b>	<b>Hartford</b>	<b>Windsor County</b>	<b>Vermont</b>
1999	\$107,500	\$102,500	\$110,000
2000	\$112,250	\$110,000	\$119,000
2001	\$120,500	\$120,000	\$126,900
2002	\$145,000	\$129,000	\$134,925
2003	\$156,000	\$142,500	\$149,900
2004	\$173,000	\$155,000	\$164,500
2005	\$218,250	\$176,500	\$184,900
2006	\$207,000	\$185,000	\$195,000
2007	\$207,000	\$184,250	\$200,000
2008	\$185,000	\$194,500	\$200,000
2009	\$200,000	\$185,000	\$190,000
2010	\$195,000	\$180,000	\$194,000

Includes single-family homes, condominiums, and mobile homes with land

Source: Vermont Department of Taxes

Table IV-15 provides housing sales data for Hartford going back to 1999. Housing prices grew significantly (94.4%) from 2000-2005. However, as a result of the recession, between 2005 and 2010, housing prices have fallen 10.7%. Overall, for the decade, housing prices still grew by 73.7%.

**TABLE IV-15  
MEDIAN PRICE OF PRIMARY RESIDENCES SOLD BY YEAR  
HARTFORD, 1999-2010**

<b>Year</b>	<b>Hartford</b>	<b>Net Change</b>	<b>% Change</b>
1999	\$ 107,500	\$ -2,500	-2.3%
2000	\$ 112,250	\$ 4,750	4.4%
2001	\$ 120,500	\$ 8,250	7.3%
2002	\$ 145,000	\$ 24,500	20.3%
2003	\$ 156,000	\$ 11,000	7.6%
2004	\$ 173,000	\$ 17,500	11.2%
2005	\$ 218,250	\$ 44,750	25.8%
2006	\$ 207,000	\$ -11,250	-5.2%
2007	\$ 207,000	\$ 0	0%
2008	\$ 185,000	\$ -22,000	-10.6%
2009	\$ 200,000	\$ 15,000	8.1%
2010	\$ 195,000	\$ -5,000	-2.5%

Includes single-family homes, condominiums and mobile homes with land  
Source: Vermont Department of Taxes

### **Rental Housing**

The monthly cost for rental housing has typically been higher in Hartford than in Windsor County and Vermont. In 1990 and 2000, Hartford had slightly higher rents. In 1990, Hartford's median contract rent was 13.7% above Windsor County and 16.1% above the State. The 2000 Census indicated that the median contract rent for Hartford was 6.9% above Windsor County and 4.2% above the State. However, figures from the American Community Survey indicate much higher median rents for Hartford than Windsor County (19.7%) and Vermont (24.3%).

**TABLE IV-16  
MEDIAN CONTRACT MONTHLY RENT  
HARTFORD, WINDSOR COUNTY, VERMONT**

<b>Year</b>	<b>Hartford</b>	<b>Windsor County</b>	<b>State of Vermont</b>
1990*	\$439	\$386	\$378
2000*	\$576	\$539	\$553
2006-2010**	\$971	\$811	\$781

Source: \* U.S. Census Bureau  
\*\* American Community Survey

### **HOUSING AFFORDABILITY**

The definition of housing affordability is paying no more than 30% of household income for housing including utilities.

## Home Ownership

According to the 2000 U.S. Census, households making the median family income (\$42,990) could afford the median priced home (\$120,600). However, with the escalation in home prices since 2000, this is no longer the case. According to the Vermont Housing Finance Agency (VHFA), in 2009, a household would have to earn \$58,000 a year to afford a median price of a home in Vermont of \$195,000. VHFA also noted that with a statewide median household income of \$52,000, a household could afford a home in the \$175,000 range. It would also require \$14,000 as a down payment and to cover closing costs. Even with a drop in housing prices the last few years, there are not many homes in Vermont available at that price. The median purchase price of a new home in Vermont (excluding affordable housing projects) was \$290,000 in 2010. The annual income needed to afford a home at that price is about \$86,000 and down payment and closing costs of \$24,000 to afford the home. Thus a gap between income and housing costs has developed.

In Hartford, the median sale price of a home was \$195,000 in 2010. Using the VHFA formula, a household would have to earn \$58,500 to afford it. That figure is 14.2% above the estimated Hartford median household income of \$51,226. Based on the median household income, a household would be able to afford a home in the \$171,000 range. Since there are a limited number of homes in Hartford available at this price, home ownership is out of reach for many Hartford households.

**TABLE IV-17**  
**MEDIAN HOUSEHOLD INCOME COMPARED TO THE MEDIAN HOME VALUE**  
**HARTFORD, VERMONT**  
**2000 AND 2006-2010**

<b>Year</b>	<b>Median Household Income</b>	<b>Median Home Value</b>	<b>% Household Income to Home Value</b>
2000*	\$42,990	\$120,600	35.6%
2006-2010**	\$51,226	\$195,000	26.3%

Source: \* 2000 U.S. Census  
\*\* U.S. Census Bureau American Community Survey

## Rental Housing

The proportion of rental households paying in excess of affordable levels (30% of income) is a measure of rental distress or housing cost burden. According to the American Community Survey, the number of Hartford renter households with rents at or above 30% of household income was 63.2%. Although the figure for Hartford is above the rate for Windsor County (53.4%) and the State (52%) the figures indicate high housing costs throughout Vermont.

The U.S. Department of Housing and Urban Development (HUD) provides fair market rent assessments for Vermont at the County level, which is updated annually.

**TABLE IV-18  
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
FAIR MARKET RENTS FOR WINDSOR COUNTY, 2012**

<b>Type of Unit</b>	<b>Hartford</b>
0 Bedroom Unit	\$782
1 Bedroom Unit	\$876
2 Bedroom Unit	\$1,030
3 Bedroom Unit	\$1,402
4 Bedroom Unit	\$1,668

Source: U.S. Housing and Urban Development

Based on the HUD Fair Market Rent, an hourly wage was calculated for each county and the State to determine the hourly wage needed to afford an apartment and only pay 30% of income toward housing. Since a separate rate was not conducted for municipalities, the Town and the County rate is the same.

**TABLE IV-19  
HOURLY WAGE NEEDED TO AFFORD A TWO BEDROOM APARTMENT AND  
ONLY PAY 30% OF INCOME TOWARD HOUSING  
HARTFORD, WINDSOR COUNTY, VERMONT, 2011**

<b>Type of Unit</b>	<b>Hartford</b>	<b>Windsor County</b>	<b>State of Vermont</b>
0 Bedroom Unit	\$13.19	\$13.19	\$13.55
1 Bedroom Unit	\$14.77	\$14.77	\$15.53
2 Bedroom Unit	\$17.38	\$17.38	\$19.04
3 Bedroom Unit	\$23.65	\$23.65	\$24.75
4 Bedroom Unit	\$28.15	\$28.15	\$28.47

Source: Vermont Housing Data

The following is a list of occupations in Southern Vermont with the median hourly wage. The list indicates that there are many occupations that fall below the required hourly to fall within the 30% guideline.

**TABLE IV-20  
SAMPLE OCCUPATIONS IN SOUTHERN VERMONT THAT FALL BELOW THE  
HARTFORD HOUSING WAGE, 2004**

<b>OCCUPATION</b>	<b>MEDIAN HOURLY WAGE</b>
Cashier	\$8.12
Ambulance driver & attendant	\$8.13
Home health aides	\$9.59
Hotel/motel desk clerk	\$10.08
Retail salesperson	\$10.19



Nursing aide	\$10.54
Teller	\$10.60
Landscaper	\$10.82
Emergency medical technician	\$11.45
Child care worker	\$11.66
Roofer	\$11.72
Transit bus driver	\$12.03
Payroll clerk	\$12.28
Welder, cutter, solderer	\$12.59
Medical assistant	\$12.88
Hairdresser	\$13.03
Automotive technician/mechanic	\$13.41
Police/Sheriff's patrol officer	\$14.97
Firefighter	\$15.66
Plumber, pipefitter, steamfitter	\$16.06
Carpenter	\$16.57
Librarian	\$16.71
Child, family & school social worker	\$16.73
Electrician	\$16.95
Health educator	\$17.10
Surveyor	\$17.15
Interior designer	\$18.10
Paralegal & legal assistant	\$18.15
Editor	\$18.25
Postal service mail carrier	\$19.18

Source: Vermont Department of Labor for the Southern Vermont Region, November, 2004

## **Types of Special Housing Needs**

### Single Persons

The 2010 Census found 1,459 single-person households in Hartford. This represents 32.8% of all Hartford households. The growth rate of single-person households from 1990 to 2000 was 30.9% and between 2000 and 2010 it was 5.6%. Of the single-person households, 553 or (37.%) were senior citizens and the remaining 906 consisted of non-seniors. Numerically, the largest group of very low-income renters is single persons. In 1980, there were affordable single accommodations in eight rooming houses in Hartford. Today, there is only one rooming house, providing 11 rooms. The need for rooming houses has been met by motels that offer long-term rentals, but several older motels have been demolished in recent years. In 1992, seven hotels/motels and one rooming house had a total of total of 115 rooms. Today, four hotels/motels and one rooming house have a total of 91 rooms offering long-term rentals. An affordable alternative is shared housing, but this may not be the first choice of many single persons.

### Single-Parent Families

In 2010, there were 381 single wage-earner headed households in Hartford. Of those, 293 were female-headed and 88 were male-headed. Of the female households with children under 18, 119 or 41% made less than 46.5% of the median household income. Consequently, many of these households will be paying considerably more than 30% of their income on housing and thus experience housing cost burden.

### Senior Citizens

Senior citizens represent those 65 years and older. The Census indicates that in 2000, there were 1,519 senior citizens in Hartford, which represents 14.7% of the population. That was an increase from 12.1% in 1980 and 13.1% in 1990. In 2000, households with a senior citizen accounted for 1,095 or 24.3% of all Hartford households. Of senior citizens households, 493 or nearly 1/3 of all senior citizen households lived alone. Since many seniors live on limited incomes, escalating housing costs can lead to housing cost burden. With this in mind, there have been several senior housing facilities built in Hartford over the last twenty years using federal housing program funds. They include Graystone Apartments, Village Apartments, Colodny Apartments, and Windsor Hollow Apartments.

As the “baby boomer” generation approaches retirement, there will be an even larger percentage of senior citizens, the result of which is likely to be a demand for different types of senior housing facilities. In 2000, the Valley Terrace assisted living facility was completed. Additional housing for seniors is possible through accessory apartments added to single-family houses. The following is a list of senior housing in Hartford.

**Table IV-21**  
**Hartford Housing for Senior Citizens and the Disabled**

<u>Name of Facility</u>	<u>Units</u>
Graystone Apartments	34
Village Apartments	14
Windsor Hollow Apartments	26
Colodny Apartments	8
<u>Valley Terrace Assisted Living</u>	<u>61</u>
Total	143

Note: In 1991, a change in federal policy combined senior and disabled housing.

### Disabled

According to the 2000 Census, there were 1,653 people age 5 and above in Hartford with some level of disability. This translates to a rate of 16.1% and is similar to the 17.1% rate for Vermont but is lower than the nationwide rate of 19%. For seniors, the rate was 33.6% in Hartford, 38.6% for Vermont and 41.9% for the U.S. Updated census figures were not available for 2010. Besides the possibility of reduced earning potential, leading to housing affordability problems, there may also be accessibility needs associated with disabilities. Repeated requests for accessible apartments, some of which are from persons needing to locate near the VA Hospital,

make it appear that there is a need for additional accessible units in Hartford. Presently, there are 21 units accessible to the disabled under public/non-profit management. In addition, there are an uncounted number in the private sector.

Institutional Care

As the population grows older, there will continue to be an increasing need for more diverse elderly housing such as nursing homes and extended care. Many facilities serve a regional need. In Hartford, there is one nursing home with 67 beds, and the VA Hospital has a total of 60 beds.

Homeless

Founded in 1981, the Upper Valley Haven (Haven) is one of eleven emergency shelters in Vermont. The Haven has two facilities on Hartford Avenue; the Byrne Shelter (2004) provides emergency shelter for homeless families with at least one minor child and the Hixon House (2010) which provides shelter for adults. In addition to the two shelters, the Haven also has a food shelf and distributes food and clothing to those in need. The clothing room had 6,255 visits in 2010 and 6,715 visits in 2011. The food shelf had 8,430 visits in 2010 and 10,607 visits in 2011.

**TABLE IV-22  
UPPER VALLEY HAVEN USE**

<u>Byrne Shelter (Families)</u>	<u>2010</u>	<u>2011</u>
Total Persons Served	125	133
Total Families Served	41	40
Total Children	68	67
Total Adults	57	66
Average Length of Stay (Days)	86	87
Median Length of Stay (Days)	65	74
<u>Hixon Shelter (Adults)</u>	<u>2010</u>	<u>2011</u>
Total Persons Served	80	146
Total Men Served	51	102
Total Women Served	29	44
Average Length of Stay (Days)	37	60
Median Length of Stay (Days)	26	33

Source: Upper Valley Haven

The majority of those served by the Haven come from within a 60-mile radius of White River Junction from both sides of the Connecticut River. The Haven does not provide shelter to individuals with active alcohol or drug abuse issues. They work closely with other local agencies such as the WISE Domestic and Sexual Abuse Violence Program, the VA Hospital, and the Vermont Office of Economic Services, among others. In addition to shelter, the Haven works closely with their guest families to help them take the steps needed to secure their own

housing and maintain it. They also have a very active program for assisting the younger guests with their schoolwork.

### **Hartford Housing with Public and Non-Profit Subsidies**

In 1990, there were 307 housing units in Hartford that had some form of public or non-profit subsidy. Presently, the number has increased to approximately 513 units. Between 2000 and 2005, there were 498 new housing units added to Hartford's housing stock. Based on an estimate by the Department of Planning and Development Services, approximately 95 units or 19.1% were rental units. Of those new rental units, 68 or 71.6% have some form of subsidy.

One of the most common housing assistance programs is the Department of Housing and Urban Development (HUD) Section 8 housing voucher program, which provides a rental subsidy to eligible households. To qualify for HUD Section 8 rental subsidy, a household must be low-income, which HUD defines as having a household income of less than 50% of the county median (adjusted by household size). Based on the median household income of \$66,800 for a family of four in Windsor County, the HUD levels for December 2011 are:

1 PERSON	2	3	4	5	6	7	8
\$23,800	\$27,200	\$30,600	\$33,950	\$36,700	\$39,400	\$42,100	\$44,850

After applying for and obtaining this subsidy, a household pays 30% of its monthly income toward rent and utilities, while the Section 8 Program pays the rest. The housing costs of that household then meet the definition of "affordable." Without rental assistance, it is unlikely that a household at these income levels would find affordable rents. Recent changes in the HUD Section 8 Program have required that 75% of the vouchers go to households earning less than 30% of the median household income (very low-income) and 25% to households earning less than 50% of the median household income (low-income). This has resulted in an increasing percentage of Section 8 vouchers to the elderly and the disabled living on Social Security or disability income with a corresponding decrease in Section 8 vouchers for families. Housing experts note that there is an increasing demand for affordable housing for working families struggling with higher housing costs.

In 2011, the Hartford Housing Authority ceased to exist. As a result, the forty-three Section 8 housing vouchers that were issued for Hartford were transferred to the Vermont State Housing Authority. Due to cutbacks in the Section 8 program, there have not been any additional vouchers provided in many years. As such, many housing authorities have long waiting lists. The Vermont State Housing Authority administers 173 state housing subsidies in Hartford, most of which are Section 8 vouchers. However, the state vouchers are not restricted to housing in Hartford and therefore can move with the household to another community.

The following is a list of housing in Hartford that has some form of public or non-profit subsidy. Please note that there is small degree of overlap since some of the units house people who have been provided a Section 8 voucher.

**TABLE IV-23  
HARTFORD HOUSING WITH PUBLIC OR NON-/PROFIT SUBSIDIES  
SERVING LOW-INCOME HOUSEHOLDS\*  
2011**

<b>White River Junction</b>	
Colodny House (senior and disabled)	8
Morale House (family)	3
Northwoods (family)	28
Village Apartments (senior and disabled)	14
Graystone Village (senior and disabled)	34
Stony Creek (family)	18
Twin Pines Houses	<u>10</u>
<b>White River Junction Subtotal</b>	<b>117</b>
<b>Wilder</b>	
Hollow Drive (family)	18
Windsor Hollow (senior and disabled)	26
Stony Creek (family)	18
Briars (family)	24
Brookview (family)	24
Twin Pines House	1
Twin Pines Condo	1
Upper Valley Habitat for Humanity Houses	<u>3</u>
<b>Wilder Subtotal</b>	<b>115</b>
<b>Hartford Village</b>	
Anna Pluhar (family)	3
Hillcrest Manor (family)	9
School Street (family)	8
Overlook Housing (family)	10
Twin Pines House	<u>1</u>
<b>Hartford Village Subtotal</b>	<b>31</b>
<b>Quechee</b>	
Sunrise Settlement (family)	22
Quechee Pines (family)	<u>9</u>
<b>Quechee Subtotal</b>	<b>31</b>
<b>Vermont State Housing Authority Section 8 Vouchers in Hartford</b>	<b>172</b>
<b>Vermont State Housing Authority Managed Units</b>	<u><b>36</b></u>
<b>TOTAL UNITS WITH PUBLIC OR NON-PROFIT SUBSIDIES</b>	<b>502</b>

Source: Hartford Lister's Office, Hartford Department of Planning and Development Services, Hartford Housing Authority, Vermont State Housing Authority and the Twin Pines Housing.

\* Eligible households typically make less than 50% of the median household income



The American Community Survey identified 63.2% of all Hartford rental households, paying more than 30% of their income for housing costs. Even with stabilizing housing prices in the last few years, there is an affordability problem for many Hartford households. The increasing gap between wages and housing costs will increase the number of households who are exceeding the 30% affordability rule. Working low-income households are the most vulnerable and have the greatest difficulty finding affordable housing. The result is that the only permanent new housing that is being constructed for these households is by the non-profit organizations. Consequently, the Town should support the efforts of these non-profit organizations to create housing for working households.

Between A Rock and A Hard Place; Housing and Wages in Vermont: Over the last ten years, the Vermont Housing Council and the Vermont Housing Awareness Campaign have published an annual report that tracks the gap between housing costs and wages. According to the annual update, there has been an increasing gap between housing costs and wages in Vermont.

For rental housing, a modest two bedroom apartment in Vermont costs \$990 per month. The housing wage to afford the average two-bedroom apartment would be \$19.03. According to *Between a Rock and a Hard Place*, at least 53% of Vermont's non-farm employees work in occupations that pay less than \$19.03 per hour.

Other issues of concern that came from the Report include the following:

- The median price of home in Vermont in 2010 increased 3% from 2009 to \$194,000.
- The median price of a new house built in Vermont in 2010 (that was not part of an affordable housing project) was \$299,000.
- Although interest rates remain low, closing costs in Vermont increased 37% between 2009 and 2010.
- In Vermont, 47% of renters and 38% of owners pay more than 30% of their income for housing costs. Vermont ranks 33<sup>rd</sup> in the nation in housing affordability.
- Between 2005 and 2010, home heating fuel prices have increased; including propane 41%, oil 32%, and electricity 23%.
- Homelessness in Vermont continues to grow. In January, 2011, a survey of homeless shelters and service providers counted 2,500 who were homeless.
- Vermont's homeownership vacancy rate is 1.9%, which is the 13<sup>th</sup> lowest in the U.S., while the rental vacancy rate of 6.1% ranks fourth lowest in the U.S.
- Median wages for many of Vermont occupations are far below the housing wage.

To counter many of these problems, the Report states that, "To address Vermont's housing needs, and the Vermont economy, as a whole, the state should focus on enhancing sustainability. By continuing its wise policy of making key public investments in housing infrastructure that is permanently affordable, Vermont will improve the sustainability of its economy and the lives of all Vermonters who depend on it for their wellbeing."

## HOUSING AS A REGIONAL ISSUE

In the last few years, a great deal has been written about the lack of affordable housing in the Upper Valley region and throughout the State of Vermont. In particular, there have been two studies written on the subject. The findings are listed below:

Upper Valley Housing Needs Analysis: Due to concerns that a housing crisis was emerging, the *Upper Valley Housing Needs Analysis* (UVHNA) was commissioned for communities on both sides of the Connecticut River that make up the Upper Valley Region. Completed in August, 2002, the Study included 57 communities in three Labor Market Areas (LMA):

- Hartford/Lebanon LMA (35 communities with a total population of 90,329 in 2000)
- Claremont, NH LMA (13 communities with a total population of 20,458 in 2000)
- Springfield, VT LMA (9 communities with a total population of 40,578 in 2000)

The Study revealed that the Upper Valley Region experienced strong economic growth during the 1990s which generated a large number of new jobs, a housing shortage and significant housing affordability crunch. The study reported that if the rate of new housing is not doubled this decade, the housing shortage will worsen and anticipated job growth could suffer. The following are some of the key findings:

Upper Valley Region (All three LMAs):

- To make up for the current housing shortage, the region needs make up for a shortfall of 3,100 new units. To accommodate anticipated job growth and household growth this decade, an additional 9,700 new units are needed region wide.
- Without a doubling of the rate of housing production this decade, economic growth in the region will be hampered.
- During the 1990s, region wide, 1,000 seasonal units were converted to year-round occupancy. The current rate of seasonal housing is 15%.

Hartford/Lebanon LMA:

- Nearly 11,000 new jobs were added in the Hartford/Lebanon LMA, primarily due to growth of Dartmouth College, Dartmouth-Hitchcock Medical Center (DHMC), new technology firms at Centerra Business Park, the Airport Business Park, and at retail establishments in West Lebanon. Unemployment rates remain lower than 2%. The 1990s showed that growth at Dartmouth College and DHMC helped reduce the effects of a regional recession.
- Housing growth has not kept pace with housing demand. Job growth and the growth in households surpassed growth in housing. While 5,000 new households were added to the LMA, only 2,800 new housing units were created. 5,600 new units are needed this decade.
- 2/3 of the job growth occurred in New Hampshire, while housing growth was evenly split between Vermont and New Hampshire.
- Home ownership and rental vacancy rates are less than half normal levels.

- Housing costs increased approximately three times faster than income growth. This has led to limited housing choice and strained affordability.
- Housing is least affordable in the Lebanon/Hartford LMA. Middle-income families earning up to \$40,000 per year have limited housing choices and difficulty finding affordable housing. A household earning the median income could afford a \$125,000 home, while the median home price was \$170,000. The result was that 25% of households experience ownership affordability issues.
- Low-income households have to make major compromises in their housing selection.
- Meeting the need for more rental housing will be even more difficult. Forecasts identify the need for 1,800 new rental units.
- Job growth is expected to continue at the 1990s rate.
- Without a much higher housing production rate this decade, the current housing crunch will continue.

Windsor County Housing Needs Assessment: The Vermont Department of Housing and Community Affairs commissioned housing studies for all fourteen of Vermont's counties. In 2005, the *Windsor County Housing Needs Assessment* was completed. The county wide study included twenty-four municipalities. The *Study* documented the lack of affordable housing opportunities for low-to-moderate income Windsor County residents and confirmed that a serious housing shortage has emerged. The *Study* also noted that the impact is particularly burdensome in the northern part of the County due to proximity to Hanover and Lebanon, New Hampshire. The *Study* included two focus group discussions: one in Springfield and the other in Hartford. The following are some of the key findings:

- In the past few years, the cost of housing has increased as much as 30% a year.
- There are few rental housing options. In 2005, the shortage was estimated at 2,231 rental units.
- In 2004, the number of subsidized housing units totaled 1,079. Of that number, 54% were units restricted to elderly or disabled tenants. Subsidized housing provides for 24% of low-income renter households resulting in a current gap of 746 affordable elderly rental units and 2,807 units for the non-elderly. Statewide, there are 3,000 people on the Section 8 housing voucher waiting list. The report acknowledged that there are not enough housing funds to go around.
- By 2010, there is a need for construction of 813 owner-occupied homes to bridge the gap between supply and demand.
- A gap exists between income needed to purchase a home and the purchase price. The gap is expected to widen.
- The elderly population is growing at a faster rate than the general population. In 2000, more than 1,938 residents had a mobility or self care limitation. This represents a 16% of all Windsor County households. According to the Vermont Department of Aging and Independent Living's *Shaping the Future of Long Term Care & Independent Living* report, the projected number of persons with long-term care need will grow to more than 2,100 by 2010.
- High growth is expected in the 45 and 69 age group and the 80 and older age group, while the 25-44 age group will experience a significant decline and the 15-24 age group will expand slightly.

- The trend of smaller household size is expected to continue. Between 2000 and 2010, the number of households in Windsor County is expected to grow at 6%, while the population is expected to grow at 3%. This creates greater demand for more housing units.
- According to the 2000 U.S. Census, the lowest-income households were much more likely to have mobility and/or self-care limitations and housing problems (as measured by cost burden, and/or overcrowding, and/or without adequate plumbing or kitchen facilities).
- Windsor County has a much lower unemployment rate than the State average. Four of the top five types of occupations in Windsor County are lower-paying service positions. This will create a need for more affordable housing.
- It is expected that people will be traveling more due to the inability to find affordable housing where jobs are located.
- The rental vacancy rate was 4.7 in Windsor County compared to 3.9% for Vermont. The vacancy rate for owner-occupied housing in Windsor County was 1.5%, slightly lower than the State average of 1.7%.
- The number of low-income households is expected to increase by 896 households between 2000 and 2010.

## **CHALLENGES TO THE DEVELOPMENT OF NEW HOUSING**

There are a number of challenges to the development of new housing, many of which are not unique to Hartford.

### **High Land Costs**

Over the past several years, there has been a surge in the cost of large parcels and building lots in both the rural and village areas. It has been reported that the price of land more than doubled in just the last few years.

### **Supply of Developable Land**

As the Town has grown, a great deal of new housing development has occurred on large areas of open, easily developable, relatively flat lands. As the number of these sites decreases, there is more pressure to develop what are considered the more marginal properties, with steep slopes, shallow or wet soils, etc. There also is increasing pressure on agricultural and forested lands. Due consideration has not been given to infill lots (vacant lots in built-up areas) and underdeveloped lots (land that could be developed more intensively) as part of the supply of developable land.

### **Site Preparation Costs**

As the amount of easily developable land decreases, there is an increase in the amount of development on marginal lands. These parcels have higher site preparation costs, which directly affect the cost of housing.

## **High Infrastructure Costs and Fees**

In recent years, there have been rising infrastructure costs. Providing water, sewer, roads, electricity, etc. has often increased at a faster rate than inflation. Town hook-up and impact fees have been developed to ensure that development pays its way without local government subsidies.

## **State and Federal Environmental Regulations**

As our society learns more about the impacts of development, state and federal rules have been developed to mitigate impacts. These requirements add to the cost of development. The most recent requirement has been the new federal stormwater management regulations.

## **Neighborhood Opposition to New Development**

In recent years, there has been an increase in neighborhood opposition to new development proposals. This results in longer time periods to get local and state development approval and can result in further legal delays.

## **Compatible Design**

The term “compatible design” refers to the consistency in scale, quality, or character between new and existing development so as to avoid abrupt and/or severe differences. As new residential development occurs in established neighborhoods and village centers, it is critical that the design of new development be sensitive to the established neighborhood character to ensure compatibility. Since zoning regulations do not typically go far enough to ensure compatible design, design review districts are far more effective. In Hartford, there is currently only one design review district (Downtown White River Junction). The use of a planned unit development is another method that the Planning Commission can use to ensure compatible design. With design review or a planned unit development, the developer should work closely with the Planning Commission to achieve a compatible design. As more infill development occurs, compatible design becomes even more important. The Town should work with private-sector developers and housing organizations to encourage compatible design for new housing in Hartford.

## **Accessible Design**

Accessible design relates to providing accessibility to the disabled and the elderly. With an ever-increasing older population, accessible design should be encouraged.

## **Reduced Funding for Affordable Housing**

In recent years, there has been a decrease in the amount of state and federal funding for affordable housing. The Town should work with the Upper Valley Housing Coalition, Twin Pines Housing Trust, the White River Area Housing Development Corporation, and the private-sector development community to identify possible solutions to these challenges.



## HOUSING OPPORTUNITIES

### Infrastructure

Hartford is fortunate to have four out of five of its villages served by Town water and sewer. This creates opportunities for more intensive development than areas served by on-site wells and septic systems. The Town should ensure that there is adequate expansion capacity of municipal water and sewer facilities to accommodate future residential and commercial development.

**TABLE IV-24  
HARTFORD LAND AREA SERVED BY TOWN WATER/SEWER  
2006**

	<u>ACRES</u>	<u>PERCENTAGE</u>
Total Land Area of Hartford	29,434	100.0%
Area Served by Town Sewer	4,013	13.6%
Area Served by Town Water	2,659	9.0%
Area Served by Town Water & Sewer	2,357	8.0%

Source: Two Rivers Ottauquechee Regional Commission, July 2006

### Zoning Recommendations

The process to update the 2007 Hartford Master Plan resulted in a series of zoning recommendations that encourage higher residential densities in the village areas that are served by Town water and sewer, are located near transit service, and are close to community facilities and commercial services. The recommended densities and dimensional requirements were consistent with the development patterns of Hartford's historic villages. These recommendations were implemented as part of the 2008 zoning amendments. In addition, as an alternative to requiring that a certain percentage of new housing be affordable, the 2007 Master Plan recommended that a density bonus be provided for affordable housing projects in areas served by Town water and sewer (for household incomes less than 80% of the median household income). This recommendation should be implemented with the next round of zoning amendments.

### Infill Development

There is a significant amount of land in the villages that are served by Town water and sewer. Many of these properties are relatively level and would be good candidates for infill development. Increased densities will provide greater incentive to develop these parcels.

### Redevelopment of Underdeveloped Land

There are properties throughout Town that are underdeveloped. Redevelopment at more intensive levels would be appropriate especially in light of the existence of infrastructure and increasing property values.

## **Accessory Apartments**

In 2004, legislation in Vermont was signed into law that provides an opportunity for homeowners to add an accessory apartment to their house. According to the law, municipalities must allow homeowners the opportunity to add one accessory dwelling (an efficiency or one-bedroom apartment unit that is clearly secondary to the owner-occupied house and that the apartment would include all the amenities needed for independent living) as long as they meet the following conditions:

- The homeowner must reside in the residence.
- The property has the capacity to handle the additional demand for wastewater disposal.
- The size of the accessory dwelling unit equals no more than 30% of the total square footage of the house.
- The property meets any applicable setback, coverage, and parking requirements contained in the Town zoning bylaws.

Municipalities can require a Conditional Use Permit for accessory apartments that involve building of a new structure on the property or that increases the height or floor area of the house or expands the size of the parking area. The new law is an opportunity for communities to create additional rental housing while providing homeowners with supplementary income. The Town should promote this housing alternative and establish a streamlined review process.

## **Mobile Homes**

Mobile homes provide an affordable housing option to the traditional stick-built single-family home for many Vermonters. In Vermont, State Statute requires that mobile homes, modular housing, or prefabricated housing to be treated the same as stick built housing. State Statute also prevents municipalities from prohibiting mobile home parks. In Hartford, mobile home parks are allowed as a conditional use in the RC-2 zoning district.

According to the 2000 U.S. Census, mobile homes made up 7.7% of the total housing stock in Vermont. In Hartford, there were 407 mobile homes or 7.4% of the Town's housing stock. In 2005, the number of mobile homes remained at 407 with 314 located in mobile home parks and 93 mobile homes with land. According to the 2004 Mobile Home Parks Report, there were a total of 254 mobile home parks in Vermont with a total of 7,308 lots. The average size of Hartford's mobile home parks (62.8 units) is more than double the State average of 28.8 units. Of the five mobile home parks in Hartford, two are served by Town water and sewer and three are located on private water and sewer systems. Four of the mobile home parks are privately owned, while the Olcott Falls Mobile Home Park was purchased by the non-profit corporation Housing Foundation, Inc. in 1993. Statewide, the trend has seen a slight decrease in the number of mobile home park lots. In 1998, there were 7,505 mobile home park lots. In 2004, the number decreased 2.7% to 7,308.

According to the Vermont Department of Housing and Community Affairs, Hartford is classified as having a medium number of mobile home park lots relative to the total number of housing units in Town. In 2004, Windsor County had a median mobile home park rent of \$243 per lot,

which is very close to the State median rent of \$246 per lot. Statewide, the median lot rent for a non-profit or cooperatively owned mobile home park was \$229.

There have been many improvements in the quality of mobile homes in recent years. In 2003, there were 300 new mobile homes sold in Vermont. Approximately 2/3 of them were double-wide units. The average price of a new double-wide mobile home in Vermont during 2003 was \$57,100 excluding land, while the average price of a used mobile home was \$24,963 excluding land.

### **Local and Regional Non-Profit Housing Organizations**

- Twin Pines Housing Trust (TPHT): With an office located in White River Junction, TPHT was established in 1990 and serves communities throughout the Upper Valley. As a non-profit housing developer, the organization is committed to perpetual affordable housing. The organization's portfolio (either owned by TPHT or partnered with other organizations) includes 112 apartments, 9 mobile home lots, and 25 single-family homes. In addition, they have an additional 80 units in the planning or development stages throughout the Upper Valley. Presently, there are 76 TPHT units located in Hartford.
- Upper Valley Habitat for Humanity (UVHFH): With an office located in White River Junction, the UVHFH is one of eight Vermont chapters of the international organization. Established in the Upper Valley in 1986, the mission of the organization is to eliminate substandard housing and homelessness in the community. The emphasis is on home ownership, with sweat equity required in place of a down payment. To date, UVHFH has been responsible for the creation of three new houses in Hartford and seventeen houses in other Upper Valley communities.
- COVER Home Repair: With an office located in White River Junction, COVER (Corps of Volunteers Effecting Repair) was created in 1998 under the umbrella of the Tri-County Community Action Programs. It formed from a collaboration between Dartmouth College students, other community volunteers, and a Bates College graduate who wanted to complete home repair projects that would benefit families and individuals with low-incomes. COVER is a small repair group addressing the urgent home repair needs of low-income, elderly and disabled members of the Upper Valley community. Projects focus primarily on repair or restoration of pre-existing structures: wheelchair ramp construction, pitched roof construction/repair/restoration, interior weatherization/insulation, and window or cabinet installation. COVER minimizes the cost of repair by using salvaged, at-cost materials to benefit homeowners who are physically or financially unable to complete the repair themselves.
- Upper Valley Housing Coalition: Established in 2002 as an outgrowth of the Vital Communities of the Upper Valley, the UVHC was created as a means to bring together different constituencies (business, community, municipal groups and leaders and non-profit organizations) affected by the growing housing shortage to serve as a

vehicle to work together to increase the supply of diverse workforce housing. The concept of workforce housing includes affordable housing, market-rate housing, mixed-income housing and ownership, and rental housing. The UVHC considers the availability of diverse housing choices to be critical to the continued economic vitality of the Upper Valley and to maintain the high quality of life. It also is seen as a tool to promote the development of a range of housing opportunities through several financial vehicles.

## **RECOMMENDATIONS**

This review of the housing and demographic trends provides a picture of what the Hartford community has been, is, and could be in the future. The type, availability, and affordability of housing directly influence the people who constitute the community. Current trends have shown that more and more the cost of housing is outpacing the incomes of the people who reside in Hartford. The Town must ask if it wants to be a community where its school teachers, firefighters, single parents, and elderly can find housing. It is through the Town Plan planning process and implementation of the following strategies and recommendations that the future trends can be influenced.

### **Strategy: Advocate for a diverse housing stock that promotes a range of housing types and costs.**

1. Encourage the production of adequate amounts of new housing to meet the housing needs of residents at all socioeconomic levels.
2. Encourage the retention of existing housing stock, including the upgrading of substandard housing.
3. Encourage public and private mixed-income single-family and multi-family residential development within neighborhoods and village areas where there is Town water and sewer and that are located in close proximity to public transit and community facilities.
4. Continue to support the development of housing for special-needs populations, including first-time home buyers, senior citizens, single-parent families, single persons, disabled persons, and the homeless.
5. Continue to support the efforts of the Hartford Housing Authority and the White River Area Housing Development Corporation to administer rental assistance programs for low-income residents of Hartford and assistance to other special-needs populations.
6. Support the Upper Valley Housing Coalition's regional efforts to overcome the current regional housing shortage, including participation in housing workshops and efforts to reduce the cost of developing new housing.
7. Work with non-profit housing organizations to develop affordable housing projects and secure perpetuity whenever possible.

8. Support local and regional economic development initiatives aimed at raising the income levels of current residents, thereby increasing income available for housing costs.
9. Promote the use of accessory apartments as a means of increasing the availability and affordability of housing.
10. Encourage the renovation and re-use of existing buildings to meet various housing needs.
11. Investigate the use of Town and State properties for the development of affordable housing.

**Strategy: Facilitate the development of housing through the zoning and subdivision processes.**

12. Revise zoning densities and dimensional requirements to encourage infill housing in village areas, taking into consideration existing settlement patterns.
13. Encourage mixed-use development in the village centers.
14. Allow a density bonus of up to 25% for affordable housing projects in areas served by Town water and sewer.
15. Create a residential zoning district that allows multi-family as a permitted use.
16. Ensure that higher density development does not detract from the historic character of Hartford's villages and the downtown.
17. Encourage the development of multi-family housing on a scale and design compatible with existing neighborhoods.
18. Encourage new rural housing development to be clustered in order to preserve the greatest amount of open space and blend harmoniously with the natural environment.
19. In the Downtown, encourage the rehabilitation of vacant or under-utilized buildings to provide housing on the upper floors, while encouraging first-floor commercial use.
20. Encourage innovative residential site designs that promote connections with existing neighborhoods and village areas.
21. Streamline the permitting of accessory apartments.

**Strategy: Provide the necessary resources to enable housing production.**

22. Create a municipal fund for the rehabilitation of substandard housing.



23. Develop a historic housing rehabilitation program for properties listed or eligible for listing on the National Register of Historic Places.
24. Consider reduced application and impact fees for new permanent affordable housing.
25. Conduct a study to help identify areas most suitable for new residential development.

## **CHAPTER V**

### **ECONOMIC DEVELOPMENT**

#### **INTRODUCTION**

This report summarizes the results from the economic analysis and community participation phases of Hartford's Economic Development Strategy process and presents the recommended economic development goals and strategies for Hartford. It is organized in four parts. First, an analysis of Hartford's economic performance and structure is presented. Second, Hartford's major assets and advantages along with its major challenges are summarized. Third, the key elements of the town's economic development vision and specific economic development goals are articulated. These two sections draw upon a community visioning session held on January 9, 2002, six focus groups held January 9 and 10, 2002, and individual interviews.

In the fourth section, a six-part economic development strategy is recommended to advance these economic development goals and build on key Hartford assets. The rationale for each component strategy and specific action steps to implement it are discussed. In the concluding part of the strategy section, an implementation plan is provided that addresses overall management of the strategy and the delegation of responsibility for major action steps.

The planning process to formulate Hartford's economic development strategy incorporated information and input from six sources:

- A review of existing reports, studies, and analyses by the Town of Hartford and other sources;
- An analysis of economic data and trends for Hartford, Windsor County, and Vermont;
- Input from the January 9, 2002, community vision session;
- Input from two meetings of the Economic Development Strategy Steering Committee;
- Focus groups held on January 9 and 10, 2002, with local businesses, town, and civic organizations, the tourism industry, property owners, the real estate community, and banks and economic development professionals; and
- Individual interviews with additional businesses, non-profit organizations, and government leaders

#### **DEMOGRAPHIC AND ECONOMIC ANALYSIS**

This section summarizes key information and presents findings from an analysis of demographic and economic data on Hartford, Windsor County and Vermont. It is organized in three parts:

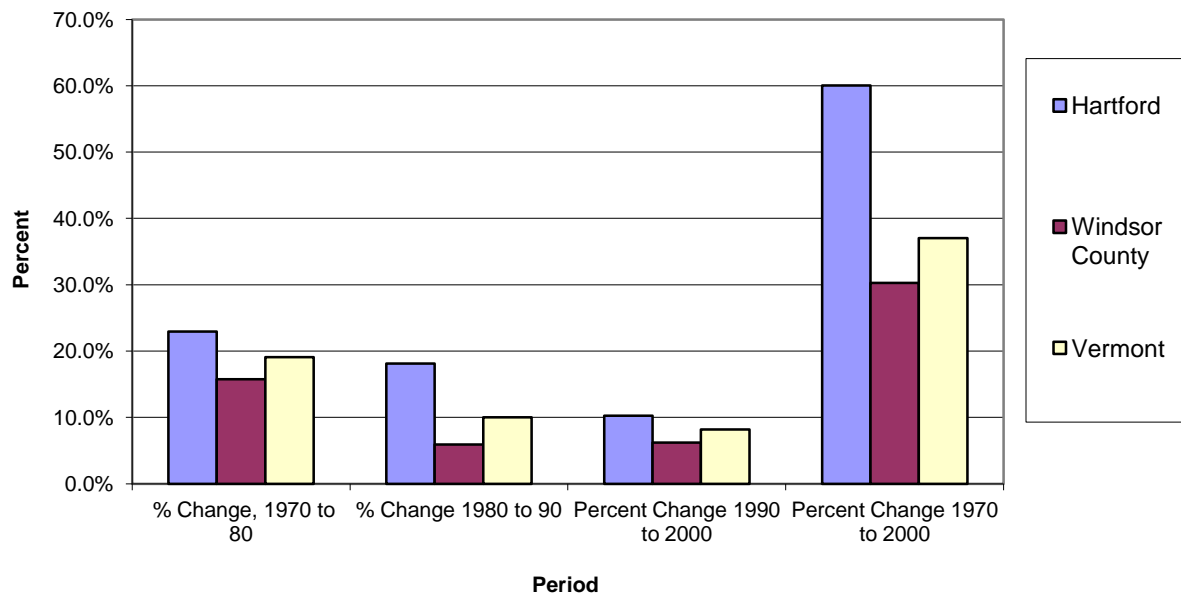
1. A brief overview of population trends and composition;
2. An assessment of the Town's economic performance over the past decade; and
3. An analysis of the Town's current economic structure and major sources of job growth during the 1990s.

This analysis highlights where Hartford is performing well and identifies faster growing sectors and important industry concentrations that may be appropriate targets for future growth. It also identifies potential problems and challenges that help to define the town's economic development goals.

### Demographic Profile

Hartford's population has grown rapidly over the past thirty years, far above the County and State growth rates. The town's 2000 population was 10,367, a 10.2% increase from 1990, compared with 6.2% growth for the county and 8.2% for all of Vermont. Figure V-1 presents population growth for Hartford, Windsor County and Vermont for each of the last three decades and cumulatively from 1970 to 2000. Over this thirty-year period, Hartford's population grew at twice the county rate and 62% faster than Vermont.

**Figure V-1. Population Growth By Decade, Hartford, Windsor County and Vermont**



Hartford's population is slightly older than the State's and has a higher concentration of renters than both the Windsor County and Vermont. Hartford's median age was 40 years in 2000, above Vermont's median age of 38 but below Windsor County's, at 41. Similarly, 14.7% of Hartford's population is 65 or older, compared to 12.7% for Vermont. One-third of Hartford's population consists of renters, compared to 28.5% for Windsor County and 29.4% for Vermont. This probably reflects the diversity of Hartford's housing stock and greater availability of rental units.

Despite this diverse housing stock, Hartford and the surrounding region have very low housing vacancy rates and housing demand that is outstripping the available supply. According to the 2000 Census, Hartford had a 1% vacancy rate in owner-occupied housing and 2.5% in rental housing. These levels are below that for the State and region. Vermont's vacancy rates in 2000 were 1.4% for owner-occupied housing and 4.2% for rental housing, while the respective rates for Windsor County were 1.6% and 5.1%. A recent housing study commissioned by the Upper

Valley Lake Sunapee Regional Planning Commission reports an overall regional vacancy rate of 1.5% for owner-occupied units and 4.8% for rental units<sup>1</sup>. Moreover, this study shows that housing demand has far outstripped supply, with a resulting decline in the available inventory and an increase in prices. While households grew by over 2,500 from 1990 to 2000, the number of total units grew by only 1,500 in the Hartford Labor Market Area (LMA). For the four-LMA area covered in the study, the average home price increased from below \$100,000 in 1988 to almost \$180,000 in 2001. During this period, the median rent for a two-bedroom unit grew from \$500 to \$700. The increase in housing costs has outstripped income growth, with the average home price growing 33% from 1997 to 2001 as the average income increased by only 13%.

### **Economic Performance**

This analysis assesses how well Hartford's overall economic base is growing and how well its residents are benefiting from this job growth, compared to the County and State. Four indicators of economic performance are used:

- Overall job growth;
- Unemployment rate;
- Income growth; and
- Poverty rates.

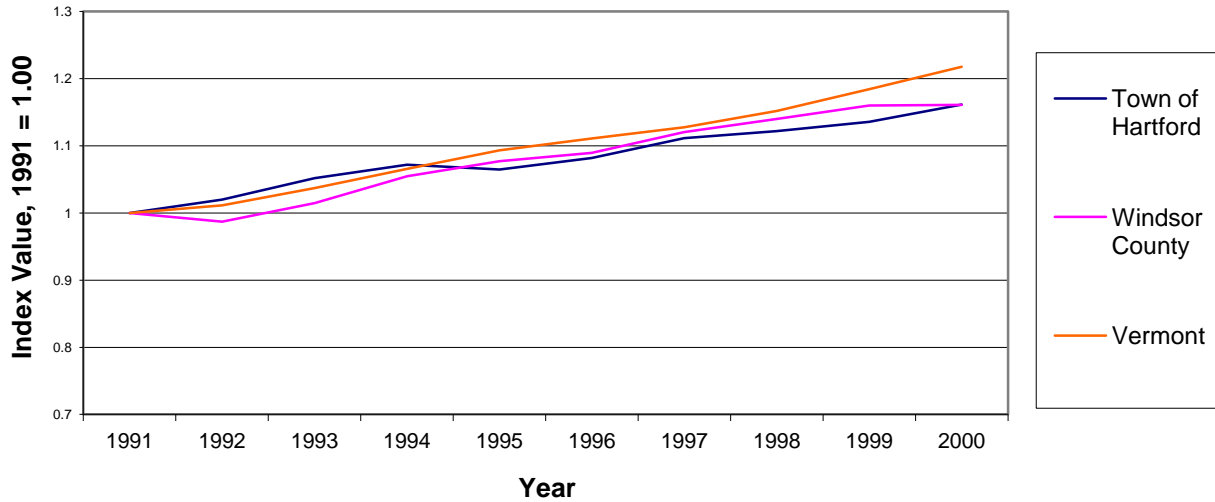
Since there is no recent data on town-level income and poverty levels, the analysis of these two indicators relies on the County-level data supplemented with some local figures on poverty among schoolchildren. It is important to note that employment figures are establishment-based data that refer to jobs at employers located in the designated area. Unemployment rates, median income, and poverty rates are household-based data that describe the residents of a designated area.

During the 1990s, Hartford's job growth was equal to the County growth rate but below that for Vermont. Figure V-2 compares trends in overall job growth for Hartford, Windsor County, and Vermont, using an index where 1991 employment equals 1.0. Vermont's total employment grew by 21.7% from 1991 to 2000, while both Hartford and Windsor County jobs grew at 16%. However, Hartford's private sector jobs grew by 22.1% over the decade, close to Vermont's 23.2% rate and above 18% growth at the county level. This indicates that slower growth in Hartford's government jobs accounts for its weaker job growth performance in the 1990s.

---

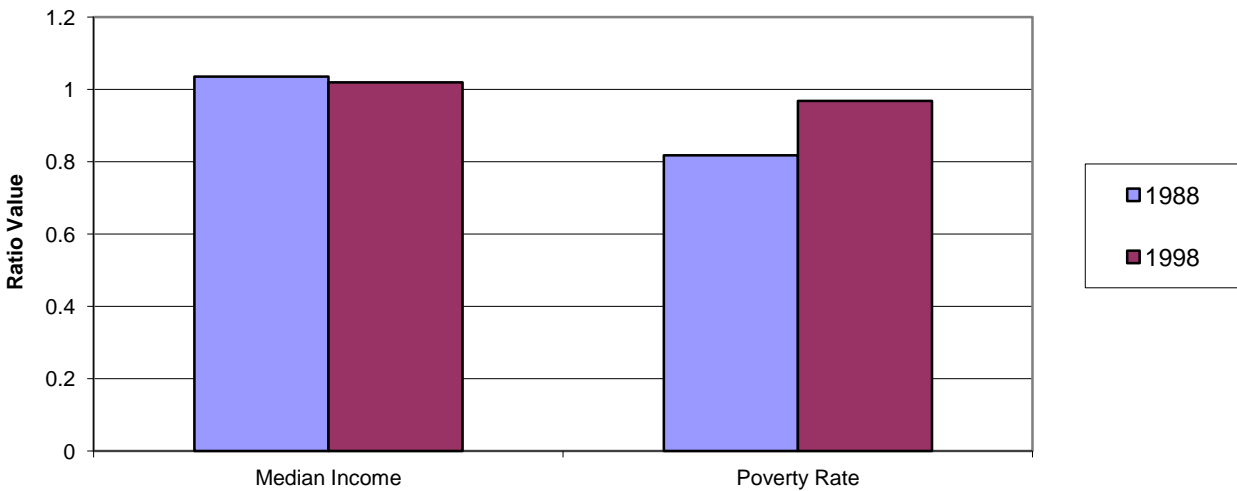
<sup>1</sup> This rate is for a four labor-market area region that includes the Claremont, Springfield, Lebanon, and Hartford Labor Market Areas (LMA). Rental vacancy rates were lowest in the Lebanon LMA at 2.1%.

**Figure V-2. Employment Growth, Hartford, Windsor County and Vermont, 1991 to 2000**



Hartford’s unemployment rate is very low and well below County and State levels, indicating that the Town residents have little difficulty securing jobs within the region. In November 2001, Hartford had a 1.5% unemployment rate. While this rate was an increase from the 1.1% rate in November 2000, it was 60% below the county rate (2.6%) and less than half of Vermont’s 3.4% rate. The unemployment rate for the Vermont portion of the Hartford-Lebanon Labor Market Area is the lowest rate in Vermont. While this very low unemployment rate is good for the region’s residents, it indicates a very tight labor market, where new and growing employers are likely to face difficulty finding sufficient employees. This problem is worsened by the limited housing availability and high housing costs, which make it more difficult for firms to attract new workers to the area.

**Figure V-3. Ratio of Windsor County to Vermont, Median Income and Poverty Rate**





While job growth and unemployment both indicate strong economic performance, income and poverty data suggest that the regions are not performing as well as the state in terms of income growth and poverty. Figure V-3 compares the ratio of Windsor County's median income and poverty rate to that of Vermont for 1989 Census data and 1998 estimated figures. In both cases, Windsor's relative position declined over the decade. Its median income dropped from 3.5% above the state level in 1989 to 1.9% above the state in 1998. More significantly, the county poverty rate increased from 8.1% in 1989 to an estimated 9.3% in 1998, while the state's poverty rate dropped slightly from 9.9% to 9.6%. Consequently, Windsor County's poverty rate changed from 81.8% of the State level in 1989 to 96.9% in 1998. Another indicator of local poverty rates is provided by Census Bureau estimates of the percentage of children living in poverty for all school districts in the United States. According to these estimates, Hartford's child poverty rate is above that of surrounding towns. Hartford had an estimated child poverty rate of 8% in 1997, which was at least twice that of its Vermont neighbors and above the rates for Lebanon (7%) and Hanover (6%).

Several key findings emerge from the economic performance analysis:

- Hartford is performing well in population and job growth;
- Unemployment is not a problem for town residents;
- Poverty is increasing as income growth is below the state level, which suggests a need for better paying jobs;
- Tight labor markets may limit the ability to attract new employers without an expansion of the labor force; and
- Limited housing availability and rising housing costs are an obstacle to expanding the labor force, while also reducing living standards for existing residents.

### **Economic Structure Analysis**

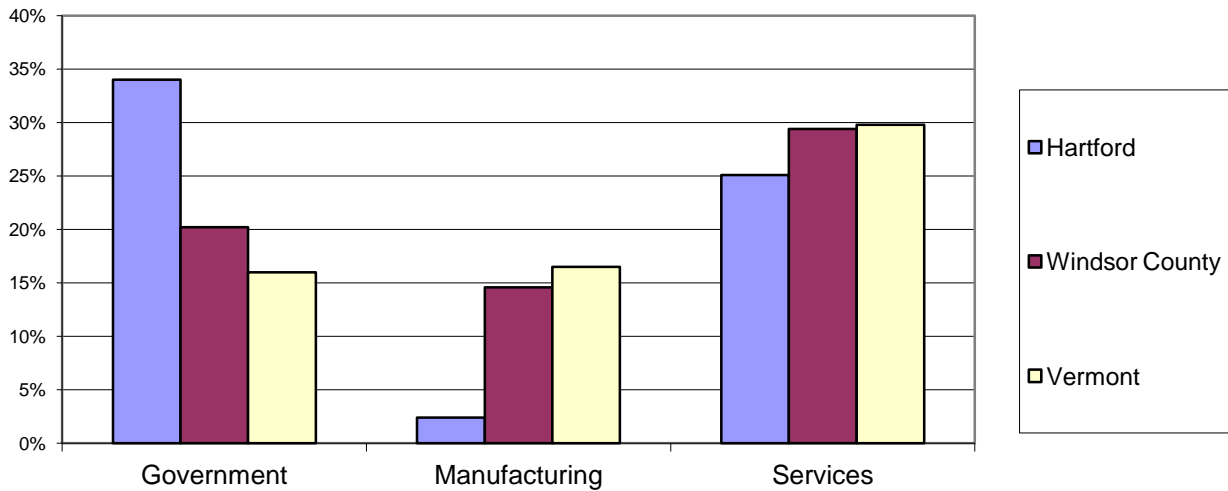
This section focuses on the composition of Hartford's economic base and the major sources of job growth for the town and county to help identify strengths and weaknesses within Hartford's economic base and to identify potential target industries for future growth.

Hartford's economic base is heavily concentrated in government jobs and has a smaller manufacturing and service sector than the County and State. Figure V-4 shows that 34% of Hartford's jobs are in the government sector, far above the 20% and 16% shares for Windsor County and Vermont, respectively. The federal government accounts for 60% of Hartford's government jobs and explains its disproportionately large government sector. Two large federal facilities, the Veteran's Administration medical center and the United States Post Office regional distribution facility, account for the vast majority of this federal employment<sup>2</sup>. These larger federal facilities also represent part of Hartford's base in health care and distribution, two important economic clusters for the town. Local government is the town's second largest employer, providing 538 jobs, primarily in the school system (396 jobs). Hartford is most under-represented in manufacturing jobs, which accounted for 14.6% of county jobs and 16.5% of state employment in

---

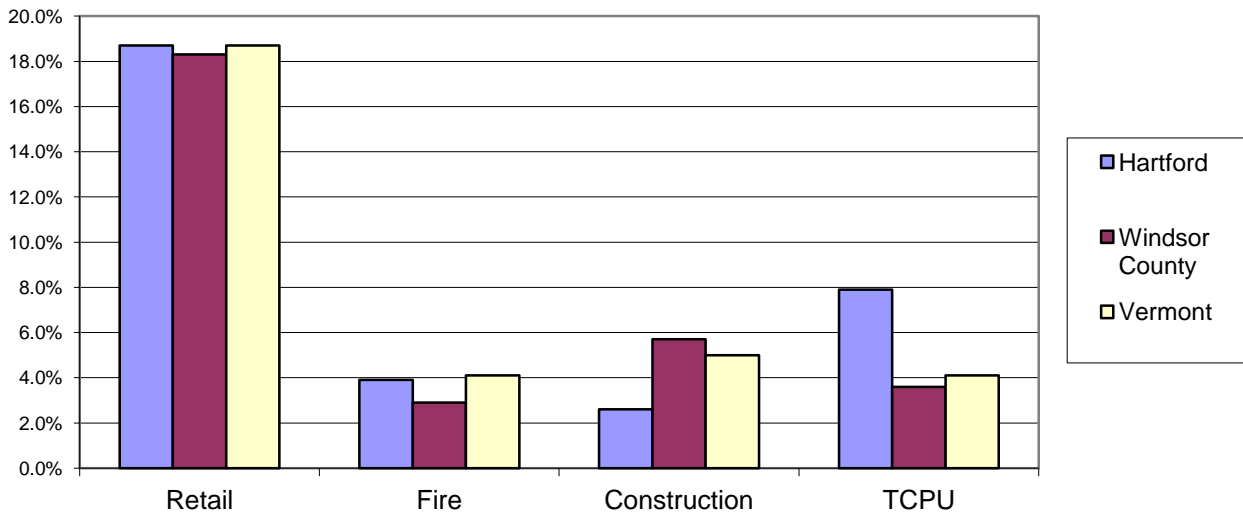
<sup>2</sup> State employment data from the ES-202 data services reports Hartford having 1178 federal jobs in 2000, with 466 in the postal services and 677 in health services.

**Figure V-4. 2000 Employment Share for Major Sectors**



2000 but only 2.4% of Hartford’s job base. Since manufacturing is one of the highest wage sectors, Hartford is not capturing an important source of good-paying private-sector jobs. The town’s service sector, at 25.1% of total employment, is somewhat smaller than the county and state shares of almost 30%. Hartford’s share of jobs is close to the state and county levels for retail and FIRE (Finance, Insurance and Real Estate) but there is a high concentration of transportation, communications, and utility jobs (TCPU) in Hartford, due in part to the town’s excellent transportation access (see Figure V-5).

**Figure V-5. Retail, FIRE, Construction and TCPU Shares for 2000**



In 2000, Hartford’s employment totaled 5,771 jobs, with 3,810 in the private sector and 1,961 in government. Within the private sector, the six largest industries, each with at least 200 employees in 2000, are:

- Eating and drinking places (452 jobs)

- Health services (320 jobs)
- Miscellaneous retail (230 jobs)
- Auto dealers and service stations (218 jobs)
- Social services (211 jobs)
- Trucking and distribution (207 jobs)

Hotels and lodging was just below this level, at 196 jobs.

When both government and private-sector employers are considered, Hartford has three key industry clusters that account for a large share of its job base and where it has a high concentration of jobs relative to the state.<sup>3</sup> These three key clusters are:

- Health care, with 997 jobs (including the VA medical center) and 17% of total employment;
- Distribution, with 673 jobs (including the Post Office facility) and 11% of total employment; and
- Tourism, with 507 jobs<sup>4</sup> and 9% of total employment.

**Table V-1. 2000 Average Annual Wages in Key Industries for Hartford and Vermont**

Sector	Hartford	Windsor County	Vermont
All Employment	\$30,628	\$27,421	\$28,920
All Government	\$38,095	\$31,755	\$30,110
All Private	\$26,785	\$26,326	\$28,694
Eating & Drinking Places	\$12,902	\$11,045	\$11,238
Health Services	\$26,389	\$26,576	\$30,397
Miscellaneous Retail	\$20,900	\$21,628	\$20,210
Auto Dealers & Service Stations	\$27,773	\$23,539	\$25,490
Social Services	\$21,051	\$17,625	\$18,322
Trucking & Warehousing	\$32,951	\$31,317	\$30,567

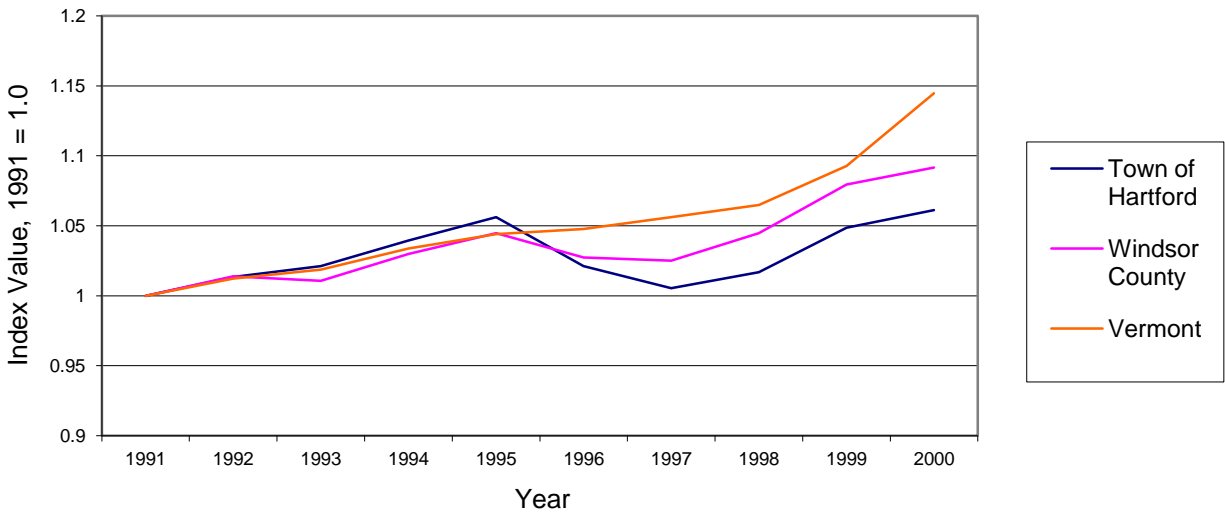
Wage levels within Hartford’s largest industries are mixed. The Town’s large government sector pays wages well above the town’s average wage and above County and State wages within the government sector. However, only one of the Town’s six largest private industries, trucking and warehousing, pays wages above the Town’s average annual wage. When compared to the private sector wage, two of the six largest industries pay above the average annual private wage of \$26,785: trucking and distribution, with an average annual wage of \$32,951, and auto dealers and service stations, with \$27,773 in annual average pay. Moreover, Hartford’s private-sector average wage in 2000 was 7% below Vermont’s average of \$28,694.

<sup>3</sup> A location quotient is a measure of an area concentration of economic activity relative to a larger region. Hartford’s location quotients for health care, distribution, and tourism relative to all of Vermont are 1.79, 8.96, and 2.1. This means that Hartford has almost twice the state share of jobs in health care, almost nine times the state share in distribution, and over twice the state share in tourism.

<sup>4</sup> Tourism employment was estimated as the total of hotels and lodging, recreation and amusement, and one-third of eating and drinking establishments and miscellaneous retail.

Hartford is growing faster than the State and County in most sectors, but its growth in government jobs is slowing. Hartford’s job growth in manufacturing, services, FIRE, and TCPU exceeded County and State growth rates during the 1990s, while its retail job growth lagged the State’s. Services were an especially important source of new jobs for Hartford, adding 465 jobs and accounting for 57% of net job growth over the decade and 67% of the net growth in private employment. Government employment in Hartford grew by 6% from 1991 to 2000, below the 9.1% growth in Windsor County and 14.4% growth for Vermont. Moreover, federal government jobs declined by 5% during the decade, due to a loss of almost 100 jobs at the Veterans Administration health center.

**Figure V-6. Government Employment Growth, 1991 to 2000**



**Table V-3. High-Growth Industries for Hartford and Windsor County 1991 to 2000**

Industry	Hartford Absolute Job Growth	Hartford Percentage Job Growth	Windsor County Percentage Job Growth
Total Employment	802	16.1%	16.1%
All Private Employment	689	22.1%	18.0%
Health Services	194	154.0%	55.8%
Social Services	131	163.8%	33.4%
			84.8%
Trucking & Warehousing	108	109.1%	
			20.8%
Miscellaneous Retail	85	58.6%	
			10.2%
Eating & Drinking Places	57	14.4%	
Engineering & Management	36	38.7%	52.2%
Business Services	-4	-2.9%	52.2%

At the industry level, Hartford's fastest growth is occurring in lower-wage businesses, while it is capturing a smaller share of regional growth in high-wage service industries. Table V-3 compares local and County growth rates for the major high-growth industries. Hartford is adding the most jobs and experiencing the faster growth in health services, social services, trucking and warehousing, and miscellaneous retail. In these four industries, Hartford's growth rates during 1990s far outpaced growth in Windsor County. However, wage levels in three of these industries are below the Town's average private-sector wage. In two key high-wage industries, business services and engineering and management services, jobs in Hartford grew at rates well below the County and State levels. Hartford's employment in business services declined by 2.9% from 1991 to 2000, while jobs in Windsor County increased by 52.2%. Although this decline reflects the loss of an important employer in 2000, Hartford's growth in business services was below the County rate throughout the decade<sup>5</sup>. In management and engineering services, County employment increased by 52.2%, compared to 38.7% growth in Hartford. State growth rates during the 1990s in these two industries were even higher.

### **Summary and Implications**

Several important findings emerge from the economic structure analysis:

- Hartford's job base is very dependent on two large federal facilities, and employment at one of these facilities has been declining over the past decade;
- Health care, distribution, and tourism are three key industry clusters in Hartford that together account for over one-third of all jobs;
- Hartford's largest and fastest growing private-sector industries have relatively low wages, below both the town's overall average wage and its average private-sector wage; and
- Hartford's growth in key high-wage service industries is below County and State rates.

These findings, along with the demographic and economic performance analysis, have the following implications for Hartford's economic development goals and strategy:

- Diversifying Hartford's economic base is an important goal to both reduce its dependence on its two large federal employers and to expand its base of high-paying jobs
- Attracting higher paying jobs is an important issue for Hartford to help raise local and regional incomes and reduce poverty rates. With a declining supply of land, it is particularly important to use this scarce resource to capture high-quality jobs.
- Expanding the earnings capacity of Hartford residents is a greater priority than simply expanding job opportunities. Low unemployment rates and modest income growth suggest that labor-forces skills and the supply of quality jobs are more important than overall job growth and access to jobs. Since most residents are employed outside the town, higher resident incomes depend on increasing their skill levels and access to better paying jobs throughout the region.
- Expanding the region's workforce housing supply and labor force is a key economic development challenge for Hartford and the entire region. While Hartford cannot address this problem alone, it can help formulate regional initiatives while advancing sound projects and programs within the town.

---

<sup>5</sup> From 1991 to 1999, Windsor County business services employment grew by 87%, compared to 33% for Hartford.



- Health care and tourism are two important industries to retain and grow, given their important role in the Hartford's economy, although private-sector wages in these industries are not high.
- Distribution is another potential target industry, especially given its higher paying jobs, but the land-and traffic-intensive nature of this industry makes it less attractive.

## **DEVELOPMENT ISSUES AND OPPORTUNITIES**

Economic development opportunities are also shaped by the availability of land and buildings to house business growth. Hartford's available real estate falls into four categories:

- Undeveloped land zoned for commercial or industrial use that is served by water and wastewater infrastructure
- Undeveloped land zoned for commercial or industrial use that **is not** served by water and wastewater infrastructure
- Vacant building space
- Under-utilized land and buildings

Hartford's inventory of undeveloped land served by infrastructure is fairly limited, primarily consisting of 110 acres in the Sykes Mountain Avenue district and a handful of vacant parcels in business parks in Wilder. This land represents Hartford's prime development land since it is adjacent to interstate highway exchanges and supplied with public water and wastewater. Furthermore, with the declining supply of such prime development land within the region, Hartford's inventory will be increasingly valuable and should be targeted to uses that provided the greatest benefit to the town.

Additional commercial and industrially zoned land that is not served by infrastructure is concentrated along the Route 5 South corridor and the Route 14 corridor. A recent study of Route 5 south indicated that 58.6 acres of this land is suitable for development, with the balance not suitable for development due to wetlands, public use, and other factors. Since no study of the Route 14 corridor has been undertaken, the amount of land suitable for development is not known. Without infrastructure, this land is less desirable since it requires investment to create private water and septic capacity and its use would be limited to retail and service uses that do not require wastewater service or extensive water use. The real estate community and some groups at the community visioning meeting argued strongly that expanding Hartford's supply of new land for commercial and industrial development should be an economic development priority. This would require extending water and wastewater infrastructure along the Route 5 and Route 14 corridors to open up new land that is zoned for commercial and industrial use for development.

Vacant building space exists throughout Hartford, primarily in small commercial and retail buildings within village centers. One of the largest amounts of vacant space is in the American Legion building in White River Junction. A final source of real estate to support economic development is under-utilized land and buildings. This includes land and buildings in minimal economic uses, such as storage, and in locations for which the market would support higher economic uses. A number of under-utilized buildings devoted to storage, distribution, utility, and industrial uses exist along the railroad corridor in White River Junction. Since this area is served

by water and wastewater, and is close to major interstate highways and adjacent to residential neighborhoods, it has the potential for economic uses that will generate greater economic benefits and be more compatible with the surrounding uses. As regional demand for land grows and recent trends in White River Junction continue, the economic importance and potential of this area will increase. At the community visioning session and focus groups, there was a strong desire to target new development in White River Junction and other areas that are already served by good transportation, water, wastewater, and telecommunications infrastructure.

The potential uses for the town's real estate assets are affected by a number of factors, including the community's goals, fiscal impacts, economic growth and market demand, infrastructure service, and the character of surrounding uses. Community economic development goals, as discussed in the following section, emphasize creating balanced development that minimizes environmental impacts and provides higher paying job opportunities. However, there is also a strong interest in balanced development that includes both residential and economic uses and a diversity of jobs for people with different education and skill levels. Fiscal impacts concern the marginal tax revenues and service costs generated by new development. Family-oriented residential development frequently imposes costs on a community, due to high education costs for school-aged children, that exceeds the tax revenues generated by a new housing unit. However, these added costs are partially offset by state education aid. Commercial and industrial development typically generates tax revenue in excess of increased service costs, although this may not be the case when new investments in roads and other infrastructure are needed to accommodate the development. Office and hotel uses generate the highest tax revenues per acre of development since they are higher density developments with higher value building improvements. Retail development typically yields less property tax revenue per acre than office and hotel development but can be a major local revenue generator when a local sales or inventory tax exists. Moreover, retail development also generates more traffic than office or hotel uses<sup>6</sup> that may require road and interchange improvements, although many communities have been able to get developers to cover some or all of these costs. The economic and market trends discussed in the previous section also support increased office development in Hartford since many of the fastest growing industries are in the service sector. In terms of the surrounding environment, office and retail uses are most compatible with the existing character of Hartford's Village Centers. A variety of uses could fit into land use patterns in the Sykes Mountain Avenue area, given the current mix of hotels, distribution and transportation facilities, auto-related related uses, and retail. A recent study of this area recommended mixed-use development that could include tourist and motorist facilities, vehicle sales and repair, office and research, light industry and retail. However, the study advocated denser and better planned development that avoids further strip-style land use and is more pedestrian-oriented and attractive with sidewalks and landscaping.

In conclusion, several factors suggest Hartford will face a unique opportunity to shape its future over the next five to ten years as development pressures make its existing inventory of land more valuable. Multiple factors, including economic demand, fiscal impact, and job quality, favor office and service-sector development, especially in White River Junction and the Sykes

---

<sup>6</sup> A Maryland report states that a 110,000 square shopping center can generate 9,710 trips per day, with big box stores also generating up to 35 truck trips per day.

Mountain Avenue area. Small-scale retail and service businesses are appropriate for existing vacant space in the other village centers.

## **ECONOMIC DEVELOPMENT ASSETS**

Hartford's key economic development assets were identified through a community visioning session, focus groups, interviews and the economic analysis. These assets provide a foundation for Hartford's economic development strategy since the town will be most successful with development plans that build on existing advantages and strengths. Critical economic development assets and advantages include:

- The town's central location and strong highway access at the intersection of Interstates 91 and 89. Hartford's location provides easy access throughout the region and is within 1 to 2 hours of the major government and economic centers in Vermont and New Hampshire.
- Scenic beauty and recreational resources that include the rural landscape and mountains, three rivers, Quechee Gorge, and the associated state park. These resources are a key part of the Town's quality of life, help attract residents, and are central to its role as a tourist destination
- Historic and cultural assets include historic farm homesteads, the heritage and architecture of village centers, the Railroad Museum, and the Northern Stage Theater. An emerging cultural resource is the growing number of artists locating in White River Junction. These resources contribute to the region's attraction as a tourist destination and draw people from throughout the region to Hartford. A number of these assets also provide momentum to support the revitalization of White River Junction.
- Quechee Lakes planned development and resort is an important source of tax revenue for the town, attracts high-income residents and second-home owners that expands spending to support local businesses, and adds to the town's recreational amenities.
- Water, wastewater, and telecommunications infrastructure in the town's primary economic centers that is vital for many business uses and supports higher density residential and commercial development. This infrastructure also protects environmental quality and open space by ensuring the proper treatment of wastewater and facilitating development in concentrated areas. White River Junction's telecommunications capacity is an asset of growing importance as the use of Internet and high-speed telecommunications grows in importance to businesses.
- A supply of land available for development that is already zoned for industrial and commercial use. This includes over 100 acres in the Sykes Mountain Avenue area and two remaining parcels in both the Olcott and Billings Farm business parks. Additional industrial and commercially zoned land exists on the Route 5 and Route 14 corridors, but it is not served by water and wastewater service. A recent study of the Route 5 South corridor by the Upper Valley Lake Sunapee Regional Planning assessed the suitability of this area for various uses. While the area includes 449 acres of land zoned for industrial and commercial use, only 58.6 acres were found suitable for such development. A variety of factors, including wetlands, existing development, steep slopes, prime agricultural land, and land in public ownership, excluded most of this area from future development. Close to 80% of the land suitable for commercial and industrial use is located north of

Kline Drive and would require extending wastewater service and upgrading of existing town water service to support new development.

- Rail access and transportation services for both passenger service to White River Junction and freight service to several developed areas. Freight service is an important asset to some manufacturing and distribution firms, while passenger service supports some tourism activity.
- Low rental real estate costs that help to incubate new businesses, attract firms seeking a lower cost location, and support users, such as artists and artisans, that need low-cost space to be viable.
- A strong local and regional education system that includes high-quality K-12 public schools, technical colleges in Vermont and New Hampshire, Lebanon College, and Dartmouth College. Hartford's public school system helps attract families and is a key resource for workforce education. The two technical colleges offer degrees in mainly technical fields and are a skills-training resource for existing employees and workers.
- Proximity to Dartmouth College and the Dartmouth-Hitchcock Medical Center, which serve as key regional employers and an engine for new business formation through their role in attracting and educating talented entrepreneurs, engineers, and managers. This asset supports two key growing industries for Hartford and the region: health care and information technology. Dartmouth's \$400 million expansion plan will provide a further engine of regional growth over the next several years.
- Town government, civic organizations, and regional agencies that provide leadership and capacity to address issues and improve the region. Town departments, the banking community, and Green Mountain Economic Development Corporation have created a supportive environment for businesses and new development. The Two Rivers-Ottawaquechee Regional Commission provides planning and research support to help address local issues while providing a focal point for addressing regional needs and concerns. Multiple business and civic groups are working to improve White River Junction and promote the town and region as a visitor destination.
- The preparation of a regional Comprehensive Economic Development Strategy (CEDS) under the U.S. Economic Development Administration (EDA) guidance is an important asset, providing both a regional framework for Hartford's economic development activities and access to federal EDA funding.
- The town's heterogeneous population creates a special character and community life that attracts residents and businesses, generates markets for a wide-ranging mix of businesses and provides a diverse workforce for businesses.

## **ECONOMIC DEVELOPMENT CHALLENGES**

Hartford faces a number of challenges and obstacles in leveraging these assets and realizing the benefits of its many economic development opportunities. The most critical economic development obstacles raised in the community meeting, focus groups, and interviews include:

- Limited growth in new housing, especially workforce housing, and high housing costs that make it difficult to attract new workers to the region and prevent employees at local firms from living in town.

- The extremely low unemployment rate and small available workforce is a constraint to the growth of existing employers and affects the ability to attract new employers. Workforce development issues exist both among entry-level workers who lack basic education and job-readiness skills and in the supply of higher skilled workers.
- Residential and commercial buildings in poor condition that require significant new investment to attract users and that contribute to poor perceptions of Hartford.
- The perceived image, physical appearance, and building conditions in parts of White River Junction reduce its attractiveness as a shopping and visitor destination and its appeal as a business location. Significant improvements have occurred in recent years with the installation of new sidewalks and streetlights, the opening of the new visitor center and railroad museum, renovation of the Tip Top Bakery Building, the location of the Northern Stage Theater, several new businesses, and planned improvements to Railroad Row underway. These improvements provide significant momentum for continued revitalization, yet focus group discussions indicated that perceptions of White River Junction are lagging behind these changes and still remain an obstacle to shopping and investment.
- The absence of a strong sense of identity and commitment to Hartford as a whole and the limited cohesion and coordination among the town's five villages.
- Heavy reliance on two federal facilities for 20% of its job base, which creates the potential for significant job losses with the closure or downsizing of either facility.
- Limited success in establishing itself as a center for higher-paying professional and technology-based firms while much of its private-sector employment and job growth is concentrated in lower-wage industries. This situation limits higher paying job opportunities for town residents and creates a challenge to attract new employers that can provide higher paying jobs while generating minimal environmental impacts.
- As development pressure grows in Hartford due to its location, good infrastructure, and strong school system, there is a need to balance new development with the preservation of the town's natural beauty, rural character, and attractiveness as a place to live, work, and visit.
- Hartford faces a challenge in maintaining its fiscal capacity to meet the demand for local services that accompanies a growing population, new development, and increasing state and federal mandates. A related challenge is to keep its tax rate affordable to avoid overburdening exiting businesses and residents and to help attract new investment. There was a shared sense that Hartford needs to attract new commercial development along with housing to balance the greater cost to the town generated by family housing.
- Overcoming the regulatory burdens of Act 250 and the perception that Vermont is both a high-cost state and difficult place to do business is an obstacle to attracting new businesses and development to Hartford.
- A limited supply of commercial and industrially zoned land that is served with water and wastewater infrastructure. While Hartford does have some existing prime development land well served by infrastructure, this supply is limited and is likely to be absorbed in the next 5 to 10 years. Expanding the available real estate for longer-term economic growth will require more reuse of existing buildings and exploring the expansion of water and wastewater service to some areas.



## **ECONOMIC DEVELOPMENT VISION AND GOALS**

This section presents a broad economic development vision for Hartford and specific economic development goals that emerged from the public participation process. The vision and goals provide the foundation for the specific economic development strategies presented in the following section.

### **Economic Development Vision**

The community meetings and focus groups generated several common themes that form the basis for a shared vision of the town's economic future. This vision includes:

- A revitalized, more attractive and vibrant downtown White River Junction, well-articulated by one group at the community visioning meeting as “White River Junction is a (jumping place) with cafes, restaurants, and things going on”;
- A more attractive and visually appealing Town, with fewer abandoned buildings, less blight, and appealing gateways to the Town;
- A stronger sense of community across the entire Town and within the five village centers and where the village centers are stronger focal points for community activities, services and small businesses;
- New development and investment focused in already developed areas that are served by existing infrastructure, especially the five village centers, and in denser and more pedestrian-oriented forms that minimize strip and sprawl-style development;
- Balanced economic growth that includes both new commercial and residential development and that provides a mix of jobs for people at different skill levels. Strong support exists for attracting new businesses that are environmentally friendly and add higher paying and technology-intensive jobs and for expanding the supply affordably priced housing.
- Improved economic outcomes and less economic disparity within Hartford, including higher income levels for town residents, reduced poverty within the Town, and reduced disparity in investment activity and economic well-being across Hartford.
- Well-preserved scenic beauty and rural landscapes and improved scenic and recreation resources within the Town, especially greater access to and utilization of the Connecticut and White rivers.

### **Economic Development Goals**

Hartford's economic development strategy is based on the following goals that reflect the shared vision for town articulated above:

- Improve the image and physical appearance of White River Junction and attract new businesses and economic uses that establish White River Junction as a regional center for entertainment and cultural activities and professional services;
- Create more attractive and vibrant village centers with new small businesses, upgraded buildings, and expanded community activities;

- Attract new businesses and employers to Hartford that are environmentally friendly and provide high-paying jobs, emphasizing information and technology-based firms, consulting and management services, and health care-related activities;
- Improve the employment skills, earnings capacity, and incomes of Hartford residents with low-paying jobs;
- Expand the supply of affordable rental housing and workforce home ownership opportunities within Hartford and the Upper Valley Region; and
- Target new development to already developed and underdeveloped areas served with existing infrastructure and minimize development on existing agricultural land and open space, especially in key scenic areas.

## **ECONOMIC DEVELOPMENT IMPLEMENTATION AND RECOMMENDATIONS**

The following six strategies are proposed to achieve Hartford’s economic development goals and realize the shared vision for the Town’s future. In formulating the strategies and implementation actions, consideration was made to leverage important Town assets, address critical obstacles and extend existing local capacity to realize the Town’s development vision. (The full text of the “Economic Development Strategy” Report completed in April 2002 should be reviewed for detailed background on the strategies and recommendations.)

### *Strategy One: Expand Capacity to Revitalize White River Junction with New Downtown Partnership Organization and Redevelopment Entity*

The revitalization of White River Junction is an important economic development goal for Hartford in its own right, but it also advances two other goals: targeting new development to already developed areas and attracting new environmentally friendly and higher paying businesses. White River’s existing building stock, transportation access, and strong water, wastewater and telecommunications infrastructure provide a strong foundation for attracting more professional and technology-based firms. Moreover, a vibrant White River Junction with more stores, restaurants, and arts, cultural and entertainment activities provides amenities to help attract these firms and serves as a destination for local residents.

### **Recommendations**

1. Create a downtown partnership organization involving property owners, businesses, residents, the arts community, civic organizations and town officials and raise funds to hire a full-time staff person for the organization.
2. Submit an application for State downtown designation.
3. Develop a plan to guide the work of the downtown partnership organization that has broad-based support.
4. Undertake several short-term activities to increase awareness and support for the downtown partnership organization and build on the current momentum.
5. Create a façade and building improvement fund in White River Junction.
6. Establish an entity with the mission and authority needed to prepare and implement redevelopment projects.

7. Maintain and strengthen White River Junction's attractions and improve linkages to other key destinations by:
  - a) Create an arts organization to strengthen recognition and community support for arts and cultural activities downtown.
  - b) Work with Northern Stage Theater to establish a permanent home in White River Junction for this critical destination.
  - c) Establish a transportation service that links White River Junction, Quechee Village, and other key destinations.
  - d) Secure special state legislation to transfer state-owned land at the junction of the White and Connecticut River to town ownership, providing a key site to strengthen the downtown's pedestrian and scenic connection to the rivers.

### *Strategy Two: Strengthen Village Centers as Community Centers*

This strategy addresses the community's goal to enhance village centers as focal points for community life. It also builds on the unique character of each village and their importance in the Town's economic and social history, adapting these strengths to contemporary community conditions. Furthermore, since most Town centers are well served by infrastructure, this strategy can also reinforce the goal of attracting new businesses to already developed areas. However, strengthening village centers does not necessarily mean making them economic centers. It may mean increasing community activities or services, adding recreational resources, diversifying the housing mix, or other goals. What constitutes a more vital community center and the specific steps to get there must be defined by each village. This strategy expands the resources, capacity, and attention to support community-based initiatives. Thus the impetus for implementation of this strategy will come from grass-roots efforts in each village. Town government will organize and commit itself to supporting these efforts and create two programs to support physical improvements and investment that compliments local initiatives. Finally, investing in stronger village centers should be implemented in a manner that fosters a stronger sense of identity and community pride for the entire town.

### **Recommendations**

8. Identify an existing organization or create a new one in each village to define and implement improvement efforts in the village center to identify shared goals and priorities for strengthening the village center.
9. Establish a "Village Service Team" across town departments to work with each local volunteer organization on village improvement efforts.
10. Utilize the façade and building improvement fund discussed under strategy one to provide an incentive for improving buildings in village centers.
11. Create a housing improvement program that provides financial assistance for low and moderate-income homeowners to stabilize their properties and to undertake improvements. The program also should include a means to mitigate the property tax impact of such improvements.
12. Identify existing community events and plan additional ones to be held in each village center, with the goal of having at least one event each season.

13. Establish a transportation service that links White River Junction, Quechee Village, and other village centers to strengthen village centers.
14. For those village centers where expanding local economic activity is a goal:
  - a) Identify existing home-based and small businesses within Hartford that are potential tenants for vacant village center building through a review of existing records and directories, outreach, and surveys;
  - b) Work with building owners to make improvements needed to accommodate potential tenants with real demand for space in the village center.

*Strategy Three: Build a More Accessible and Effective Workforce Development System*

More accessible and effective education and training services is central to helping lower income workers improve their skills and advance into higher paying positions. Moreover, addressing regional labor shortages and creating a higher skilled workforce over time will also help attract and retain higher-paying professional and technology-based firms. This is a complex issue to address since education and workforce development is a regional issue that involves the K-12 education system, post-secondary education at the region's colleges, skills training at private trade schools, job readiness and skills training provided through non-profit organizations, and services provided by the State Department of Employment and Training. Despite the fragmented nature of education and training services, some communities and regions have formed consortia that improve linkages between education and training providers and the needs of employers and major industries and strengthen job preparation, placement, and career advancement opportunities for the labor force.

**Recommendations**

15. Identify potential sites and buildings to house a satellite facility for Community College of Vermont and/or Vermont Technical College.
16. Cultivate a delegation of local government, business, and civic leaders to lobby for it with college and state officials.
17. Work with business organizations such as Chambers of Commerce to prepare a guide to regional education and training services that provides useful evaluative data on program quality, such as graduation rates, job placement rates, starting salaries for graduates, and the like.
18. Advocate for the creation of a regional workforce development consortium that can improve coordination among education and training providers, fill service gaps, and more effectively address employer needs and improve the skills and earnings of workers.

*Strategy Four: Attract Professional Service and Technology-Based Businesses to Hartford*

While the primary goal of this strategy is to utilize Hartford's limited supply of prime commercial and industrial zoned land to maximize economic impacts and expand higher paying job opportunities, it will advance several additional goals. First, it helps diversify Hartford's economic base and achieve the balance and environmentally friendly development envisioned by the community. Second, by increasing the local supply of higher paying jobs, it creates more opportunity to link lower-income residents to better paying employment. Third, it will expand

and diversify Hartford's tax base. Fourth, attracting these firms to already developed areas is consistent with the goal of targeting new development within areas served by infrastructure and helping to preserve Hartford's scenic beauty and natural resources. Finally, it leverages the regional strength in these industries and seeks to better position Hartford to benefit from the region's leading engines for future economic growth.

## **Recommendations**

19. Implement a marketing campaign targeted to attract high-technology and professional-service firms to Hartford, highlighting existing services, incentives, and tax benefits available.
20. Prepare information materials that explain the zoning requirements and process for targeted types of development, including new construction of an office building, new construction of a light manufacturing plant, and rehabilitation of an existing building for office or mixed use.
21. Implement the Sykes Mountain Avenue Study recommendations to create a more attractive and pedestrian-oriented mixed-use area, including zoning changes to allow higher density office development that can appeal to professional and high-tech firms.
22. Attract a developer to build a multi-tenant Technology Center office building in White River Junction and/or the Sykes Mountain Avenue area.
23. Determine the financial feasibility of extending water and wastewater service to the Kline Drive area, which is suitable for new development.
24. Evaluate both the development potential and financial feasibility of extending water and wastewater service for the Route 14 corridor.
25. Update zoning to reflect actual development potential along the Route 5 and Route 14 corridors.
26. Monitor the likelihood of the Veteran's Administration facility cutbacks and closure and advocate to avoid such actions while developing a contingency plan for cutbacks or closure.

### **Strategy Five: Develop Local and Regional Initiatives to Expand Workforce Housing**

Housing availability is a critical regional issue as well as a local goal. Expanding the supply of housing for the workforce is central to addressing labor shortages that constrain existing business growth and make it difficult to attract new employers to the area. It is also central to the community's desire for balanced growth and economic diversity within the Town. Hartford has some advantages in increasing housing supply, with a strong school system, good water and wastewater capacity, and zoning that allows greater housing density than surrounding bedroom communities. Since workforce housing has fiscal consequences for a community by increasing the costs for public schools beyond the new tax revenue generated, new housing and the associated fiscal impacts should be shared regionally. Given the regional nature of the housing supply problems and the need for shared fiscal responsibility, Hartford can best advance regional solutions through its participation in the newly established Workforce Housing Coalition.

## **Recommendations**



27. Work within the regional Workforce Housing Coalition to develop regional initiatives to expand the supply of workforce housing.
28. Work with lenders, developers, brokers, and state agencies to create a homeownership program in Hartford that utilizes specialized first mortgage products and a soft-second mortgage, to make home ownership affordable to low- and moderate-income residents.
29. Explore the market potential and required zoning to use duplex and townhouse style housing as a lower cost affordable home ownership option, especially as infill housing within village centers.

*Strategy Six: Strengthen Community Pride and Identity Throughout Hartford*

This strategy addresses the desire for a stronger sense of community and greater connections among residents throughout the town expressed at the community visioning session. The increased understanding, sense of community purpose and trust that emerges through these efforts will enhance the Town's overall economic development and civic initiatives. It represents the building of social capital that is often cited as a critical success factor in economic and community development.

**Recommendations**

30. Establish or build on an existing annual community-wide event to bring people together, celebrate the town's heritage and successes, and have fun.
31. Hold an annual "re-visioning" meeting to report progress on the economic development plan and other initiatives, foster dialogue among residents, and update the economic development strategy.
32. Create information tools, e.g., a web site, electronic newsletter, print newsletter, and a regular feature in the *Valley News*, to report on successes and implementation progress and to notify residents about events, meetings and activities throughout Hartford.
33. Establish an Economic Development Advisory Committee (EDAC) to oversee and coordinate implementation of the Economic Development Program comprising of residents of all five villages, key businesses and employers, and a staff or board member from the organizations responsible for major implementation tasks.

## **CHAPTER VI COMMUNITY FACILITIES AND SERVICES**

### **INTRODUCTION**

The provision of public services is an important element in promoting and protecting the health, safety, and general welfare of the community. Hartford's community facilities provide residents, businesses, institutions, and visitors with police and fire protection, water, sewer, libraries, road maintenance, waste disposal, cemeteries, schools, and other services. Many of the community facilities represent a substantial investment by the Town of Hartford, and private owners have, in turn, substantial investments that rely upon these facilities and services. Most of these facilities and services are funded through local property taxes. Impact fees also are utilized to fund expansions of facilities necessitated by growth. When residential, commercial, industrial, and institutional areas expand, old facilities become outmoded. The need for additional public facilities and services increases as the population grows.

This chapter first looks at goals and strategies based on community perspectives. Next, specific community facilities and services are discussed, including Town Hall, Police Department, Emergency Services, Parks and Recreation, Education, Libraries, Solid Waste, Human Services, and Cemeteries. Finally, recommendations regarding each are summarized. Water, Wastewater, and Roads are covered in other chapters. Map 12 shows all community facilities in the Town of Hartford by type of facility, name, and location.

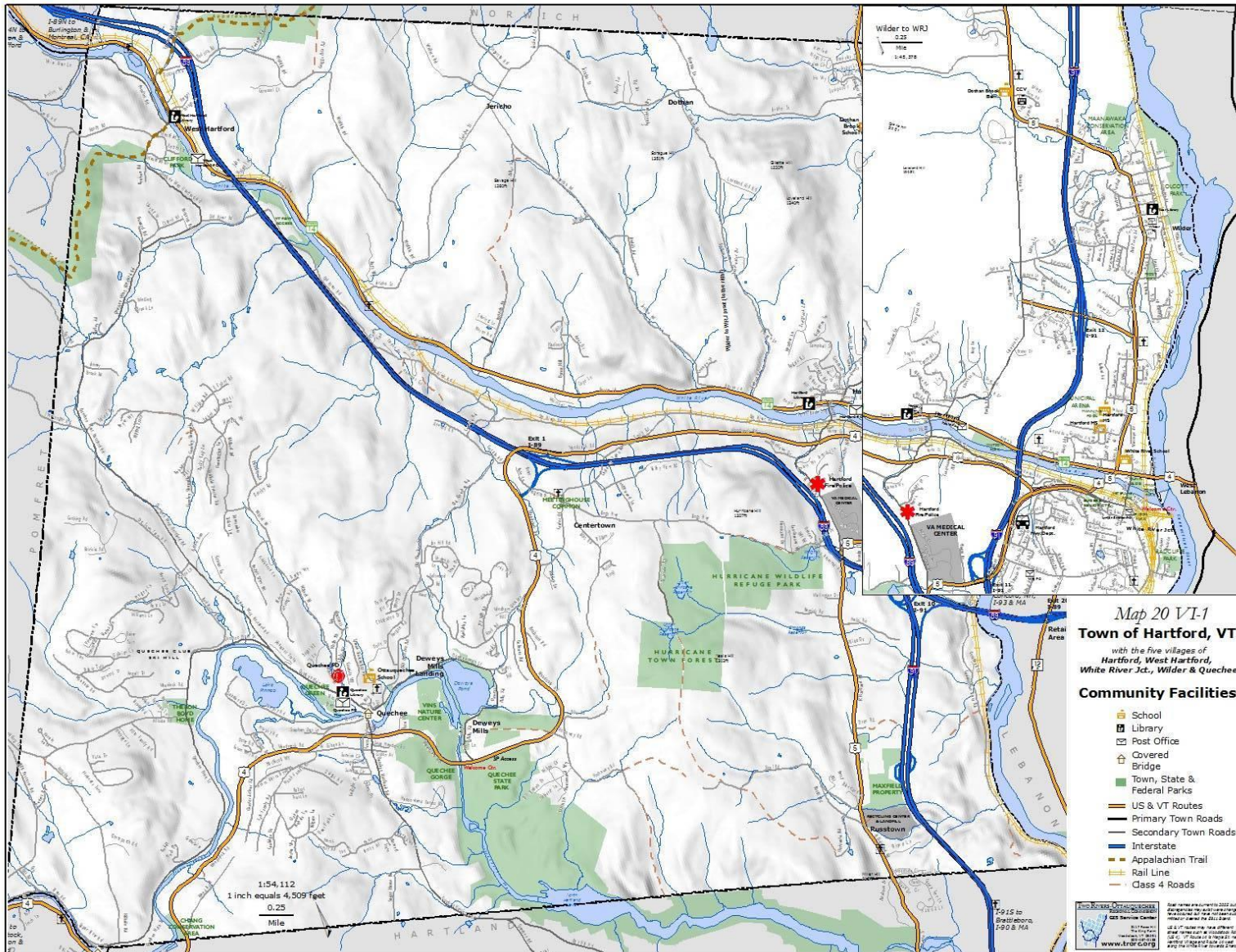
### **GOALS**

1. To maintain an efficient and cost-effective level of facilities and services adequate to meet the needs of Hartford residents and visitors, including quality schools and attractive recreational facilities.
2. To anticipate future land use needs for municipal purposes, including schools; to investigate early acquisition of such lands; and to encourage participation of developers in this program.

### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

Map12 (Community Facilities)





## **TOWN HALL**

The Hartford Town Hall is located on a 3.4-acre site on Bridge Street in White River Junction adjacent to the White River and includes the adjacent Lyman Point Park. Built to serve as a school, the two-story building is of post and beam construction, with exterior brick-bearing walls. The northern half of the building was built in 1884 and the southern half was built in 1895. The building served as a school until 1952. In 1955, the building was converted to town offices and renamed the Municipal Building. It has served in that capacity since then. From the spring of 2014 to spring 2015, the building was remodeled and renamed the Hartford Town Hall. The Town Hall has a floor area of approximately 15,400 square feet. Presently, twenty employees have offices in the Town Hall and there are four meeting rooms. The Town is listed as a contributing property on the National register of Historic Places as part of the White River Junction Historic District.

## **DEPARTMENT OF PUBLIC WORKS FACILITY**

The Department of Public Works (DPW) Facility is located on a 2.2-acre site on Airport Road. The site consists of three buildings, a 14,548 square foot building that houses DPW administrative offices and vehicle maintenance area, a 9,100 square foot salt shed and a 2,400 square foot storage shelter. The site is used for the maintenance of all Public Works vehicles and equipment including the highway, solid waste, and water and wastewater departments and storage of all equipment used for road maintenance and for the storage of materials used for guardrail repair and culvert replacement. In addition, the site is used for stockpiling sand and salt used to treat roads during winter storms and the storage of calcium chloride used for dust control on gravel roads. The facility hosts a 30-kW solar array, commissioned in February 2017. The array provides renewable energy to the facility and helps to offset the facility's electricity costs.

## **POLICE DEPARTMENT**

The Hartford Police Department is housed in the Public Safety Facility on VA Cutoff Road on a 2.2-acre site. The one-story building (with two stories on the south end) is of cement block construction with brick veneer and was built in 1978. The Public Safety Building is 21,422 square feet of which the Police Department utilizes 8,700 square feet of space sharing a centralized dispatch service area, training classroom, lobby, and fitness area with the Fire Department. The police portion of the building houses office space for the chief, administrative assistant, deputy chief, support and patrol officers, detectives, supervisors, and a squad room. In addition, there is a fingerprinting/records/photo area, evidence storage, interview/fingerprinting station, conference room, secure custody area, sally port, locker and shower areas.

The Hartford Police Department is transitioning toward Community and Problem Oriented Policing – moving beyond simply responding when called and making arrests/issuing citations. The hallmark of professional policing, the Department is nearing the end of the law enforcement accreditation self-assessment process leading to credentialing in addition to maintaining the spirit and professional standards of law enforcement accreditation, the focus is in the following key areas:

- Recruit, hire, train and retain a workforce that is reflective of the Town's service population in appearance and values by providing a high quality, inclusive work environment, progressive training and opportunities for continual advancement.

- Advance the local quality of life by collaborating with allied criminal justice agencies, local government, schools, human service agencies, the faith community and residents to resolve quality of life issues before they become a crime.
- Develop advanced investigative capabilities through specialized training, collaborative partnerships, data analysis and information sharing.
- Integrate the principals and practice of Crime Prevention through Environmental Design (CPTED) in new and refurbished development projects, including highway safety, commercial and residential.
- Advance agency technologies to include car to street level computing upgrades, public engagement, and public safety communications infrastructure.

## **FIRE DEPARTMENT**

The Hartford Fire Department is a combination All-Hazards (career and paid on-call) department that provides fire protection, emergency medical services, technical rescue services, and hazardous materials protection to the community.

The Department's Headquarters (Station 1) is located on the VA Cutoff Road in White River Junction in the Public Safety Facility. The Fire Department portion of the building provides 13,456 square feet of space. There are five bays providing space for ten emergency vehicles and equipment, offices the Chief, Assistant Chief, Administrative Assistant, Fire Marshal and additional workplaces for the rotating duty shifts. A meeting and training room are shared with the Police Department. A second non-staffed station, known as Hartford Station 2 is located on Willard Road in Quechee.

The career staff consists of two Chief Officers, 17 career Firefighter Advanced Emergency Medical Technicians/Paramedics, one full time Fire Marshal, a full time Administrative Assistant, one part-time Fire Inspector and approximately ten paid-on-call firefighters. The Fire Chief also serves as the Deputy Emergency Management Director.

From 2003 to 2018, the calls for service increased by 39 percent. As shown in Chart VI-1 ambulance responses increased 32 percent during this time-period, and fire/service responses increased 56 percent.

Our Mission is to provide the highest levels of community safety prevention and emergency response services.

Our Vision is to be a regional emergency service leader in support of our changing community needs, through innovative practices and partnerships that result in a comprehensive and adaptive set of programming.

### **Distribution Service Level Objective Performance**



The Hartford Fire Department shall limit the risk to our communities and our citizens from fire, injury, death, and property damage associated with fire, accidents, illness, explosions, hazardous materials incidents, and other natural or manmade emergencies through prevention and response.

Performance Level Strategy: Meet pre-established objectives regarding the timeliness of response to specific risks based on an analysis of historical response to that risk, the outcome of those responses and the potential for future risk in each defined category reflective of the Department's mission.

**Strategic Benchmarks** - The Strategic Benchmarks are based on the National Fire Protection Association (NFPA) and Insurance Services Office (ISO) for determining best practices for fire and emergency medical services response (EMS).

**Fire Performance Benchmark:** For 90 percent of all structure fires, the total response time for the arrival of the first-due unit, staffed with three firefighters and one officer, shall be: 7 minutes and 0 seconds in suburban areas; and 12 minutes and 20 seconds in the rural areas. The first due unit for all risk levels shall be capable of: providing a minimum of 1,000 gallons of water and 1,000 gallons per minute (gpm) pumping capacity; initiating command; requesting additional resources; establishing and advancing an attack line flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

**Fire Performance Benchmark:** For 90 percent of all structure fires, the total response time for the arrival of the effective response force (ERF), staffed with 14 firefighters and officers shall be: 15 minutes and 20 seconds in suburban areas; and 16 minutes and 20 seconds in the rural areas. The ERF shall be capable of: establishing command; providing an uninterrupted water supply; advancing an attack line and a backup line for fire control; complying with the Occupational Safety and Health Administration (OSHA) requirements of two in-two out; completing forcible entry; searching and rescuing at-risk victims; ventilating the structure; controlling utilities; and performing salvage and overhaul. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

**Emergency Medical Services (EMS) Performance Benchmark:** For 90 percent of all emergency medical services (EMS) responses, the total response time for the arrival of the first-due unit which is the effective response force (ERF), staffed with two firefighters, shall be: 7 minutes and 0 seconds in suburban areas; and 12 minutes and 20 seconds in rural areas. The first due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting initial patient assessment; obtaining vitals and patient's medical history; initiating mitigation efforts within one minute of arrival; providing appropriate treatment; performing automatic external defibrillator (AED); initiating cardio-pulmonary resuscitation (CPR); providing intravenous (IV) access-medication administration, producing related documentation and transport of patient.

**Hazardous Materials Performance Benchmark:** For 90 percent of all hazardous materials response incidents, the total response time for the arrival of the first-due unit, staffed with three firefighters and one officer, shall be: 7 minutes and 20 seconds in suburban areas; and 12 minutes and 20 seconds in rural areas. The first due unit shall be capable of: establishing command; sizing up and assessing the situation to determine the presence of a potential hazardous material or

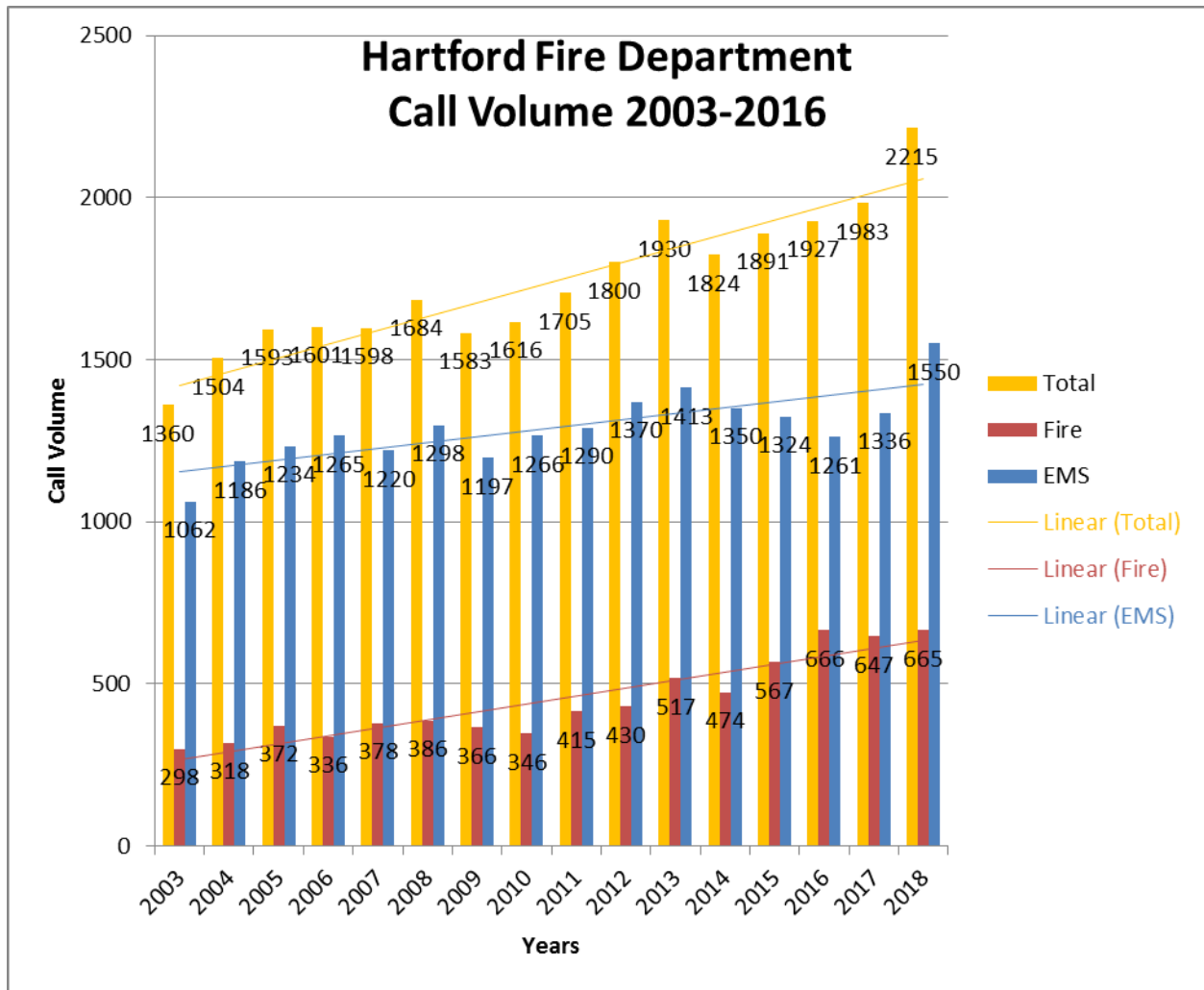
explosive device; determining the need for additional resources; estimating the potential harm without intervention; and begin establishing a hot, warm and cold zone.

**Hazardous Materials Performance Benchmark** For 90 percent of all hazardous materials response incidents, the total response time for the arrival of the effective response force (ERF), staffed with twelve firefighters and officers shall be: 15 minutes and 20 seconds in suburban areas; and 16 minutes and 20 seconds in rural areas. The ERF shall be capable of providing the equipment, technical expertise, knowledge, skills and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

**Technical Rescue Performance Benchmark:** For 90 percent of all technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with three firefighters and one officer, shall be: 7 minutes and 20 seconds in suburban areas; and 12 minutes and 20 seconds in rural areas. The first due unit shall be capable of: establishing command; sizing up to determine if a technical rescue response is required; requesting additional resources; and providing basic life support to any victim without endangering response personnel.

**Technical Rescue Performance Benchmark:** For 90 percent of all technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with twelve firefighters and officers shall be: 15 minutes and 20 seconds in suburban areas; and 16 minutes and 20 seconds in rural areas. The ERF shall be capable of: establishing patient contact; staging and apparatus set up; providing technical expertise, knowledge, skills and abilities during technical rescue incidents; and providing first responder medical support.

**CHART VI-1 SUMMARY OF FIRE DEPARTMENT CALLS 2003 - 2018**



Source: Hartford Fire Department, 2018

**PARK AND RECREATION**

**Hartford Parks & Parks and Recreation Department**

The Hartford Parks and Recreation Department is a full-service agency within the Town of Hartford. The Department is made up of two divisions: parks and recreation services. The Department offers a wide range of recreation programs, leagues and special events along with servicing fourteen parks and three facilities.

The Department is also responsible for six town-owned cemeteries. These cemeteries are considered inactive and are not operating facilities. The cemeteries include: Delano Savage, Russtown, Simons, Tucker, Wright Family Tomb and Potter's Field. Maintenance and care for the cemeteries include general maintenance of grounds and repairs to aging headstones. In 2018, a Cemetery Committee was established and a committee report in November, 2018 identified the need for a Cemetery Commission to manage town owned cemeteries and address the future needs of private cemeteries.

The Recreation Division provides year-round diversified recreation and leisure programs for the whole community and all ages, including a comprehensive athletic program for 4 to 18-year-olds. Adult sport leagues and drop-in athletic programs are also offered. The recreation programming also includes a variety of community based special events ranging from concerts in the park to the annual Independence Day Celebration. The Department collaborates with many organizations and businesses to offer the annual Ice Fishing Derby, Trunk or Treat, Hurricane Hill Trail Run, Dance for Daughters, Glory Days Festival, Polar Express North Pole and many trips and tours.

The Department received its National Agency Accreditation in 2004, re-accredited in 2009 and 2014. The Department will complete a re-accreditation in 2019.

**Our Vision:** A department that cooperates with all community groups to bring a variety of recreation opportunities to the citizens of Hartford. Parks and facilities maintained at the highest quality and improved on a regular basis to meet the future needs of the community. Something for everyone – where the citizens of Hartford and surrounding communities recognize the vital necessity of recreation through diverse programs that reach all, regardless of age, gender, race and economic backgrounds.

**Our Mission:** To serve the needs of the community through quality parks and facilities and by offering lifelong learning through recreational and cultural programs.

### **Department Personnel**

The Department is staffed with six full-time employees: Director, Administrative Assistant, Superintendent of Recreation Programs, Superintendent of Parks & Facilities and two Park & Recreation Stewards. Volunteers continue to be the backbone of the many recreation programs for the youth and adult population. The volunteer Parks and Recreation Commission works actively in assisting and advising the Director. The Commission is made up of five members appointed by the Selectboard and governed by the Parks and Recreation Commission Bylaws. Commission members have a liaison with the Selectboard, School Board, Tree Board, Conservation Commission, the Bugbee Senior Center, and Hartford High School Athletic Department.

## **Equipment**

The Department maintains a variety of equipment and vehicles, which are reviewed annually for upgrading and replacement through the town capital investment program (CIP). The department has identified that further support for CIP funding needs to be supported immediately to address aging equipment fleet, Vehicles and other maintenance equipment.

## **Community Wide Survey**

The Department surveys the community in a variety of ways to understand and obtain feedback on the recreation and park facility needs of the community. Each program and special event have individual evaluations for staff and spectators to identify how the program went for the patron and to provide positive and negative feedback for improved and enhanced program development. Additionally, every five years, the department will conduct a community wide survey to further identify, the overall needs of the community through the park and recreation agency. The last community wide survey was completed in 2017

## **Revenue and Expenditures**

The current working budget of over \$1.2 million dollars is sufficient to maintain the current services as outlined in the Parks and Recreation Budget but lacking the capital funding necessary for proper development of equipment reserve funds. Reserve funds should be established and funded for playground improvement, enhancements and replacement as well as improvements, enhancements and replacement of facility amenities and equipment. Many of the park facility playgrounds are antiquated and need to be replaced. Many capital investments such as Wendell A. Barwood Arena and Maxfield Sports & Recreation Complex have not received funding for proper facility reserves. Proper funding for capital reserves have not been in place in years and we are now starting to feel the effects of funding shortfalls in past capital investments.

The Department's recreation programs operate on user-fees. Fees are set at a reasonable amount which cover direct expenses and priced to be affordable. The Brian Hansen Scholarship Program was established with the support of the Hansen family. Scholarships are awarded through collaboration with the Hartford School District that works with the town to identify those in need and who are qualified for scholarships through the national free and reduced lunch program.

## **Facilities and Park Overview**

Hartford residents are fortunate to have an extensive system of parks and facilities with a wide variety of recreation opportunities located within the Town (Table VI-1). (See also Map 16 in Natural Resources Chapter.) The Town's neighborhood parks, athletic facilities, and the Hurricane Forest Wildlife Refuge Park are supplemented by federal and state Quechee Gorge/North Hartland Lake lands, as well as Connecticut River facilities at the privately-owned Wilder Dam and an extensive system of facilities developed as part of the Quechee Lakes Planned Unit Development. The Appalachian Trail passes through West Hartford in the northwest corner of Town, offering easy access for day hikes or longer journeys.



## **Town Facilities**

The Parks and Recreation Department uses Town and School District Facilities for most all indoor programming. The Wendell A. Barwood Arena and Sherman Manning Pool are located on school property under the jurisdiction of the Town of Hartford Parks and Recreation Department.

The Wendell A. Barwood Arena was recently renovated in 2014 adding a 7,500 square foot addition to the facility. Additional upgrades included a new roof structure and updated lighting. In 2018, a new refrigeration plant was installed. The facility is used primarily as an ice skating/hockey arena from October to March and multipurpose facility May to September. The facility also hosts special events, school and town athletics and ceremonies, summer day camp, and community functions.

The Sherman Manning Pool is presently closed due to structural failures but when operational, would operate a maximum of ten weeks a year from late June to late August. Traditionally, the pool opens the week after school is over and closes one week prior to Labor Day weekend. The facility offers a wading pool, main pool with diving and swimming lanes, waterslide, and a large sunning deck area. Swimming and diving instructions are offered, along with recreational swimming. The locker room facilities are operated by the School District and shared during the summer months with the Parks and Recreation Department. The pump house is utilized for storage and contains the pool filtration. A facility assessment completed by Weston & Sampson in 2018 identified the need for complete replacement of the pool on the existing site. Replacement will require further engineering and design work to identify true cost before a presentation for bond vote consideration. In 2018, the Sherman Manning Pool was closed due to a failure in the aged gutter system. A pool study committee was formed to identify aquatic needs in the community. A final report, presented to the Selectboard in October, 2018 identified the need for a new pool at the Hartford High School Complex.

School Facilities and Athletic Space also are utilized by the Parks and Recreation Department. These include gymnasiums at the Dothan Brook, Ottauquechee, and White River Schools, Hartford Memorial Middle School and Hartford High School, as well as classrooms, cafeterias, and specialty rooms (library, home economics, and theater). The outdoor athletic fields are also used by the Department for various events and activities.

**TABLE VI-1**

**PUBLIC AND PRIVATE RECREATIONAL LANDS AND FACILITIES**

<u>AREA</u>	<u>ACREAGE</u>	<u>FACILITIES</u>
<b>MUNICIPAL</b>		
Fred Briggs Park	0.2	Lawn, gardens, and Engine 494
Frost Park	2.0	Play area, flooded rink, picnic shelter.
Lyman Point Park	0.9	Picnic area, launching area, and open play area and play structure, and community bandstand
Clifford Park	12.0	Softball field, baseball field, horseshoe pits, tennis court, basketball hoop, picnic area and playground equipment, river access and picnic shelter.
Ratcliffe Park	8.4	Fields for soccer, softball, baseball, picnic area, Basketball court, playground equipment
Watson Memorial Park	8.6	Soccer field, playground, dog park and river access.
Meeting House Common	1.0	Pocket park & toddler playground, picnic area.
Veterans Memorial Park	1.2	Passive park & memorial geese sculpture
Hurricane Forest and Wildlife Refuge Park	142.0	Trails and picnic area
Hartford High Area, Gilman Environmental Area	14.0	Pool, indoor ice arena, tennis courts, two gymnasiums, fields for football, baseball, field hockey and softball, and a grass track. Environmental education area.
Maxfield Sports & Recreation Complex	65.0	Open air shelters, regulation baseball/softball fields, 4 little league fields, soccer fields, tennis courts, basketball court and walking path
Hartford Town Forest	423.0	Forest trails, hunting and two small ponds
Maanawaka Conservation Area	21.0	Forest, trails, shoreline with fishing access
David Chang Conservation Area	6.0	Shoreline with fishing access
Dothan Brook School	5.0	Playground equipment, playfields, and gymnasium
White River School	1.7	Playground equipment, gymnasium
Ottauquechee School	6.0	Playground equipment, playfields, and gymnasium
<u>Quechee Falls Park</u>	<u>0.5</u>	Viewing area with benches, garden.
<b><u>Subtotal:</u></b>	<b><u>718.5</u></b>	
<b>STATE</b>		
Quechee State Park	76.0	Picnic, camping, hiking, xc skiing
<b><u>Subtotal:</u></b>	<b><u>76.0</u></b>	
<b>FEDERAL</b>		
Appalachian Trail	250.7	Hiking

Veterans' Hospital	64.0	Hospital and grounds
Army Corp of Engineers Flood lands and North Hart- land Reservoir	759.8	Walking, birding, cross country skiing, fishing, Quechee Gorge and Deweys Pond

**Subtotal:** **1,074.5**

### PRIVATE

Great River Hydro, Wilder Dam	79.0	Boat launch, athletic fields, open recreational space picnic Area. Managed by Parks and Recreation
-------------------------------	------	---

Quechee Lakes Landowne Assoc. Polo Field	54.0	Open space used for polo games, Scottish Festival
Lake Pinneo	55.0	Swimming, sailing, windsurfing
Ski Area	73.0	Downhill ski area
Highland Golf Course	127.4	Golf course, cross country skiing
Lakeland Golf Course	136.4	Golf course, cross country skiing
Greenbelt and Wildlife area	1,939.0	Greenbelt and wildlife area
Quechee Green Park	10.0	Walking/jogging path, playground, exercise course, and athletic fields
Quechee Green Bandstand	0.2	Bandstand and green space. Managed by Parks and Recreation
Dewey's Mill Landing & Field	1.8	Open recreation space, boat access to Dewey's Pond
QLLA (other)	321.0	Deweys Mills Pond and surrounding marshland, Murphy Farm, greenbelts and Clubhouse acreages
<b><u>Subtotal</u></b>	<b><u>2,796.8</u></b>	
<b><u>TOTAL</u></b>	<b><u>4,665.1</u></b>	

### Town Parks

The park system provides both passive and active leisure time activities. Each park is described below.

Frost Park is a neighborhood park located in a residential area of Wilder Village. The park has a large play structure (constructed in 2003), swing sets, park benches, hopscotch, four-square, ½ court basketball, picnic tables and shelter, and roadside parking. This park is not large enough to hold any regulation athletic fields. During the winter, the field is flooded and frozen for use as a lighted ice-skating rink. Playground structures are suitable for young children.

Lyman Point Park includes the municipal lawns and is used primarily for picnicking, fishing, and boat portages. It also has a large playground constructed in 1995, community bandstand constructed in 1997, picnic tables, and park benches. Substantial parking is available at the municipal parking lot and the Point Plaza parking lot. This park is situated on the northern point of the White and Connecticut Rivers' confluence and provides easy access to fishing and canoeing activities.

Clifford Park is a day-use neighborhood park along the White River off Westfield Drive on Recreation Drive located in West Hartford. A large percentage of users visit the park for more than three hours. Large groups use the property for special outings and group sports. The Park contains a regulation softball field, eleven regulation horseshoe pits, a small basketball court, playground equipment, a tennis court, picnic tables and grills. A large barn is used for winter storage of park equipment, fishing and boating access, a nature trail, and parking areas.

Ratcliffe Park is a neighborhood park located in White River Junction. It is primarily used for athletic sporting events (soccer, baseball, softball and basketball) and family picnicking. The Park contains two baseball diamonds, playground equipment, a regulation basketball court, a regulation soccer field, picnic tables and grills, park benches, a water fountain, parking, an overlook along the Connecticut River, and the White River Community Garden.

Watson Memorial Park, located in Hartford Village, is primarily used for athletic games, programs and events. This property is owned by the School District and maintained and scheduled by the Town. The Park contains a large playground, a regulation soccer field (also used for lacrosse and field hockey), and picnic benches. The park is also home to the Watson Dog Park which is managed and funded by the voluntary Upper Valley Dog Park Supporters.

Kilowatt North/South Park are located in Wilder Village on Great River Hydro property. A large picnic area with tables and grills exists along the Connecticut River. A small car-top boat portage also exists. Improving water access with a ramp and doc system will improve access to the water and provide a safe area for fishing and paddle type water craft access. Kilowatt South Park is located at the Great River Hydro Dam. Kilowatt South and Kilowatt North are leased to the Town of Hartford. Future plans include improving the security, park amenities, access road, improvements to the boat launch, trails and recreational activities of the park grounds.

Fred Briggs Park is located in downtown White River Junction along Main Street. The Park consists of a memorial garden, small lawn, four maple trees and the Engine 494 with supporting canopy constructed in 2003. It is important that the Fred Briggs Park maintain a presence in the downtown community during any improvements to the downtown area. Development of a downtown green could be considered as a major improvement to Fred Briggs Park. An area for small concerts, farmers markets and a simple gathering place for patrons and community members in a downtown setting. The Town of Hartford does not have such a center within the five villages and Fred Briggs Park has the opportunity to be just that.

Quechee Green Bandstand is located in the “heart” of Quechee Village along the Ottauquechee River. The bandstand is used for a summer concert series.

Dewey's Landing is located on Quechee Main Street at Dewey's Pond and provides small car-top boat portage and fishing access. The property is owned by the Army Corps of Engineers and maintained cooperatively by the Hartford Parks and Recreation Department and the Vermont Department of Forest, Parks and Recreation.

Dewey's Pond Field located on Dewey's Mill Road allows access to winter activities on Dewey's Mill Pond (ice-fishing, skating, snow shoeing and cross-country skiing). The Department plows a portion of the field to allow people to park vehicles during the winter months

Hurricane Forest Wildlife Refuge Park consists of 142 acres. In 1973, Winsor C. and Bertha C. Brown donated the property to the Town on Wright Reservoir Road. The land was voted at Town Meeting to be accepted by the Town with certain conditions and restrictions. The gifted parcel provides a year-round sanctuary for wild birds and animals and contains the recently drained Wright Reservoir, hiking trails, and picnic sites. The site is contiguous to the Hartford Town Forest. In 2006/2007, the Wright Reservoir Dam was included with the Town Forest Upper and Lower Hurricane Reservoirs in an engineering assessment report, which recommended improvements to all three dams. The two Town Forest reservoirs have been breached and the Wright Reservoir is drained. The Town has worked closely with Vermont Dam Safety to devise a plan for either restoration or breaching of the dam structure. Preliminary reports identified nearly \$600,000 needed to repair the Wright Reservoir dam improvements.

Maxfield Sports & Recreation Complex: is located at 120 Leslie Drive, White River Junction. Opened in 2015, this 60-acre parcel of park and recreation space is home to several recreational assets which include a regulation high school baseball and softball field, four youth baseball fields with a recreational sports field in between the fields. In addition, there are three regulation sized multipurpose fields that are primarily used for soccer and lacrosse. The complex is also home to four full tennis courts, two with pickle ball lines, two basketball courts and a gravel walking path that circulates most of the field spaces. Three canopy style pavilions are located throughout the facility and parking is available for all uses. Within the facility is a small utility building where maintenance equipment is housed during park operations. Future consideration needs to be given to acquiring lights for the high school softball field. Currently, there are lights on the baseball field which are primarily used for high school and Nighthawk baseball games.

Meeting House Common is located on Center of Town Road in Hartford. A toddler playground structure was installed in 2006 and the site has a small open play area and picnic benches.

Veterans Memorial Park is located on Railroad Row in Downtown White River Junction. It is home of the Veteran Memorial geese sculptures. A passive park along the White River, it consists of lawn, a paved walkway, and benches.

### **Conservation Commission Managed Properties**

Hartford Town Forest consists of 423 acres and is located on a Reservoir Road. The property contains two small ponds and an extensive trail system. The property is open to hunting and fishing. A Forest Management Plan was last updated in 2009 and a Recreation Management Plan was adopted in 2002. The property is used for several educational programs by the Hartford Schools. It



is hoped that this relationship will continue. Once the site of two reservoirs, the dams were removed, and two small ponds remain.

Maanawaka Conservation Area consists of 21 acres and is located on a Connecticut River backwater in Wilder. Serving as the southern end of the 1½ mile long Hazen Trail that links Hartford to Norwich and the Montshire Museum, the property was acquired by the Town in 1998 using the Town Conservation Fund and two grants. The property also has a trail that provides fishing access to the nearly ¼ mile frontage to a Connecticut River backwater. A Management Plan for the property was developed in 1999.

David Chang Conservation Area consists of six acres along the Ottauquechee River on the Hartford/Hartland town line. Located on Route 4, the Town acquired the property in 2003 Town using Town Conservation Funds and a grant. A plant inventory and a Forest Management Plan were completed in 2004.

### **Other Public Recreation Facilities**

Army Corps of Engineers Lands in Quechee: An extensive public recreation land corridor, made up of Quechee State Park and Army Corps of Engineers flood control lands, extends from Deweys Pond south along the Ottauquechee River to North Hartland. Boating and fishing are available at Deweys Pond, with a small parking area at the north end of the Pond and a trail south to the Quechee Gorge Bridge on Route 4. Picnic areas and a campground at the State Park along Route 4 are heavily used by visitors to the area. The trail to the bottom of the Gorge is used by visitors and residents to view the Gorge and for access to fishing. Facilities at the southern end of the public land in North Hartland include a beach, boat ramp, and picnic shelters.

The Quechee Gorge Master Plan, developed in 1996 with a Federal Public Lands Highways Grant, proposed numerous enhancements to the area associated with the Gorge and public lands. These included development of a visitor center and sidewalks along Route 4; improvements to traffic safety, pedestrian circulation, and parking; improvements to and expansion of the existing trail system around the Gorge; and a trail extension to the recreation facilities at the North Hartland Dam for those interested in a longer hike. Implementation was possible through a coordinated effort between the Town, area residents and businesses, the Army Corps of Engineers, the Hartford Area Chamber and the State of Vermont.

National Parks Service Lands of the Appalachian Trail: The Appalachian Trail corridor passes through the northwest corner of town, crossing the White River in West Hartford. Through a cooperative effort involving the Hartford and Norwich communities, landowners, the Upper Valley Land Trust, and Appalachian Trail Conference, many additions have been made to the amount of federal and private land along the trail protected to provide a buffer between hikers and surrounding land uses. Linkages continue to be planned and developed, building on existing Class IV road corridors in Hartford and Norwich.

### **Future Needs**

The Parks and Recreation Department strives to provide excellent services to the Hartford community in program offerings and recreational facility. The Department works hard to respond to the programmatic needs of the growing community and may need to expand in areas of seasonal staffing and equipment purchases to continue providing a high standard of service.

The Department has successfully completed development/acquisition of public parks in all five villages. Areas of immediate interest include the development of a sustainable capital fund necessary to protect and continue to invest in existing infrastructure that the Town owns and operates. This includes but is not limited to playground equipment and other park amenities such as fencing, fields, buildings and common area structures.

The Parks and Recreation Department will continue to work with the Department of Planning and Development Services in planning for potential indoor community recreation facilities, park and open-space development. Community demands for indoor recreation space and potential population growth increases the demands on our facilities and parks putting a burden on our ability to maintain the existing facilities the town has invested in. As the make-up of population changes, there will be more demand for diversified social, cultural, health, and athletic programs that may demand for indoor space such as a community recreation facility. The Department must respond to the community's demand for quality recreation programs and park/facility services. Each year the demand for more activities for all community members increases. As the parks/facilities are improved, the level of maintenance must meet the high expectations of the community.

### **Parks and Recreation Department Capital Improvement Plan**

The following list of the top improvements that were adopted by the Parks and Recreation Commission in the order of highest priority.

1. Acquire lights for the high school softball field at Maxfield.
2. Establishment of a reserve fund for sustainability of capital investments that have been made in the public park system, such as playgrounds, ballfields, park amenities.
3. Establishment of a revolving fund for recreation programming. Operating programming opportunities through revenue generated programs and scholarship offerings to residents.
4. Establishment of a capital reserve fund specific to the Wendell A. Barwood Arena and future of the Hartford Sherman Manning Pool.
5. Create a parking area for the Hurricane Forest Wildlife Refuge Park.

### **EDUCATION**

In July 2009, the Hartford School District Board of Directors officially adopted the following policies to guide the mission of all schools. The “Universal End”, along with an accompanying set of specific “Ends Policies” describe the aspirations we all have for our students while clearly stating what each graduate should know and be able to do. The Universal End statement: Students will graduate from the Hartford School District equipped with a diverse set of knowledge and skills – achieved through a combination of classroom-based, hands-on, and peer-to-peer learning – that will provide them the foundation to excel in future endeavors.

In pursuit of this Universal End, the Hartford School Board has identified the Ends Policies on which the District will focus:

- **Academic Excellence:** Students will read, communicate, solve problems, collaborate, think critically and innovate across settings and contexts.
- **Citizenship:** Students will demonstrate an understanding of their role in society and participate in their community in a positive manner.
- **Global Awareness:** Students will demonstrate an understanding of how global factors influence and connect to their local communities and communities around the world.
- **Health and Well Being:** Students will demonstrate the importance of maintaining physical, social, and emotional well-being.
- **Life Skills:** Students will demonstrate qualities essential for personal success in and out of school.
- **Technology and Information Skills:** Students will use technology to communicate and collaborate across settings and apply digital citizenship skills.

In 2000, the State Board enacted its first School Quality Standards in order to ensure "all Vermont children will be afforded educational opportunities that are substantially equal in quality..." 16 V.S.A. § 165. After reviewing the rules in 2012/2013 and soliciting public comment, the State Board adopted the present Education Quality Standards (EQS) which went into effect in 2014. These rules outline what is required of schools and contain some notable shifts. One of these shifts was towards "proficiency-based learning" (PBL) and "proficiency based graduation requirements" which are defined within the rules as "systems of instruction, assessment, grading and academic reporting that are based on students demonstrating mastery of the knowledge and skills they are expected to learn before they progress to the next lesson, get promoted to the next grade level, or receive a diploma." This differs from the previous system where students move to the next level based on Carnegie units or "seat time" within a course or move from grade level to grade level based on chronological age. Another of these shifts focused on "personalized learning" and included "personalized learning plans." Personalized learning is "tailoring learning for each student's strengths, needs and interests—including enabling student voice and choice in what, how, when and where they learn—to provide flexibility and supports to ensure mastery of the highest standards possible" (iNACOL definition). Finally, EQS mandates that we not only cover content in traditional subject areas (e.g., English, Math, Global Citizenship, Science, Health, Physical Education and the Arts), but also in the Transferable Skills. These "transferable skills" are often thought of as "21st century skills" or "soft skills" and are skills students will need to be college and career ready and able to be successful in the global economy of the 21st century. In Hartford School District (HSD), these skills include communication, collaboration across networks, accessing and analyzing information, agility and adaptability, critical thinking and problem solving, curiosity and imagination, combined with initiative and align nicely with our Ends Policies.

HSD began work on these shifts in 2015. As a district, we undertook a process that led to the first district action plan which focused on three goals: Proficiency and Personalization, Assessment and Data, and Social/Emotional Learning. This document has since guided and prioritized our work. Realizing that many of our students will graduate and enter jobs that don't currently exist or that will look quite different than what they presently require, we realized the need to explicitly teach and assess transferable skills. To date, we have identified our transferable skills, created K-12 rubrics for

each and are incorporating them into our curriculum and instruction. We have also identified our proficiency-based learning outcomes (PBLOs) K-12 in each content area and are in the midst of establishing performance indicators (based on the national content standards) for each PBLO at all grade levels or grade clusters. Additionally, we have made strides towards personalizing student learning by giving students more voice and choice about their mode of learning (not all learning has to take place within four walls of a classroom) as well as allowing for multiple avenues for demonstrating that learning. Increasingly, our high school students are required to show their level of proficiency in a public forum to a real audience identifying the goal(s) of their learning, outlining their process for achieving the goal(s), and then reflecting on their learning including their level of proficiency in the transferable skills. Middle school students share their goals and their learning through student led conferences. Students complete personalized learning plans in grades 7-12. As the proficiency work progresses, our aim is for students to identify the areas of proficiency on which they need to focus and have them, with support, develop a path to achieving those goals. Elementary schools plan to incorporate more intentional goal setting by students into their work to prepare students for the development of a personalized plan by the seventh grade. Future work includes defining proficiency for each of the PBLOs and assessing and presenting them.

Our second goal focuses on assessment and data. The district has established an assessment calendar and identified common district assessments administered within established windows. Data from the district assessments combined with other school and classroom level assessment data helps drive instruction in the regular classroom and aids in identifying students in need of additional support. We also use this and other data as we conduct a needs assessment to guide us as we prioritize our action plan work and determine if we are having success with various strategies within the plan. In 2015, we hired a data administrator who has spent countless hours inputting data into Infinite Campus, our student information system, so that we can access that data to make numerous decisions. He has also helped to identify other ways this system might be of benefit to us. Future work includes adding Tableau to Infinite Campus, a data visualization tool that will bring greater clarity to the data we extract and enable us to better utilize the data. Professional development on the use of this tool will begin this year.

As our society faces increased challenges, schools find themselves in the position of having to provide increased social and emotional support to their students. Goal three addresses some of these challenges. We are presently working on the development of a new district behavior philosophy moving us away from a punitive approach to a more restorative practice and setting systems in place to promote restorative practices. Additionally, as more of our children come to us having experienced some form of trauma, we are planning to provide to our staff professional learning on trauma informed approaches to supporting these students and in turn enhancing our practices for all students.

The District continues to make significant progress in addressing issues and meeting the goals of our technology plan. We are a Google Suite for Education site, which affords us the use of a variety of Google programs at no additional charge. Many teachers and students use a wide array of Google tools, knowledgeably and seamlessly in their daily teaching, learning and communications. Our technology network is very stable; wireless access is ubiquitous and reliable, BYOD (Bring Your Own Device) is available to all students and staff, and guests have access to Wi-Fi through generated guest passes. Our schools have a good number and variety of technological devices to increase

student learning and students’ capacities to demonstrate their learning. A replacement plan is in place that is guiding our purchasing and replacement decisions. The district has also hired a person to oversee our learning management system, to coordinate testing and to input and analyze data. All our schools are connected via fiber and all network operations are centrally located, making management of the entire network efficient and easily accessible for IT operations. The district technology team is very happy with the progress our district has made in all technology areas throughout the district. We hope to continue to meet the needs in this area and expand the availability and the array of devices to our students and staff. This is no small task in today’s world, but we feel more than ever that we are prepared to do so.

**TABLE VI-2  
HARTFORD SCHOOL DISTRICT ENROLLMENT DATA**

<b>SCHOOL</b>	<u>2003</u>	<u>2008</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Hartford High	800	692	592	577	511	492	500
Memorial Middle	386	360	322	317	313	299	318
Pre-K – 5	739	714	721	712	685	689	702
Career and Tech	223	207	181	177	196	231	245
Other	50	31	40	44	39	46	39
<b>TOTAL</b>	2198	2004	1856	1827	1744	1757	1804

Source: Hartford School District

**Facilities**

The School District places a high priority on ensuring that its students, staff and the public have safe, clean and well-maintained facilities. Over the past eight years, the district has invested over \$10 million dollars in capital improvements that include major physical plant upgrades at the career and technology center and high school, renovation of the middle school gym and cafeteria and the White River Elementary School, as well as the addition of a state-of-the-art fitness center and locker room. The complete renovation of the high school, middle school and career and technology center campus and parking lots has provided more accessibility and safety and in addition is aesthetically appealing.

The District has a well-developed 25-year facilities maintenance plan based on a complete engineering assessment of all facilities, which was completed in 2012. The maintenance plan outlines all major capital projects that need to be addressed in the near future.

The District’s facilities include: The **Dothan Brook School**, which was completed in 1993 and can accommodate over 450 students in grades K-5. The school was built with the “core facilities” to allow for future expansion to a capacity of 600. The school is located at the north end of the village of Wilder and is connected to the village via a multi-use path. The school is in full compliance with present building codes and offers its students and staff a safe and beautiful learning environment. The building includes 21 classrooms, a computerized library, computer lab, dedicated art and music facilities, a full nursing station, full cafeteria and kitchen, and a 5,155 square foot gym.



The **Ottauquechee School** was built in 1994 and can accommodate 350 students in grades K-5. The school was built with the “core facilities” to allow for future expansion to a capacity of 400. The school is located on 17 acres in the village of Quechee. The school is in full compliance with present building codes and offers its students and staff a safe and beautiful learning environment. The building includes 14 classrooms, a computerized library, computer lab, dedicated art and music facilities, a full nursing station, full cafeteria and kitchen, and a 4,125 square foot gym.

The **White River School** is a wood and brick building on Pine Street in White River Junction. The school can accommodate 300-350 students in grades K-5. The school was built in 1907 on a two-acre site. Two additional rooms were built in 1924. There was an addition built in 1934 that added the gymnasium, and another significant addition was added in 1938. Finally, there was a major renovation and addition in 1993, as part of the elementary-school bond project. This renovation made use of previously unused areas of the building’s basement, as well as a complete upgrading of the building’s fit and finish. Major work was done to create an up-to-date library, cafeteria, art and music areas, and handicapped accessibility. New administration, guidance and nursing areas were built, and the building was brought into compliance with building codes. The building was reoccupied in 1994. In 1995, a computer lab was installed adjacent to the library with networked computers and has full Internet accessibility. A complete physical plant renovation including new heating, plumbing and electrical services was completed in 2015. New finishes and a complete new roof were also part of the \$3.6 million-dollar project.

The **Hartford Memorial Middle School**, located on Highland Avenue in White River Junction, is a brick building constructed in 1952. A four-classroom addition has been added since that time. The school serves over 300 students in grades 6-8, including tuition students from the Town of Sharon. Major improvements were made to the building’s infrastructure in 1996-97. A renovation of the schools’ cafeteria, kitchen, gym and locker rooms was completed in 2013. In the summer of 2017, a second elevator was added for access to the lower band room. Last summer, the parking areas were rebuilt, and granite curbing, lighting and additional playing fields were added, all greatly enhancing the safety and aesthetic quality of the campus.

The **Hartford High School**, located adjacent to the middle school, is a brick and panelized building built in 1962, with a substantial addition built in 1986. The school serves Hartford’s students in grades 9-12, as well as tuition students from 16 surrounding towns. The school has a large gymnasium with recently replaced bleachers, a 300-seat auditorium, and full kitchen and cafeteria facilities. The school’s “block schedule” has allowed for students to take a greater number of credits and for teaching to be more focused in longer class periods. Outdoor recreational facilities include fields for football, softball, baseball, and field hockey. The school rents time for ice hockey from the Town of Hartford. Soccer, baseball and lacrosse take place at off-site facilities. Major improvements to the building’s infrastructure were made in 1996-97. The school replaced an inadequate oil boiler and made significant improvements to the woodchip-burning boiler. A new handicapped accessible bathroom was added in 2001. Another renovation was completed in 2012 that included a new electrical system, renovated auditorium and new plumbing and electrical service. Last summer, the high school campus was redesigned and rebuilt to provide better drainage, accessibility, safety, access and aesthetics. The press box and grandstand were rebuilt and add to the athletic experience.

The **Hartford Area Career and Technology Center** was built in 1971 by the State Department of Education. The program serves high school students from Hartford and five surrounding towns. Course study is offered in health sciences, auto technology, business administration, building trades, career technology education, collision repair and refinishing, computer science, cosmetology, culinary arts, design illustration and media arts, industrial mechanics and welding, human services, natural resources, cooperative education and STEM. Most of these programs rely heavily on the use of technology. The majority of the Center's students go on to either two-year or four-year higher education. Energy efficient lighting was installed in 1997. The building was converted from electric to hot water heat in 1996-97, resulting in a significant savings in heating costs. The building was wired for data and a new phone system in 1997. In 2012, the facility received a new electrical service. In 2018, the entire parking area was rebuilt and redesigned with additional new lighting.

In addition to serving the Town's educational needs, the District's school buildings are used for many of the Town of Hartford Parks and Recreation Department programs. The District and the Parks and Recreation Department have a working agreement that gives priority to the activities of the School District and the Town when planning for facility usage. The shared use of facilities ensures that both the School District and the Parks and Recreation Department have a variety of venues available to meet the needs of the community.

### **Adult Vocational Training**

Hartford Area Career & Technology Center (HACTC)- Adult Education Program offers hands-on work, career, and life/community enrichment training classes in manufacturing, construction, transportation, business, and health career industry sectors. HACTC Adult Education Program also offers customized business and industry training. Recommendations for additional class offerings are always welcomed.

### **HACTC Adult Education Program class offerings & industry partnership training programs:**

- Licensed Nursing Assistant (LNA) – Meets Vermont and New Hampshire requirements for LNA licensure, contingent upon passing state exam. 50 hours theory in HACTC health sciences lab, plus 52 hours HACTC supervised clinical experiences at a regional long-term nursing facility.
- HACTC - Regional Test Center for American Red Cross – Vermont LNA exam monthly testing at HACTC for HACTC students and any other students approved for LNA testing by Vermont Board of Nursing.
- Phlebotomy – Theoretical and technical introductory skills of a Phlebotomist. Phlebotomy is the collection of blood samples for purposes of research, testing, donations or transfusions. 32 hours hands-on instruction at HACTC sponsored by Vermont Technical College.
- Understanding Opiate Addiction – 7-hour workshop learning/sharing about opiate crisis, signs of opiate addiction, effects of opiate addiction on people & families, what community & individuals can do to help in White River Junction. Sponsored by the Vermont Department of Health and Vermont Adult Career & Technical Education Association.

- Introduction to Welding – Introduction to metal shop safety and general metal fabrication skills. Hands-on instruction in: Oxy-fuel brazing, Oxy-fuel cutting, Manual plasma cutting, CNC plasma cutting, GTAW (TIG) welding, SMAW (stick) welding, GMAW (MIG) welding. 24 hours of classroom and lab. Additionally, the American Welding Society – Green & White Mountain Chapter periodically holds trainings at HACTC.
- Electrical & Plumbing Apprenticeship Programs – HACTC is a host site for related instruction component of Registered Electrical and Plumbing Apprenticeship programs. Students meet a four-year classroom requirement to be eligible for Vermont State Journeyman exam. 144 hours of annual classes at HACTC, sponsored by Vermont Technical College for the Vermont Department of Labor.
- Heavy Equipment Operation Program – Hands-on training to operate: graders, excavators, loaders, backhoes, bulldozers, skid steers, dump trucks, compaction equipment, and OSHA 10/Heavy Equipment Safety & Work Zone Safety / Flagger Training. 140-hour class sponsored by HACTC Adult Education Program & Vermont Adult Career & Technical Education Association, funded by the Vermont Department of Labor. Classes held at River Bend Career & Technical Center, Bradford, Vermont.
- Introduction to QuickBooks, Introduction to Quicken, Introduction to Excel – Hands-on instruction in Microsoft Office suite computer software products. 16-hour classes and 4-hour workshops in computer concepts, commands, organizational procedures and shortcuts to create business productivity solutions.

## **Other Facilities**

The School District also operates and maintains a superintendent’s office, special education office and maintenance facility. The District also owns the Watson Memorial Playground in Hartford Village, which is maintained by the Hartford Parks and Recreation Department. Several District classes recently renovated the field house at Watson Field, which is presently used for storage by the District.

The Regional Alternative Program at the Wilder School is an educational therapeutic program serving students, grades 1 through 12, from the Hartford Area Regional Collaborative member schools. Students with severe behavioral disabilities are referred to the Wilder School by the member supervisory unions.

The Hartford Autism Regional Program leases space on Palmer Court in Wilder. The program provides educational and clinical services for students in elementary school through high school who have autism or other related developmental disabilities. Using principles of applied behavior analysis, this program strives to teach students effective communication skills, social skills, functional academic skills, self-help/personal care skills, ADL skills and pre-vocational/ vocational skills training.

## **Higher Education**

Hartford and the Upper Valley have many opportunities for post-secondary higher education. In Hartford, Community College of Vermont has a campus in Wilder and offers a range of associate degrees in arts and sciences as well as certificate programs. The Center for Cartoon Studies,

located in Downtown White River Junction is a post-graduate educational institution that offers a two-year Masters of Fine Arts in comics and graphic novels. Other area schools include Vermont Technical College in Randolph Center, Vermont, Vermont Law School in Royalton, Dartmouth College in Hanover, New Hampshire, and River Valley Community College in Lebanon and Claremont, New Hampshire.

## **CHILD CARE**

Safe, affordable, accessible and high-quality child care is a key component of a successful local economy. Families come in many forms often with the parents or responsible adults working, full or part-time, to provide support for themselves and their children. While the focus is often on early childhood, ages of few months to ages 3 or 4 when pre-school starts, child-care is often challenging for families with children in elementary and middle school. Parents struggle to fill in time after school, school breaks, summer vacation and sick children. With more and more adults working 2<sup>nd</sup> and 3<sup>rd</sup> shift in retail and food services, health care, transportation, services and public safety, some parents struggle to find ways to keep their child safe and occupied while they work. Many parents and guardians are forced to make ad-hoc arrangements with extended family and friends. Families where one parent works one set of days and shifts, and the other parent works another set of days and shifts, the parents often just pass in the evening or at dawn. Single adult heads of household are especially challenged.

There are two primary objectives for high-quality child care in all forms. One objective is that it allows parents to remain in or enter the work force, thereby contributing to the economy. The second objective is that high-quality child care prepares a child do better in kindergarten and first grade and later, and after school and summer activities are an important addition to primary and secondary education. Good community programs also provide opportunities for children who live in households with limited financial resources.

The State of Vermont licenses and regulates many types of child care through the Department for Children and Families (DCF) and the Department of Health. The DCF provider directory listed 13 licensed providers and 7 registered home providers in the Hartford in February 2019. A state-wide study of market rates in 2017 showed costs ranging from \$240/week for children under 24 months to \$180/week for children aged 5 to 13 which is expensive for many families. The development of half-day Pre-K programs in the three Hartford School District elementary schools has provided support for many along with strong educational benefits to the children. The Dartmouth College Child Care Center for infants to pre-school charges on a sliding scale based on household income with monthly fees running from \$620 to \$2,050.

The Hartford Parks and Recreation Department runs an extensive 12-month program that provides an array of programs for youth. The Hartford School District also has club and athletic programs that run after school. Most of these are low cost programs with waivers and subsidies available. Many, however, do require adult drop-off and pickup.

The Two Rivers-Ottauquechee Regional Plan has an extensive chapter on child care trying to provide a regional prospective citing resources that are spread across the region. The Regional

Plan acknowledges the many challenges facing these programs from low salaries that make recruitment and retention of employees difficult to affordability for parents.

Currently, the Town of Hartford Zoning Regulations allow a daycare facility as a conditional use in all zoning districts but one and a recreational facility in all but two districts.

## **LIBRARIES**

Library service in the Town of Hartford has historically been a complicated mosaic of village libraries with different governing structures and resources. Periodically, some residents and administrators have sought consolidation and/or establishment of one central library and created various ad hoc committees. In 2002 a \$3.2 million-dollar bond to establish a new municipal library was rejected by voters. Fifteen years later, technology and the rise of consortiums have aided the four Hartford public libraries (three incorporated non-profits and one municipal) in becoming a more unified library system.

Since a 2013 conversion by the Quechee Library technical services librarian working town wide, each library is now a member of the VOKAL (*Vermont Organization of Koha Automated Libraries*) consortium of 59 Vermont libraries using *Koha*, an open source software. All Hartford residents now have 24/7 access to electronic materials and online browsing capabilities of Vermont titles that can be physically delivered, upon request, to any site. Following this conversion, any Hartford library patron card is accepted at any other Hartford library.

In 2018, amidst rapidly changing technology affecting access and habits, library planning can be done in Hartford only after examining the individual histories below. This plan is being done at a time when some question the need for future funding of libraries at any level in the digital age while others see an increased need as economic disparities of individuals mount, and the net neutrality of Internet services is challenged. Furthermore, say library advocates, people continue to need help with the technological challenges of access and, extremely important, the continued vetting of materials whether found through electronic searches or consortium acquisitions.

### **Projected Library Needs and Recommendations**

The American Library Association ALA no longer sets quantitative space standards for public libraries, such as a library building with a recommended number of square feet based on population size. Also, applying any size or circulation standards to Hartford's 2010 population (9,952) for 2020 (10,302) and 2030 (10,457) would need to be viewed through the lens of multiple sites that have long been considered "village libraries" although they have evolved very differently. Equally important at this time is the fact that many books and an even larger percentage of information are accessed not through print but electronically. This leads to the following recommendations:

- 1) Professional staff fully competent to stay current with emerging technology; able to purchase, install, and operate computers, devices, software and, equally important, help patrons to manage technology for personal and public devices.



- 2) Continued vetting of resources - on-line and for acquisition - and the ability to help patrons understand verification of materials.
- 3) Continued availability of print materials so that the serendipity of the browsing function is not lost. Not only are there many tangible reasons to sometimes prefer print over digital, there is also the important fact that when libraries cease to provide the shelves of thoughtfully acquired collections and serve only the targeted (often marketed or trending) requests from patrons then an essential support of a reflective, learning, diverse civilization will be lost.
- 4) Accurate and positive public information as to available library services.

In Hartford, a large challenge going forward with multiple libraries is to allocate public funds and support with recognition of the populations served, staff availability and professionalism, and use of resources. Programs will continue to be very important to these community centers serving as a place for interaction with others. They will continue to be lending libraries of items (such as museum passes) as well as print materials, and, via visual technology, offer electronic meeting spaces. The capabilities of governing boards as to efforts made for diverse representations and cooperation are important factors for future vitality as is positive recognition and good public relations for these essential cultural institutions.

## **Background**

Passionate attachment to its villages is Hartford's bane and glory. Each village has undergone peaks and valleys, but in each village, there arose a library. In 1922, the West Hartford Board requested that the Town take it over as a municipal library. It was destroyed by flooding in 1927 and rebuilt. The other three libraries (Hartford Village, Quechee and Wilder) remained non-profit, incorporated libraries. Gates Memorial Library, located in WRJ, closed in 1997. After flooding in 2011 from Tropical Storm Irene, the West Hartford Library was again rebuilt by tax dollars and renamed the West Hartford Library and Community Center. Trustees for that site are elected by town-wide vote and the staff are municipal employees. Boards of Trustees of the other libraries are elected by the associations; staff do not receive municipal benefits. Incorporated libraries furthermore must fundraise for all capital expenses while taxpayer appropriations fund most of the operating expenses. That is supplemented in some cases by Friends groups and grants.

Longstanding confusion and proposed cuts in 2017 over library funding led to public affirmation of the following: Vermont state statute, while stating that library service provision is every town's obligation, makes clear that a town can provide this to municipal and/or incorporated libraries. There is no distinction in the nature of these public libraries (municipal or incorporated) re. a town's obligation to fund the providers. Hartford is unique in the number of libraries for its size, the differences among the libraries as to activity and use, and the fact that both incorporated and municipal type exist in the same town.

While there is some duplication of services, the village nature of the libraries and town indicate a standing desire for these separate, but integrated units. Particularly in the community center role, these desires are well met. Furthermore, a well-functioning, unified system is now in place not only on a town basis, but also statewide through an intensive interlibrary loan system and courier

service. Careful budgeting and careful attention to what resources are most essential as well as most used are important going forward. Studies in the past have included advocacy for a central library; two main libraries and other “reading rooms”, as well as funding based on traditional library measures such as circulation statistics, visits, and computer use and instruction. Some of these have been tried with varying degrees of success: Quechee/Wilder Libraries have been fully integrated since 1997 with shared staff and a collection that is primarily housed at Quechee, but rotates in part to Wilder, the smaller library with a larger hall/meeting room. Recommendation is that traditional library measures and statements of focus be submitted annually to the Town Manager and Selectboard with funding requests.

### **Hartford Village Library**

The Hartford Library is located at 1587 Maple Street in Hartford Village, in a beautiful Victorian building constructed in 1893. The library building has maintained its original character through the dedicated care of its trustees and patrons. The original stained-glass windows, fireplace, oak shelving, furniture, portraits, paintings, and many other distinct features remain intact. The building was added to the National Register of Historic Places in 1995.

The Hartford Library currently houses a collection of approximately 23,000 items, including DVD’s and audiobooks. Downloadable e-book and audiobook services are also available. High speed fiber internet/Wi-Fi with five patron computers is also provided. Interlibrary loan services are readily available through the Vermont Department of Libraries.

Outreach services are provided to four senior housing communities, homebound individuals, day care providers, and the Myra Flanders Reading Room at 221 Maple Street in White River Junction.

Children’s programming includes two weekly story hours for preschoolers, a bi-weekly reading club for older children, a summer reading program, and other seasonal events.

Adult programming includes a very popular monthly book discussion group, a summer reading program, as well as special author visits and educational programs.

The Hartford Library partners with the Hartford Historical Society through the Genealogy Resource Center at the library as well as the community “Old Fashioned Village Christmas” and “Ice Cream Social” events.

Groups of cub scouts, boy scouts, homeschooling families, teen mentoring programs, and others use the library’s meeting room. The meeting room is also rented to individuals and groups for private events as a source of income for the library.

All these services are provided by employees and volunteers with less than two full-time paid employees.

### **Quechee Library Association**

Begun in 1869 in a village with two working mills and several farms, the library continued even as those vocations faltered in the 1950s. With the influx of full and part time residents from the Quechee Lakes planned community in the 1970s, the 1909 brick building built on Main St. was too small at 465 square feet. A capital campaign began that culminated with a \$100,000 LSCA federal grant and the construction in 1995 of a new library at 1957 Quechee Main Street to serve the town. After another capital campaign (again without local tax dollars) an addition enlarged the library to 6,500 square feet and completed accessibility for the three floors. Since that time, the library has been a strong leader for progressive library services, automating early, building a respected collection of 35,000 plus items, forward technology and programming with eternal appreciation for the value of the book. As a community center with hundreds of programs centered on books and topics of cultural and social significance, the library each year has program attendance of over 4,000. Circulation averages about 40,000 items annually, with the library one of the highest net lenders through the statewide interlibrary loan service. Since the 1990s, it has been the primary library in Hartford re. usage, open to all residents and visitors at no cost. In 2011, it led the way to facilitate access and sharing among all town libraries and residents as its tech services librarian executed the move of all to the same software. The same view of town-wide services has led to many outreach services in White River Junction (including Bugbee Senior Center) and daycare centers. Its goal of serving all town residents as a transformative center for reflection and discourse continues and has been validated by ongoing, varied grant and local support.

### **West Hartford Library**

The West Hartford Library has survived three floods since 1922 when it evolved from a school to its inception as a library owned by the Town of Hartford. As part of the “Hartford to Hartford Committee”, Hartford, Vermont and West Hartford, Connecticut raised \$14,000 to help rebuild the library when the library was flooded in 1927. The new building was built on land donated by the Place-Wilkinson families as their home had been destroyed in the flood. The library reopened in 1928 and survived until Hurricane Irene in 2011. With support of the town, the library was moved to higher ground and a beautiful new addition now houses the majority of the books, DVD’s, audios and the children’s section. The Library is fully compliant with the Americans with Disabilities Act (ADA) and the original building now hosts a community room. Funds from the state and federal government enabled the purchase of land around the library which is now considered park land.

The West Hartford Library provides reading material, movies, inter-library loans, computers, free Wi-Fi, meeting and community space with a full equipped kitchen and smart TV. Activities include a farmer’s market, story-times for children, a summer reading program, a village party, a Halloween celebration and much more. Many Appalachian hikers come through in the summer and fall and stop for computer use, rest, and fresh water.

The library has again become the focal point of West Hartford Village and we will continue to do our best to provide as many village and surrounding area needs as possible. We are a town-owned and funded library governed by five trustees elected by the townspeople and managed by one librarian with the help of volunteers and the “Friends of the West Hartford Library”.

## **Wilder Club and Library**

Charles Wilder's concept of a complete 19<sup>th</sup> Century community center that included a library (as well as a pool room, auditorium and even a bowling alley) resulted in the Wilder Club and Library. He left a small endowment that has helped support the building. Hall rentals contribute to support but are kept to as low a fee as possible to allow community members' use for family occasions. The historic building has been the recipient of multiple Vermont Historic Preservation and Cultural Facilities grants as well as local grants to become accessible while preserving historic integrity. This accessibility as well as a new air conditioning system encourages increased use by various organizations.

In 1997, the Wilder Club and Library trustees made the difficult but forward-looking decision to contract with Gates and Quechee Libraries to administer library services to reduce the redundancy and inefficiency of five distinct libraries in one town. At this point there had already been numerous attempts to improve cooperation. The Wilder Board acknowledged too that it was very difficult to keep a professional librarian for long in a part-time small library. After Gates Memorial Library closed, Quechee Library continued the contract with Wilder and, following automation, the two libraries became a fully integrated service.

## **SOLID WASTE**

The Hartford Solid Waste, Recycling and Transfer Center is located on 19 acres of land on U.S. Route 5 South. In 1991, the Center underwent major changes resulting in a new recycling and solid waste facility that opened in June, 1992. The Center consists of an Administrative Office, Recycling Building, Scale House, and Household Hazardous Waste Building. The buildings have a total of 9,412 square feet. In July 1991, the Town began its curbside recycling program for residents of Hartford. Today, curbside collection and the main functions and services of the Center continue, where the uses for some of the spaces have changed including leasing a portion of the building for complementary uses such as a secondhand store and bottle/can redemption center.

The Center also includes a Construction and Demolition (C&D) transfer component. This service is open to all Town residents, businesses and property owners and the ten towns who are members of the Greater Upper Valley Solid Waste Management District (GUVSWMD). Several towns from New Hampshire also are allowed to use the construction and demolition area.

In addition to recyclable drop-offs at the Center, the Town's curbside recycling program that started in 1991 has greatly increased the amount of recyclables taken from the waste stream. The table below shows the volumes for 2017 from curbside pick-up and drop-off at the Center from the Town and GUVSWMD.

**TABLE VI-3  
COLLECTIONS OF RECYCLABLE MATERIALS – 2017**

**Municipal Solid Waste (compacted & bulky) – 1200 Tons**  
**Construction & Demolition Debris - 1100 Tons**  
**Curbside Recycling - 726 Tons**

**Recycled Material at the Center – (403.35 Tons)**

Scrap Metal	503,420 lbs. (251.71 Tons)
Specialty Metals	20,981 lbs. (10.49 Tons)
Aluminium Cans	8,800 lbs. (4.40 Tons)
Steel Cans	36,000 lbs. (18.00 Tons)
Tires	32,400 lbs. (16.20 Tons)
Batteries (Auto)	4,682 lbs. (2.35 Tons)
Batteries/Cell Phones	1,910 lbs. (.96 Ton)
Electronics	148,220 lbs. (74.11 Tons)
Paint	50,260 lbs. (25.13 Tons)

Note: Totals do not include volumes of household hazardous waste collected at regional HHW collections.

The Center also is a no-cost collection site for all Vermont residents for single-use and rechargeable batteries (Act 139), electronics (Act 79), paint (Act 58), and fluorescent and mercury containing bulbs (Act 39).

In 2016, a ground solar project was completed at the Center through a lease agreement with a solar company that installed and maintains a 500-kW array on top of the closed landfill. The solar field was projected to produce 892,000 kWh. In 2016, 2017, and 2018 it produced 832,405 kWh, 802,685 kWh, and 796,854 kWh. This renewable energy project allows the Town to reduce a portion of its annual electrical costs for various Town facilities.

**Vermont Universal Recycling Law**

In 2012, the Vermont Legislature unanimously passed the Universal Recycling Law (Act 148) in response to the state’s stagnant recycling rates that had hovered around 30-36% for nearly two decades. At that time, almost half of Vermonter’s trash was recyclable or compostable material. Putting these into landfills not only adversely impact valuable natural resources, but also release many more greenhouse gas emissions than reuse, recycling, food donation, and composting. The enactment of Act 148 was the response to this situation. In 2018, the Vermont Legislature made some changes to the law to address concerns about collection, disposal and timelines.

The law put in place the following goals with specific deadlines and benefits.

- Increase recycling and composting, which conserve natural resources and reduce greenhouse gas emissions and energy use.
- Promote food donation. Feed Vermonters not landfills.
- Provide consistent and convenient recycling and composting services statewide.



- Build green businesses and jobs that strengthen Vermont’s economy by encouraging businesses to invest in recycling, food donation, and organics management.
- Reduce the need for landfills, protecting our land, air, and water.

The Town is now gearing up for 2018 Food Scrap generators of 18 tons/year (1/3 ton/week) must divert material to any certified facility within twenty miles. Leaf, yard and clean wood debris are banned from the landfill. Haulers must offer leaf/yard debris collection. By 2020, all food scraps, including those from households, must be diverted with no exemption.

### **Financing the Solid Waste Program**

The Center operates under enterprise-fund accounting rules. It is not a property tax-funded entity, but receives all operating expenses from tipping charges, membership fees, and commercial haulers and resident landfill user fees. The curbside recycling program that stops at all residences is supported by Town General Tax Funds. The market for recyclable materials is changing, most recently with fewer vendors that will take them and increasing costs. The Town also is experiencing a decline in the amount of construction and demolition debris coming to the facility. The Town is mindful of these trends and the need to review how the facility will be needed in the future.

### **Future for Hartford’s Solid Waste, Recycling and Transfer Center**

While the Town has been successful over the years in providing needed solid waste services to residents, business and developers, changing markets, costs, available services within the region, and new state laws have altered the Center’s operations and costs. This has highlighted the need to review the future direction of the Center. It also has put a spotlight on the inadequate funding from the state to assist towns in meeting the Universal Recycling Law today, next year and beyond.

## **HUMAN SERVICES**

The provision of human services is important, either directly or indirectly, to all residents of Hartford. Human-services programs serving Hartford and the region have been developed to help ensure the physical and mental health of the area residents and provide transportation, education, counseling, and other services. Hartford's citizens have at their disposal a wide array of services. Citizens can access the complete list of agencies by dialing 211 or using the VT211 website.

## **CEMETERIES**

Native Americans inhabited Vermont as early as 9,000 – 7,000 BC. Summer settlements typically occurred along rivers and streams. Settlement of Hartford by European descendants occurred about 250 years ago. Since the early days of Vermont, only associations, religious organizations, or private parties have principally owned and run cemeteries. Town and city governments avoided it. Only much later when those associations or religious groups had diminished and disappeared have governments, at their choice, stepped in to own and maintain a cemetery that had by then become inactive, aged, and historic.

The Town of Hartford and its people have followed that pattern. Today, Hartford has four cemeteries owned by associations, two owned by St. Anthony Parish/Diocese of Burlington, six historical sites owned by the Town, and several smaller ones in private hands. Some termed "active" sell burials plots. Others known as "inactive" do not sell burial plots due to lack of space or other limitation. Burials may still occur in inactive cemeteries due to purchases of plots prior to the cemetery becoming inactive. In Hartford, the four owned by associations and one owned by the Diocese remain active. Ownership also involves the responsibility to administer, maintain, and financially provide for the burial ground

On January 2, 2018 the Town of Hartford Selectboard approved the establishment of a Cemetery Committee and charged them with:

- *To evaluate concerns and issues with cemeteries Town-wide; explore future needs; and provide recommendations for a way ahead for cemeteries within the Town.*
  - *Primary areas of focus include, but are not limited to:*
    - *Funding:*
      - *Shortfalls*
      - *Care & Maintenance*
      - *Limiting Rules*
    - *Retirement/Aging of Trustees/Sextons*
    - *Loss of Knowledge/Records*
    - *Burial Spaces (Long Term)*
    - *Statute*
    - *Education*

The Cemetery Committee reported their findings to the Selectboard on November 16, 2018. The recommendations have yet to be implemented and will require further discussions and policy development. At the time of this report, Cemetery Associations have remained active and identified issues with continued maintenance, and repairs are being addressed through a funding increase approved by voters at Town Meeting in 2019. Further work remains with recommendations to establish a Cemetery Commission to oversee funding allocations provided by the Town and the establishment of consistent records management for all cemeteries within the community. A description of Hartford public and private cemeteries (excluding private family lots) is maintained with the Town's Park and Recreation Department.

## **CAPITAL IMPROVEMENT PROGRAM**

Hartford's Capital Improvement Program (CIP) is a six-year planning document that identifies specific projects to fund in the upcoming fiscal year, and project priorities for the following five years. This gives the Selectboard and community advance notice of projects on the horizon to allow for adequate planning and resources to meet these future needs. The CIP is the implementation arm of the Town Plan, and should reflect the goals, strategies, actions, and priorities in the Town Plan. It also should reflect the budget priorities set by the Selectboard. Currently these are to:

- improve community safety;

- support targeted growth and economic opportunity;
- maintain and improve the Town's infrastructure;
- improve the town's sustainability and resilience; and
- improve the health, quality and character of our community.

The Town updates the CIP annually to reflect changes in Town priorities and as projects become more defined in the planning and budgeting processes. Some of the tasks employed to be prepared for the annual update include:

- community engagement through surveys and/or community meetings;
- Selectboard annual review of budget priorities;
- project planning to identify design and financing options; and
- identifying opportunities to leverage and/or partner with funding and investments from regional, state and federal agencies, and the private sector.

To enable an informed decision-making process, the CIP includes:

- a list of projects – major Town infrastructure to be constructed or improved and equipment to be purchased or replaced;
- the projects ranked in order of preference based on the adopted Town Plan and budget priorities;
- the plan for financing the projects including annual contributions to reserve funds for ongoing infrastructure improvements and equipment replacement to minimize the fiscal impact in any one year;
- a timetable for the construction or completion of the project;
- justification for the project; and
- explanation of expenses for the project.

Recognizing that the CIP is a document that is updated annually, the following is the most current list of project priorities adopted by the Selectboard on January 2, 2019. The list is a work in progress and does not represent a prioritized order.

**TABLE VI-4  
HARTFORD CAPITAL IMPROVEMENTS PROGRAM PROJECT PRIORITIES**

<b>Capital Improvement Project</b>	<b>Annual Cost</b>	<b>Total Cost</b>	<b>Running Total</b>
Fire Equipment Replacement	\$227,000	\$1,135,000	<b>\$1,135,000</b>
Bridge Repairs & Replacement + 3,132,000 Grant	\$175,000	\$1,050,000	<b>\$2,185,000</b>
Sykes Mt. Ave Sidewalk/Butternut to Walsh Ave (North Side)	\$30,000	\$180,000	<b>\$2,365,000</b>
Highway Equipment Replacement + \$300,000 in FY2020 (2,141,000 Total)	\$350,000	\$3,123,000	<b>\$5,488,000</b>
Bugbee Infrastructure Replacement - \$ one-time + \$70,000 Rebates • Roof Replacement \$46,000 • Stc	\$174,125	\$174,125	<b>\$5,662,125</b>
Maxfield (Lighting/Drainage/Paving) + \$200,000 fundraising	\$200,000	\$200,000	<b>\$5,862,125</b>
DPW Facility, multiple projects - WRJ Salt Shed Roof (\$54,000 in FY 2022)	\$65,000	\$390,000	<b>\$6,252,125</b>
Quechee Main St Sidewalk - = + \$150,000/FY2023 • \$370,000 State Grant	\$80,000	\$390,000	<b>\$6,642,125</b>
Public Safety Storage Building	\$348,944	\$348,944	<b>\$6,991,069</b>
Parking Facility for employees and siezed vehicles	\$474,212	\$474,212	<b>\$7,465,281</b>
Gates St./Fairview Terrace Wall - \$40,000 (one-time FY 2020)	\$3,340,000	\$3,340,000	<b>\$10,805,281</b>
Outdoor Pool Replacement	\$3,600,000	\$3,600,000	<b>\$14,405,281</b>
Waterman Hill Sidewalk + \$300,000 State Grant	\$60,000	\$300,000	<b>\$14,705,281</b>
Bike/Ped Plan Reserve to Initiate Work for Projects Beyond 2025	\$30,000	\$150,000	<b>\$14,855,281</b>
RT 14/West Hartford Sidewalks + \$35,000 Grant • Radar Feedback and Ped Path Implementation in F	\$25,000	\$150,000	<b>\$15,005,281</b>
Public Safety Facility - Training Facility	\$225,000	\$225,000	<b>\$15,230,281</b>
WABA North Wall Upgrade	\$274,000	\$274,000	<b>\$15,504,281</b>
Rt. 4 Sidewalk/Waterman Hill to Jake's Market	\$34,000	\$170,000	<b>\$15,674,281</b>
Hartford Ave Sidewalk	\$15,000	\$90,000	<b>\$15,764,281</b>
Rt. 4 Sidewalk/Waterman Hill to Gorge	\$220,000	\$1,028,000	<b>\$16,792,281</b>
Wright's Reservoir Dam - \$600,000 one-time	\$600,000	\$600,000	<b>\$17,392,281</b>

Source: Hartford Capital Improvements Program, 2018

## COMMUNITY FACILITIES AND SERVICES GOALS, STRATEGIES AND ACTIONS

### General

**Goal 1: To provide and maintain community facilities and services that are cost-effective and serve the needs of the community.**

**Strategy 1: Maintain and redevelop community facilities and services to meet current and changing needs in the future.**

Actions:

- a. Continue to maintain an up-to-date five-year Capital Improvements Program (CIP) to plan major capital expenditures and help spread the costs over time.
- b. Increase local awareness of the range of services available to Hartford residents.
- c. Continue to support and cooperate with the region's human-services providers to ensure that those services utilized by Hartford's residents continue to be available.
- d. Promote the removal of architectural barriers that prevent people with disabilities from using or gaining access to public places.
- e. Plan for all community facility buildings to be energy-efficient and have adequate space and parking.

### Police Department

**Goal: Build a human centered approach to law enforcement.**

**Strategy 1: Complete transition to Community and Problem Oriented Policing.**

Actions:

- a. Recruit, hire and retain a workforce that is reflective of the Town's service population in appearance and values, providing a high quality, inclusive work environment, progressive training and opportunities for continual advancement.
- b. Provide Police foot or bike patrols (vs. car and parking) in the village centers as needed.
- c. Expand the present Police patrol force to meet the needs of the community as warranted.
- d. Advance the local quality of life by collaborating with allied criminal justice agencies, local government, schools, human service agencies, the faith community and residents to resolve quality of life issues before they become a crime.

**Strategy 2: Develop advanced investigative capabilities through specialized training, collaborative partnerships, data analysis and information sharing.**



Actions:

- a. Integrate the principals and practice of Crime Prevention through Environmental Design (CPTED) in new and refurbished development projects, including highway safety, commercial and residential.
- b. Advance agency technologies to include car to street level computing upgrades, public engagement, and public safety communications infrastructure.
- c. Maintain an effective system of public safety by appropriate maintenance, upgrade and replacement of necessary emergency equipment and facilities.

## **Fire Department**

### **Goal 1: Enhance prevention activities and response times.**

**Strategy 1: Have prevention and response agreements in place that are definitive in scope and scale with key community partners to ensure highly efficient service hand-offs, by June 30, 2020.**

Actions

- a. Map existing partners and review any and all agreements by March 31, 2019.
- b. Map potential and emerging partners by May 31, 2019.
- c. Create a matrix of prevention and response elements and criteria to evaluate HFD's requirements for each by September 30, 2019.
- d. Identify and detail all relevant reciprocal agreements and gap by January 31, 2020.

**Goal 2: Improve staffing levels to provide the ability to respond adequately to emergency situations.**

**Strategy 1: Implement a robust and relevant talent development system by March 31, 2020 that promotes an agile and resilient work team.**

- a. Research and develop a lattice and ladder system of professional opportunity for all roles by June 30, 2019.
- b. Conduct a training needs assessment, incorporating current and predictive data for service demands by June 30, 2019.
- c. Implement a competency-based professional development program by September 30, 2019.
- d. Implement a process for ongoing system management by January 31, 2020.

**Strategy 2: Implement a managed growth plan to match capacity to increasing levels of demands for all mandated services by March 31, 2020**

- a. By May 30, 2019, develop a list of all current and anticipated mandated and recommended services that HFD has to fulfill.
- b. By September 30, 2019, create intentional data reporting that references demographic and other data to demonstrate capacity needs,

- c. Research and develop a staffing matrix with variable roles and requirements to best match the continuum of services, by January 31, 2020.

**Goal 3: Improve Emergency Disaster Management in the areas of mitigation, preparedness, response and recovery.**

**Strategy: Hartford Fire Department will be recognized as a regional “all hazards responder” in local communities by 2021, and in the emergency services field by 2022 as a regional “all hazards responder” leader.**

- a. Create intentional data reporting that references vital impact, by June 30, 2019.
- b. Create a benchmarking system for data against regional standards, by September 30, 2019.
- c. Develop a communications plan for stakeholder groups by November 30, 2019, and outreach plan for industry recognition by June 30, 2020.
- d. Implement and establish a management plan for external relations and communications by January 31, 2020.
- e. Implement a process for ongoing system management, by September 30, 2020.

## **Recreation**

### **A. Organizational**

**Goal 1: Continue collaboration and adapt to the community’s cultural and demographic make-up.**

**Strategy 1: Maintain a variety of recreational opportunities for all residents.**

Actions:

- a. Continue to collaborate with special interest groups to provide recreation programs and special events; Polar Express, Covered Bridges Half Marathon, Balloon Fest and Special Events.
- b. Continue to explore the possibility of constructing a river trail from Downtown White River Junction to Ratcliffe Park, which is part of the Latham Works Community Group.
- c. Continue relationships with the Lebanon/Mascoma Trail Network to connect with White River Junction.

**Goal 2: Secure a plan that will guarantee funding to maintain our existing recreational programs, resources and facilities.**

**Strategy 1: Develop financial giving opportunities and establish secure funding resources.**

Actions:

- a. Establish a capital reserve fund to secure funds in the operating budget to go toward existing capital maintenance and repair of existing facilities.
- b. Develop a give a gift catalog that shows images and descriptions of park and recreation related items that the Department can use through a donation.

- c. Establish a revolving fund for recreation programs.
- d. Identify cost-saving maintenance practices and landscaping options for parks and public spaces.

**Goal 3: Implement or participate in a community-wide needs assessment, maintaining a 4 to 5-year cycle.**

**Strategy 1: Initiate participation in community needs surveys or develop internally to collect data on a 4 to 5-year cycle.**

Actions:

- a. Continue to demonstrate through evaluation of community need through needs assessment and program evaluations for desired new programs and facility offerings.

**Goal 4: Create a sub-committee consisting of a variety of vested interests to establish a community center.**

**Strategy: Meet with community partners and stakeholders to identify a vested need for a community indoor recreation facility.**

Action:

- a. Create a steering committee to focus on the feasibility of developing a community center for the Town of Hartford. Look at developing in collaboration with the Bugbee Senior Center.

## **B. Programs**

**Goal 1: Have services and facilities meet the community's cultural and demographic make-up.**

**Strategy 1: Maintain a variety of recreational opportunities for residents of all ages, cultural diversity, and abilities to advocate and promote a healthier community population.**

Actions:

- a. Plan and implement town-wide indoor and outdoor active-living programs for families and adults.
- b. Maintain community wide events by enhancing its program through collaborations with other organizations such as the Chamber of Commerce and Downtown Merchant Associations.
- c. Continue participation in the Hartford Community Coalition.

**Strategy 2: Facilitate intergenerational social awareness and diversity.**

Action:

- a. Create and implement two intergenerational art/music programs per year (cooking, quilting, knitting and card making).

**Strategy 3: Meet the programming logistics of working parents through a more on-line presence.**

Actions:

- a. Continue to engage in social media outlets to promote further programs and offerings.

**Strategy 4: Build on existing coalitions within the community and identify new opportunities.**

Actions:

- a. Continue to collaborate with special interest groups to provide recreation programs and special events: Polar Express, Covered Bridges Half Marathon, Balloon Fest and other special events.
- b. Continue to explore the possibility of constructing a river trail from Downtown White River Junction to Ratcliffe Park with the Latham Works Community Group.
- c. Continue relationships with the Lebanon/Mascoma Trail Network to connect with White River Junction.

**Strategy 5: Continue to promote programs that create one-town awareness versus a one-village image.**

Actions:

- a. Program activities that create visitation to each village (Valley Quest, Tree Walk tour and fun run/walk events)
- b. Maintain the Park and Recreation motto of five villages, three rivers, one town.

**Goal 2: Secure a plan that will guarantee funding to maintain existing recreational programs, resources and facilities.**

**Strategy 1: Develop financial giving opportunities and establish secure funding resources.**

Actions:

- a. Establish a capital reserve fund to secure funds in our operating budget to go toward existing capital maintenance and repair of existing facilities.
- b. Develop a give a gift catalog that shows images and descriptions of park and recreation related items that the Department can use through a donation.
- c. Establish a revolving fund for recreation programs.
- d. Identify cost-saving maintenance practices and landscaping options for parks and public spaces.

**Goal 3: Provide and maintain desired and high-quality programs and services.**

**Strategy 1: Create short-term and long-term measurable assessments of Parks and Recreation services and facilities.**

Actions:

- a. Use evaluations at the end of every recreational program to identify what worked, didn't work and desired new programs.
- b. Maintain the Survey Monkey online program and apply the data to evaluation summaries.
- c. Implement or participate in a community wide needs assessment and program evaluations, every 4 to 5 years.

**Goal 4: Evaluate the need for a community indoor recreational facility.**

**Strategy 1: Engage community partners and stakeholders in the process.**

Action:

- b. Create a steering committee to focus on the feasibility of developing a community center for the Town of Hartford.
- c. Consider collaboration with the Bugbee Senior Center.

**Goal 5: Integrate Town and School Services and Facilities**

**Strategy 1: Have department youth & adult athletics become an integral part of developing an entire town/school sport programs and facilities.**

Actions:

- a. Maintain relationship with Hartford High School Athletics using their system to aid in the development of the youth sport and recreation programs.
- b. Maintain representation on the Hartford Field Facility Use Committee.

**Goal 6: Maintain the rural character of our community landscape.**

**Strategy 1: Facilitate community appreciation of preserving opens spaces and forested areas as recreational resources.**

Action:

- a. Schedule community conservation/environmental educational programs over the course of a year working in partnership with the Hartford Conservation Commission.



## **Education**

**Goal #1: Educate, involve, and engage all stakeholders in the movement toward individualized and student-centered learning plans that include learning through proficiency and multiple pathways to show growth and progress both academically and socially/emotionally.**

**Strategy 1: Educate and support staff in proficiency-based learning.**

Actions:

- a. Develop benchmarks for grades to incorporate the transferable skills into the district report cards.
- b. Frame teacher goal setting and evaluation around proficiency and personalization.
- c. Create collaborative time for teachers to understand what proficiency looks like.

**Strategy 2: Student led review of personal growth through Personalized Learning Plan (e.g. student led conferences). Create a system for students to track and present their personalized growth as developmentally appropriate.**

Actions:

- a. Determine scope of student led conferences.
- b. Determine the consistent elements needed for demonstrating personalized growth and goals.

**Strategy 3: Create opportunities for student learning through multiple, flexible pathways.**

Actions

- a. Create opportunities for multiple, flexible pathways where student voice and choice are identified.

**Strategy 4: Educate various stakeholders (board, parents, and community members) on Proficiency Based Grading and Flexible Pathways.**

Actions

- a. Develop a policy on PBGRs (Proficiency Based Graduation Requirements).
- b. Assess progress for District Ends Policy Monitoring Report.
- c. Create a strategic public relations plan (e.g. social media, newsletter, and other district communications).

**Goal #2: Develop a clearly articulated data system based on a variety of assessment points, both formative and summative, which allows for the individualization of learning leading to growth toward proficiency for all students.**

**Strategy 1: Create a calendar that answers why, how, and what for each district assessment.**

Action:

- a. Administrators to finalize and revise district assessment calendar to include what assessments are included, why and how they are used.

**Strategy 2: Create a technology tool that collects multiple data points.**

Action:

- a. Research, select and implement a data visualization tool that works within Infinite Campus District Information System.

**Strategy 3: Create and/or maintain a position to manage the system.**

Action:

- a. Continue to develop and revise the role of the Infinite Campus Data Manager to meet the changing needs of the district.

**Strategy 4: Determine the professional development needed at the building and district level.**

Action:

- a. Identify Professional Development needs and provide support for Professional Development for the technology tools that the district uses to utilize Infinite Campus grade book.

**Strategy 5: Establish data teams and provide consistent collaborative time and structures to look at and analyze data using common protocols.**

**Goal #3: Improve students' social emotional learning by engaging in restorative and community building practices.**

**Strategy 1: Generate/identify a district philosophy for pro-active behavior planning and intervention while keeping each school's unique needs in mind.**

Actions

- a. Strengthen our multi-tiered systems of support.
- b. Identify a common framework of Hartford School District multi-tiered supports.
- c. Create a Professional Development Plan to support our universal and targeted supports.
- d. Identify common data points to be utilized in the Infinite Campus Student Data Management System.
- e. Develop a data system to house evidence of our practice and for use in decision-making.
- f. Provide professional development for the facilitation of the analysis of data informed decision-making.

**Goal 4: Students have access to quality vocational and workforce training opportunities to prepare them for future career opportunities.**

**Strategy 1: Promote the expansion of continuing education and vocational education opportunities.**

Action

1. Encourage the development of school-business partnerships that promote valuable and sustainable employment opportunities through vocational and workforce training and experimental learning.

## **Libraries**

**Goal 1: Maximize services of our libraries by staying current with emerging technology while maintaining quality physical and digital collections.**

**Strategy 1: Provide professional staff, fully competent to develop collections, programs and facilitate use of technology.**

Actions:

- a. Maintain evaluated collections, supporting the serendipity of browsing and providing patrons access to verified information from online and print sources.
- b. Offer programs to foster community and lifelong learning.
- c. Assist patrons in use of personal and public computers and other devices.
- d. Provide accurate and positive public information about available library services for all ages.

## **Solid Waste**

**Goal 1: Continue to manage Hartford's solid waste in an efficient, cost-effective and environmentally sound manner.**

**Strategy 1: Plan today for the current and future solid waste disposal needs of Hartford residents, businesses, developers and property owners that also addresses viability and feasibility.**

Actions:

- a. Monitor trends in the waste-management industry to better position the Town to respond to market changes and Hartford's solid-waste needs.
- b. Review alternate means of operating, uses and funding the Solid Waste, Recycling and Transfer Center to determine if operational modifications are warranted to meet the future needs and fiscal capability of the Town.
- c. Work with other towns in the region to obtain more state financial support for implementation of Act 148.
- d. Develop a capital improvements plan for the maintenance or reuse of the Hartford Community Center for Recycling and Waste Management.

**Goal 2: Expand Hartford's reuse, recycling, and reduction efforts to lower the volume of solid waste that requires disposal.**

**Strategy 1: Improve residential and commercial reduction, reuse, recycling, and composting.**

#### Actions

- a. Partner with Vermont Department of Environmental Conservation (DEC) and other organizations and towns in the region to develop a regional public education program.
- b. Partner with Vermont DEC and other organizations and towns in the region to identify options to help Hartford community put excess food and food residuals to their highest uses.
- c. Work closely with Vermont DEC in examining how other regions and countries are addressing the products and packaging that make up a large portion of the waste and recycling stream.

#### Cemeteries

**Goal 1: Plan for the future of Hartford's public and private cemeteries.**

**Strategy 1: Continue the public/private partnerships reflective of the work of the Town Cemetery Committee in 2018 with a focus on records management, cemetery maintenance and organizational and financial structures.**

#### Actions:

- a. Continue to evaluate the November 2018 Cemetery Committee's recommendations to address current and future needs of cemeteries town-wide.
- b. Consider the establishment of a Town Cemetery Commission.

#### Child Care

**Goal 1: Provide safe, affordable, accessible and high-quality child care.**

**Strategy 1: Encourage the addition of child care facilities in Hartford to meet the increasing demand for child care.**

#### Actions:

- a. Work with regional and state partners to identify options for high-quality and affordable child care for all time of the day.
- b. Encourage programs that are available throughout the year that enable families to schedule well in advance.
- c. Consider making child care facilities a permitted use in some zoning districts.

## **CHAPTER VII UTILITIES**

### **INTRODUCTION**

Hartford's utility system has a major influence on land use patterns in the Town. Utilities provide services that can be metered or measured. Some, like electricity and telephone, are available virtually throughout the Town, wherever poles have been set and lines have been strung. Others, such as water, wastewater, cell phones, DSL, and cable TV, are available in more limited areas where it is economical to provide the service to a concentration of people.

The extent and adequacy of utility service plays an important role in contributing to the general welfare of residents and the quality of life and by attracting certain types of development to the community. Naturally, the demand is far from static. Existing facilities may become inadequate through structural deterioration or functional obsolescence and the increased and often new demands that accompany population growth and changes in lifestyle.

Hartford is fortunate to have municipal water and wastewater service in four of the five village areas (White River Junction, Wilder, Quechee and Hartford Village). This allows the Town the opportunity to concentrate development in these established built-up areas (refer to Map 13).

The decision to improve or extend utilities is based on the following factors: (a) existing or potential problems, (b) the cost of the utilities, and (c) public needs and desires. To plan for public utility provision, it is first necessary to determine the extent of existing facilities.

This chapter reviews existing utilities and considers the suitability of local utilities to meet future demands.

### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

### **WATER SUPPLY**

Hartford's municipal water service extends to four of the five village areas. The Hartford Water System serves White River Junction, Wilder, and Hartford Village, while the Quechee Water System serves portions of Quechee (refer to Map 13). The extent of the water service area must be considered one of the Town's greatest assets. Town wide, there are currently 2,659 acres or 9% of the land area of Hartford that is served by Town water. A water system accommodates denser development and more intensive land uses than does on-site wells. The systems enable



the Town to support a larger residential population, sizable recreation and institutional development, and a vigorous business community. The availability of a water system is a major consideration in the future growth and development of the Town. Water bills for both systems are sent quarterly. Metered accounts in both water systems are billed for usage plus an administration base rate. Unmetered Hartford accounts are billed as a set estimated usage (2,000 cu ft. as of 2018) plus the base rate. Unmetered Quechee accounts are billed based on number of bedrooms. The fee schedule is reviewed annually by department supervisors during the budget process. Recommendations for any changes are submitted to the town manager and Hartford Selectboard for approval.

A regular maintenance program is followed for both water systems that include flushing and testing hydrants twice a year and pipe replacement projects. The department continually improves the distribution systems by replacing high maintenance lines as time and budgets allow. Many of the small diameter lines are replaced “in house” by water department personnel with assistance from the highway and/or wastewater departments. Extensions to new developments are installed according to Town standards, at the expense of the developer, and may be taken over by the Water Department.

### **Hartford Water System**

The Hartford Water System serves approximately 2,042 customer accounts, 86% of whom are residential users in Wilder, White River Junction, and Hartford Villages. This water system consistently ranks as one of the best in the State of Vermont. With the construction of the storage tank and treatment facility in the mid-1970s, Hartford was one of the first Vermont towns to meet federal drinking water standards. To ensure continued compliance with both State and Federal drinking water standards, the Water Department does various sampling throughout the year.

The history of the Hartford system is interesting. The Hartford Village area and West Lebanon were once served by the same private system, with storage at the Boston Lot Reservoir in West Lebanon. In 1947, the Town bought the entire system and then sold the West Lebanon portion to the West Lebanon Fire District. To this day, the Hartford and West Lebanon systems are interconnected by a 12” main that runs across the Connecticut River on the Route 4 Bridge. In emergency situations, the valve can be opened to pipe water to the community in need.

The Hartford water system currently utilizes two wells in Wilder. Well #1 has a current pump capacity of 600 gallons per minute (GPM). Well #2 was added in 2004 and is capable of pumping 900-GPM.

In 2017, the Town of Hartford pumped over 212 million gallons from Well #1 and over 38 million gallons from Well #2. Although the water quality from these wells is excellent, they do contain elevated levels of manganese. Manganese is a naturally occurring mineral that is common in ground water. The amount found in groundwater is usually not considered a health risk; however as little as 0.05 ppm can be a nuisance by staining fixtures and laundry. The water from both wells is processed through “greensand” filters at the Wilder Treatment Plant to consistently remove the manganese to levels below 0.02 ppm before entering the distribution

system. The treatment capacity of the plant is approximately 2.16 million gallons per day (gpd), with an average daily use of 673,017 gallons in 2017. Peak day use in 2017 was 1,066,000 gallons, due to a large water main break on Hartford Avenue in Wilder. The second highest peak day in 2017 was 927,000 gallons due to a large structure fire on Harrison Avenue in White River Junction.

Replacement of Well # 1 is currently underway. The existing well #1 has been in service for more than 60 years and its capacity has diminished to a point where it is no longer cost effective to rehabilitate. The new well #1 is expected to yield 1,000-GPM. Well #2 has not performed as anticipated. It was originally designed to pump 1,000-GPM however the yield has diminished to approximately 750-GPM. A test well drilled next to well #2 showed that the aquifer cannot support a 1,000-GPM well for an extended period of time. Additionally, it was discovered that well #2 has arsenic in the raw water. This is not a health concern since the Wilder Treatment Plant removes the arsenic, however it could be an issue if the Wilder Treatment Plant had to be taken offline for an extended period of time, requiring department personnel to pump water directly into the distribution system. While the volume of water generated from the two Wilder wells and the treatment capacity of the Wilder Water Treatment Plant are expected to meet anticipated needs for many years to come, an additional well site should be investigated in the event well #2 becomes unusable.

The distribution system consists of over 45 miles of water lines ranging from 3/4" to 16" in diameter. As required by State and Federal regulations, a small disinfection residual is maintained throughout the distribution system. A 1.5-million-gallon storage reservoir located behind the fire/police station on VA Cutoff Rd and a one-million gallon storage reservoir located near the Hartford/Norwich town line provide pressure and storage during high water usage, such as a fire, and when the pumps are off. Additionally, there are 266 fire hydrants connected to the Hartford system. A 12" water main interconnects Hartford and the City of Lebanon water systems for mutual use in emergency conditions. Water is gravity-fed in all but the Campbell Street area, where the water must be pumped to a higher elevation. Presently, approximately 98% of the accounts in the Hartford system are metered. The remaining 2% pay a flat rate.

**TABLE VII-1  
HARTFORD WATER AND WASTEWATER SYSTEM  
FEE SCHEDULE**

	Water Fee	Wastewater Fee
Per 100 Cubic Feet	\$1.91	\$3.34
Base Rate	\$31.62	\$62.83

Source: Department of Public Works, Master Fee/Rate Chart, 2018

**TABLE VII-2  
QUECHEE WATER AND WASTEWATER SYSTEM  
FEE SCHEDULE**

	Water Fee	Wastewater Fee
Per 100 Cubic Feet	\$2.55	\$4.38
Base Rate	\$58.38	\$124.57

Source: Department of Public Works, Master Fee/Rate Chart, 2018

Both the Bridge Street and Hartford Village bridges have 12” water lines installed on them that carry water over the White River thus completing a hydraulic loop that enhances fire flows and stabilizes water pressure in the system.

The current source protection plan was updated and approved by the Vermont Drinking Water and Groundwater Division in September, 2016.

The follow table prioritizes water main replacement based on age, type and size of pipes, history of quality complaints and repairs and potential property damage should the pipe fail. Overall rating is 7 (best) to 35 (worst). The list was compiled by department personnel and is subject to change.

**TABLE VII-3  
HARTFORD WATER MAIN REPLACEMENT CAPITAL IMPROVEMENTS**

WATER MAIN REPLACEMENT CIP HARTFORD							\$13,165,265.00	-	
as of 8/30/17			Overall	Existing		Replacement		2017 Estimated cost	
STREET NAME	VILLAGE	Rating	feet	size/type	feet	size/type	comments	foot	Total
LATHEM WORKS LANE	WRJ	31	1379	6" CI	1379	8" DI		200	275,800.00
NUTT LANE	WRJ	31	464	6" CI	464	8" DI	RR crossing	250	116,000.00
HARRISON AVE	WRJ	29	440	6" CI	440	8" DI		175	77,000.00
HARTFORD AVE	WILDER	29	3800	8" AC	3800	8" DI		225	855,000.00
FOREST HILLS AVE	WRJ	27	1120	6" CI	1120	8" DI		175	196,000.00
MANNING DRIVE	WILDER	27	441	6" CI	441	8" poly - fused		200	88,200.00
NORWICH AVE	WILDER	27	662	8" AC	662	8" DI		175	115,850.00
SOUTH MAIN STREET	WRJ	27	3000	8" CI	3000	12" DI		225	675,000.00
SOUTH MAIN STREET	WRJ	27	750	6" CI	1		eliminate-double main	10000	10,000.00
BIRCHWOOD DRIVE	WRJ	26	775	6" CI	775	8" DI		175	135,625.00
CURRIER STREET	WRJ	26	228	8" CI	228	8" DI		200	45,600.00
SOUTH STREET	WILDER	26	293	2" GI	293	8" DI		150	43,950.00
UNION STREET	WRJ	26	300	4" CI	300	8" DI		200	60,000.00
GILLETTE STREET	WILDER	25	599	8" AC	599	8" DI		200	119,800.00

HILLCREST TERRACE	WRJ	25	760	6" CI	760	8" DI		200	152,000.00
ASH STREET	WRJ	24	254	1" GI	254	2" PVC	in house	50	12,700.00
ELK STREET	HARTFORD	24	300	8" CI	300	8" DI		200	60,000.00
GATES STREET	WRJ	24	877	8" CI	877	8" DI		200	175,400.00
HANOVER STREET	WRJ	24	1291	6" AC	1291	8" DI		200	258,200.00
WILDER STREET	WRJ	24	869	2" GI	869	8" DI		200	173,800.00
BULLARD STREET	WRJ	23	1031	6" CI	1031	8" DI		200	206,200.00
CEDAR STREET	WRJ	23	192	2" GI	192	2" PVC	in house	50	9,600.00
CONNECTICUT RIVER ROAD	WRJ	23	2500	6" CI	2500	8" DI		200	500,000.00
FAIRVIEW TERRACE	WRJ	23	3620	8" CI	3620	8" DI		200	724,000.00
FAIRVIEW TERRACE	WRJ	23	150	6" CI	150	8" DI		200	30,000.00
HAZEN STREET	WRJ	23	290	6" CI	290	8" DI		200	58,000.00
LOWER HYDE PARK	WRJ	23	2081	6" CI	2081	8" DI		200	416,200.00
MAPLE STREET	HARTFORD	23	4150	8" CI	4150	8" DI		225	933,750.00
MAPLE STREET	WRJ	23	3755	6" CI	3755	12" DI		250	938,750.00
NORTH MAIN STREET	WRJ	23	1082	8" CI	1082	8" DI		200	216,400.00
WINDSOR DRIVE	WRJ	23	288	2" GI	288	2" PVC	in house	50	14,400.00
TALBERT STREET	WRJ	23	575	6" CI	575	8" DI		200	115,000.00
THIRD AVE	WRJ	23	500	6" CI	500	2" PVC	in house	50	25,000.00
LILY POND ROAD	WRJ	22	1152	6" CI	1152	8" DI		200	230,400.00
PARK STREET	HARTFORD	22	350	8" CI	350	8" DI		200	70,000.00
C STREET	WILDER	21	648	1-1/4 C	648	2" PVC	in house	50	32,400.00
SPRUCE STREET	WRJ	21	397	2" GI	397	2" PVC	in house	50	19,850.00
A STREET	WILDER	20	1297	6" CI	1297	8" DI		200	259,400.00
AIRPORT ROAD	WRJ	20	1400	8" CI	1400	8" DI		200	280,000.00
BEECH STREET	WRJ	20	546	6" CI	546	8" DI		200	109,200.00
HEWITT STREET	WRJ	20	560	6" AC	560	8" DI		200	112,000.00
LEXINGTON STREET	WILDER	20	435	1-1/2 GI	435	2" PVC	in house	50	21,750.00
BRIDGE STREET	WRJ	19	240	8" CI	240	12" DI		250	60,000.00
WINDSOR DRIVE	WRJ	19	675	6" CI	675	8" DI		200	135,000.00
CHARLES STREET	WRJ	18	428	6" CI	428	8" DI		200	85,600.00
CHESTNUT STREET	WILDER	18	600	8" CI	600	12" DI		250	150,000.00
HAWTHORN STREET	WILDER	18	400	1-1/2 GI	400	2" PVC	in house	50	20,000.00
MAPLEWOOD TERRACE	WRJ	18	620	8" CI	620	8" DI		200	124,000.00
ABBOTT ST	WRJ	17	351	6" CI	351	8" DI		200	70,200.00
CASCADNAC AVE	WRJ	17	600	6" CI	600	8" DI		200	120,000.00
GOUDREAU STREET	WILDER	17	244	1-1/2 GI	244	2" PVC	in house	50	12,200.00
HARTFORD AVE	WILDER	17	1005	6" CI	1		possible eliminate-double	25000	25,000.00
NORTH HARTLAND ROAD	WRJ	17	2853	10" CI	2853		eliminate - reroute	5	14,265.00
NORTH HARTLAND ROAD	WRJ	17	6511	8" CI	6511	16" DI	State highway	275	1,790,525.00
PINE STREET	WRJ	17	988	10" CI	988	12" DI		250	247,000.00

BARNES AVE	WRJ	16	490	6" CI	490	2" PVC	possible in house	50	24,500.00
SYKES MOUNTAIN AVE	WRJ	16	2861	8" CI	1		eliminate - double main	50000	50,000.00
TEMPLETON AVE	WRJ	16	586	6" CI	586	12"	low pressure area	200	117,200.00
WOODSTOCK ROAD (RT 4)	HARTFORD	16	1048	8" CI	1048	12" DI	State highway	250	262,000.00
DIVISION STREET	WILDER	15	569	1-1/4 C	569	2" PVC	in house	50	28,450.00
PLEASENT VIEW TERRACE	WILDER	15	830	1" C	830	2" PVC	in house	50	41,500.00
V A CUTOFF ROAD	HARTFORD	15	3000	10" CI	3000	12" DI		250	750,000.00
WOODSTOCK ROAD (RT 4)	HARTFORD	15	696	1" C	696	2" PVC	in house - State highway	100	69,600.00
BESWICK DRIVE	WRJ	7	2110	6" CI	2110	8" DI	DONE by State 2016		0.00
FERN STREET	WILDER	7	447	1" C	447	2" PVC	in house - DONE 2017		0.00

CI - Cast Iron

AC - Asbestos Concrete

DI - Ductile

GI - Galvanized Iron

C - Copper

Source: Department of Public Works

## Quechee Water System

Originally constructed and operated by the Quechee Lakes Corporation, the Quechee Water System has been maintained and operated by the Town of Hartford since 1979. In 1998, the Town assumed ownership of the well facility and distribution system. The Quechee Water System serves both Quechee Lakes and non-Quechee Lakes properties, primarily in the heart of Quechee Village along the Ottauquechee River valley floor. Hillside development above the river valley is served by individual wells. The system serves approximately 720 customer accounts. Approximately 43% of the accounts are metered. Most of these are located in the original town-owned portion of the water system. The remaining 57% unmetered are primarily condominiums that were part of the Quechee Lakes Corporation. Since the water service lines for these buildings were not designed for individual water meters, retrofitting them ranges from difficult to impossible. Many buildings would require master meters to be installed in a pit or vault.

A gravel-packed well located near Lake Pinneo has a State-approved yield of 923 gallons per minute (gpm), with a pumped capacity of 550 gpm. The water quality is excellent and needs no additional treatment. However, the water is classified as “moderately hard” and does have an adverse effect on certain types of hot water heating systems. In 2017, the Town of Hartford pumped more than 42 million gallons from the Quechee well, for an average of 116,700 gpd. The peak day flow from 2017 was 185,457 gallons per day (gpd).

The water distribution system consists of pipes ranging from ¾” to 12” in diameter, approximately 81 fire hydrants and three booster pump stations that provide service to the Ridge, Sugar Hill, Kingswood and Snow Village Condominiums. Additionally, there are four storage tanks (see Table VII-1). In 2016, the 34,000-gallon North Hartland tank was replaced with a 400,000 gallon tank. The new tank was placed in service in January 2017. A small amount of sodium hypochlorite added at the well house provides disinfection. The current Source



Protection Plan was updated and approved by Vermont Drinking Water and Groundwater Division in 2018.

**TABLE VII-4  
QUECHEE WATER SYSTEM STORAGE TANKS**

TANK	CAPACITY IN GALLONS
North Hartland Tank	400,000
Sugar Hill Tank	132,000
Wheelock Road Tank	100,000
Kingswood Tank	54,000*
TOTAL	686,000

\*The Kingswood storage tank services the Kingswood and Snow Village Condominiums. This tank is filled from the Eastman Booster Pump Station. The water in this tank is not available for use by the rest of the system.

Source: Department of Public Works

The water distribution system is in good overall condition. There are some older galvanize iron and plastic pipes that will require replacement (i.e. High Street, West Gilson Ave). These smaller lines could be replaced by department personnel as time allows. There is also a significant amount of 8” asbestos cement (AC) water main that may need replacement in the distant future.

The following is a list of general improvements needed for the Quechee water system.

- 1) Develop another water source for the system. This could include obtaining State approval to use the Quechee Lakes Golf Course well as a backup source.**
- 2) Improve water transmission capabilities as per recommendations from department personnel and the 2007 computer water model of the system. The Department has identified that connecting the mains on Quechee Main Street from the Quechee Club to Pheasant Trace (approximately 4,200 feet) will greatly improve the system hydraulics and provide redundant river crossings.**
- 3) Replace/upgrade water mains as needed and as time allows.**

## **WASTEWATER DISPOSAL**

As previously stated, Hartford municipal wastewater service includes four of the five village areas (White River Junction, Wilder, Quechee, and Hartford Village) that are served by one of two wastewater treatment plants, one in White River Junction and the other in Quechee (refer to Map 13). The extent of the wastewater area must be considered one of the Town's greatest assets. Town-wide, there are currently 4,013 acres, or 13.6% of the land area of Hartford that is served by Town wastewater. This figure is considerably higher than the area served by Town

water due primarily to the extensive area of Quechee Lakes that is served by Town wastewater and individual wells.

A wastewater system accommodates denser development and more intensive land uses than does on-site disposal. The systems enable the Town to support a larger residential population, sizable recreation and institutional development, and a vigorous business community. The availability of a wastewater system is a major consideration in the future growth and development of the Town.

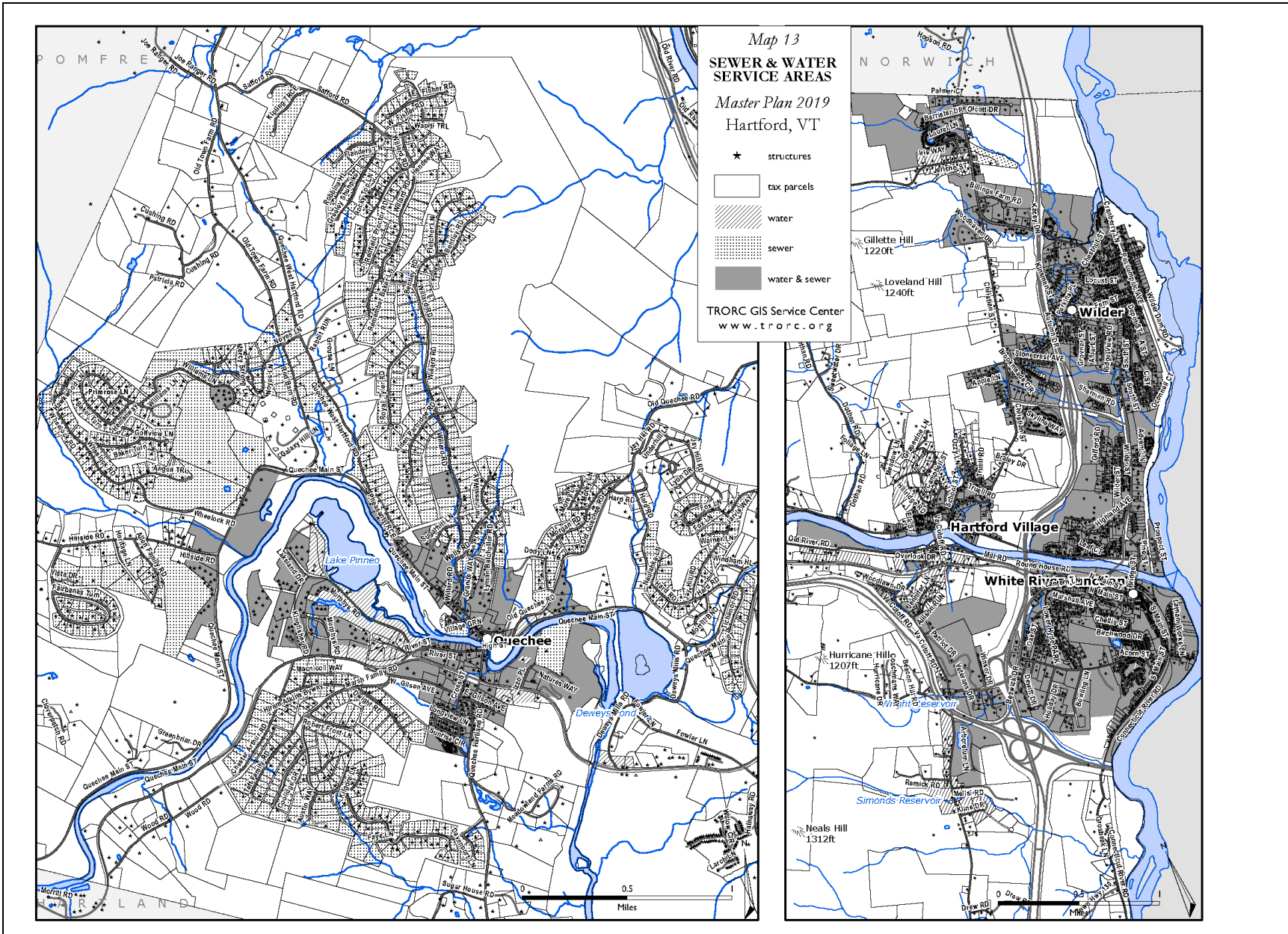
### **White River Junction Treatment Facility**

The White River Junction (WRJ) Treatment Facility (formerly known as the North Elm Street Treatment Plant) serves the wastewater areas of White River Junction, Wilder and Hartford Village. The WRJ Treatment Facility serves approximately 1,903 customer accounts. In 2017, the treatment facility serviced 1,943 sewer connections. Town sewer fees are based on water usage. This facility has been in operation since March, 1978 and was improved in 1981 with a new aeration system. In June, 1990, another upgrade was completed at an approximate cost of \$3,000,000. This upgraded the treatment capacity from 970,000 gallons per day (gpd) to 1,215,000 gpd, with a peak design flow of 4,000,000 gpd, and additional aeration, chlorine contact tank, and sludge thickening facilities. In May, 2010, a \$6,000,000 update was started and finished in September, 2012. This upgraded the treatment capacity from 1.215 million gallons per day (MGD) to 1.450 MGD with a peak flow of 4.500 MGD. With the upgrade, it converted the plant to a SBR (Sequence Batch Reactor) style facility with UV (Ultra Violet Disinfection).

The average day flow for the twelve-month period from January, 2018 through December, 2018 was 752,000 gpd. This was a 6.5% increase from 2017.

### **Quechee Wastewater Treatment Facility**

Owned by the Town of Hartford since 1998, the Quechee Wastewater (QW) Treatment Facility provides tertiary treatment, with a designed flow of 300,000 gallons per day (gpd). The Quechee Wastewater Treatment Facility was upgraded in 2010 and has a capacity of 475,000 gpd. The average daily flow from January, 2018 through December, 2018 was 260,015 gallons. This was a 16.4% increase from 2017. The collection system also includes 24 leach fields that were accepted by the Town in 1998. There are approximately 1,231 customer accounts served by the QW Treatment Facility. Town sewer fees are based on water usage.



## **Shared Systems**

As previously stated, 13.6% of the land area of Hartford is served by Town wastewater service. The remaining 86.4% of the Town is not served by Town wastewater and thus must rely on septic systems (discussed in more detail in Chapter IX, Natural Resources). In Vermont, there are State standards for separation distances between wells and septic systems. In addition, there is a back-up system requirement in the event of a failure to a primary septic system. In some cases, existing well and septic system locations on adjacent lots could make it difficult, if not impossible to comply with these requirements. Since expansion of Town wastewater service to many rural areas is not practical, the use of shared systems may be the only option. In addition, natural resource conditions may make more sense to utilize a shared system as well. Therefore, the Town should support the use of shared septic systems.

## **Septage Disposal**

The septage from private on-site septic systems is pumped by private contractors. The White River Junction Wastewater Treatment Facility can be used on a space-available basis for treatment and processing of this septage. In 2017, the treatment plant treated 188,235 gallons at a cost of \$20,563. The 2017 septage tipping fee was \$106/1000 gallons for residents and \$145/1000 gallons non-residents.

## **Sludge Management**

For years, municipal wastewater sludge was used as a fertilizer and soil amendment. The Wastewater Treatment Facilities no longer land apply sludge due to more stringent state rules and regulations. Bio-solids from the Quechee Wastewater Treatment Facility are disposed of in slurry form at approved facilities throughout the State or at Lebanon, New Hampshire Landfill. In 2017, the White River Junction Treatment Facility hauled 100% of all Bio-solids to the Lebanon Landfill at an approximate cost of \$41,600.

## **TELECOMMUNICATIONS**

### **Broadband and Cellular Communications**

Information technology (wired and wireless telecommunications, broadband internet) is an extremely important resource that contributes to our quality of life and economy. Government deregulation and changes in technology have led to a revolution in the telecommunications industry. In the age of high-speed Internet, wireless and digital technologies, fiber optic cable and broadband, there is a rush to establish the infrastructure necessary to accommodate growth in a highly competitive marketplace. Services have greatly expanded and consumers have many more options. Still, many rural and outlying areas lack coverage. Given this trend, it is important that the Town support efforts to upgrade and improve broadband access throughout Hartford.

### **Wireless Communication Facilities and Aesthetics**

With the growth in wireless communications, there has been a proliferation of communication towers. Vermont's topography provides challenges to the accommodation of cellular service. Typically, the industry prefers highly visible locations such as hilltops and ridgelines in order to achieve maximum service. Unfortunately, towers can have significant visual impact. In addition, development of the infrastructure to support the towers also can have considerable environmental impacts.

In January 2002, the Hartford Zoning Regulations were amended to provide specific standards for placement and construction of wireless communication facilities while mitigating adverse impacts. The regulations proved successful as several telecommunication facilities were erected throughout Hartford in subsequent years with little impact. However, in 2014, the State rescinded the local review authority with the passage of Section 248a, a process which allows cellular providers to apply for a Certificate of Public Good rather than going through the local permitting or Act 250 review. Section 248a requires notification of municipalities of a pending application and provides an opportunity for local comments to be submitted to the Public Service Board. It is important that the Town support efforts to expand cellular coverage, but in doing so the Town must ensure that telecommunication facilities are properly sited and do not create adverse natural resource or visual impacts. Colocation shall be pursued prior to seeking new facilities and telecommunication facilities shall be the minimum height necessary to achieve coverage. Further, efforts shall be made to minimize and mitigate impacts on natural, scenic and historic resources.

### **Telephone**

Hartford's local phone (traditional land-line service) is provided by Consolidated Communications. However, consumers have the option of selecting from a variety of long-distance and internet service providers and many consumers have given up land lines and replaced them with cell phones. In addition, growth in cell-phone usage has resulted in several companies vying for residential and business customers.

### **Television**

Due to the hilly terrain in Hartford and the surrounding area, residents without cable or satellite television service have limited reception. As a result, cable television has continued to grow since it was made available to Hartford residents in 1964. Service is provided in the more densely settled areas of Quechee, White River Junction, Wilder, and Hartford Village. Comcast, one of the largest cable companies in the U.S., serves the Hartford area. In recent years, there has been an increase in satellite television service and internet service as well.

Included in the local cable network is the community access television, which broadcasts local government meetings, sporting events, and educational programming on two local stations (Channel 8 and Channel 10). Initially begun in Hanover to serve Hanover, Norwich, and the Dresden School District in 1993, the local cable access expanded to include Hartford and Hartland in 2003. Funding is provided through cable fees and grants. Currently, the local cable access television station has a studio at the Tip Top Building in Downtown White River Junction.



## **GOALS, STRATEGIES AND ACTIONS**

**Goal 1: Develop universal high-speed internet and cellular phone coverage. Expand fiber optic and cellular networks to ensure affordable and reliable communications technology.**

**Strategy 1: Support the development of fiber-optic and cellular communications systems.**

Actions:

- d. Support providers in expanding and high-speed internet service.
- e. Support providers in developing cell towers and systems that fill service gaps.
- f. Consider establishing a citizen's committee to study communication needs and capacities in Hartford.
- g. Support efforts to upgrade and improve broadband access, especially in the Town's growth center and village centers.

**Goal 2: Encourage the extension of utilities to areas zoned for commercial/industrial development and dense residential and mixed-use development that have been identified by the Town for growth.**

**Strategy 1: Improve and expand water and wastewater system infrastructure within the present service area before considering expansion.**

Actions:

- a. Review the need for expansion of water and wastewater systems in the Route 5 South area to service existing and potential commercial and industrial development between Route 5 and Interstate 91 as recommended in the Route 5 South Study.
- b. Evaluate the need to upgrade and expand water and wastewater systems.
- c. Support the use of shared septic systems.

**Goal 3: To encourage development in already developed and underdeveloped areas served by existing utilities.**

**Strategy 1: Continue an aggressive maintenance program for the two Town water and two wastewater distribution systems.**

Actions:

- a. Structure utility rates to cover the costs of proper operation and maintenance of the wastewater and water systems.
- b. Continue efforts regarding wellhead protection in the areas of the Quechee and Wilder Wells.
- c. Complete recommended improvements to the water systems.
- d. Establish a reserve fund for equipment replacement in the event of unanticipated failure at the White River Junction Treatment Facility and the Quechee Wastewater Treatment Facility.

## **CHAPTER VIII TRANSPORTATION**

### **INTRODUCTION**

The Town of Hartford is an important and historic transportation crossroad and gateway to Vermont. From earlier times, its rivers were avenues of transportation; barges were dragged upriver to White River Junction from the south, logs were floated down to Wilder from the north, and the stagecoaches traveling between eastern coastal cities and the Champlain Valley stopped regularly in the town center until the railroad era began.

White River Junction flourished for nearly a century as an important rail center and continues to handle significant freight and passenger service today. Two of the most important interstate highways serving northern New England intersect in the Town, making it an important stopover point for travelers and a distribution point for commerce. Hartford is midway between Boston and Montreal on Interstate 89. Hartford residents had an airport in the past, but now rely on the Lebanon Airport on a limited capacity and more typically use the Manchester, NH, Burlington, VT and Boston, MA airports. Finally, from a recreational point of view, the Town is frequently traversed by bicyclists, canoeists, hunters, skiers, snowmobilers, fishermen and foliage watchers.

A safe and efficient transportation system is vital to our basic quality of life. It is the foundation for how we will achieve all our stated goals in the Town Plan. Over the last fifty years, the regional population has grown by 67%. Although this growth rate is not expected to continue, we will continue to grow and need to ensure a planned transportation system that meets changing demands.

While most of the transportation system falls within existing public rights-of-way, the Town continues to make transportation decisions and investments cooperatively with our residential and commercial land use interests. While the majority of trips are made by the single-occupant vehicle driver, the Town continues its commitment to providing accessibility options to all populations and for all transportation modes. And while transportation has innately negative environmental impacts, the Town will continue to seek possible mitigation alternatives that can preserve and enhance the surrounding environment.

This chapter provides a planning and project development model for Hartford's future transportation system.

### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the

community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

## **TRANSPORTATION PLANNING**

The purpose of transportation planning is to ensure a consistent, coordinated, and proactive effort to preserve the existing transportation system while addressing infrastructure and service needs.

Transportation planning is also a communications tool for Hartford residents and businesses. It directs the Town's education and outreach activities. It establishes a process by which the Town solicits input and guidance for future transportation investments. It sets the stage for how multiple Town departments working with multiple transportation agencies can effectively and efficiently communicate to one another.

Hartford has a long history of being involved in transportation planning. Town staff and officials have been working on many different transportation modes and services, which are all supported by various transportation planning processes. It has been this collective response to incorporate land use planning, development regulations, and capital facility planning that has allowed Hartford to achieve its planning goals.

Transportation planning is a shared responsibility. The Town Manager, under the guidance of the Town Selectboard, helps establish and communicate transportation planning-related priorities and directives. Hartford's Department of Planning and Development Services works with citizen volunteers serving on the Planning Commission, Zoning Board of Adjustment, Historic Preservation Commission, Energy Commission, Community Resilience Organization and Conservation Commission to help implement transportation planning directives. These multiple boards have different responsibilities that incorporate transportation planning elements. As part of its role in project implementation, the Department of Public Works helps guide and inform the transportation planning process. All efforts are leveraged using regional and state transportation planning agencies referred to in this chapter.

The role of the private developers in transportation planning is critical. When presenting development proposals, it is critical that they provide, as early as possible, sufficient information, as warranted, to facilitate a thorough planning process. This may include transportation plans and traffic impact studies; how the development accommodates present or future public and private transportation facilities; and how the development follows context-sensitive design of transportation infrastructure generally consistent with the Town Plan goals, and specifically with this Chapter.

Transportation planning cannot occur within a vacuum. Regular and proactive consultation between citizens, Town officials and Regional Planning Commission staff and periodic surveying of Town residents about their satisfaction with the transportation system are critical pieces in planning for the Town's future transportation needs.

## **REGIONAL TRANSPORTATION PLANNING**

The Two Rivers-Ottawaquechee Regional Commission manages a regional transportation planning program supported by its communities, the State of Vermont, and the Federal Highway Administration. The regional transportation process includes planning and policy development as well as project programming and management.

The Regional Planning Commission's transportation process can be divided into two distinct elements. First, the Regional Planning Commission serves as the transportation liaison for all state and federal transportation policies, projects, and programs. Using this process, Hartford communicates its citizen's local and regional priorities to the elected and appointed officials in state and federal government. Second, Hartford receives project assistance and technical guidance on many different types of transportation projects. This gives Hartford an added resource for effectively leveraging its planning and transportation system management responsibilities.

All regional transportation decisions are made in the greater context of planning goals, which seek to enhance community livability, economic development, and the preservation of our environment. These goals and processes are articulated in the Regional Plan.

Hartford joined the Two Rivers-Ottawaquechee Regional Commission in 2004. Since that time, the Town and the Regional Planning Commission have worked as partners in several transportation planning issues and projects. This working relationship has already resulted in several successful collaborations on both local and regional projects.

## **PROJECT DEVELOPMENT**

The Town has a responsibility to work proactively on developing projects that meet the growing demands placed on our transportation system. Private development, government regulations, legislative mandates and policy, and accounting standards have formalized the project development process, and while the process has historically been geared toward meeting funding options and system capacity triggers brought on by private development and system deterioration, Hartford will increasingly look to planning as the first resource in identifying, developing, and prioritizing construction projects.

Transportation funding sources come from numerous combinations of the local tax base, state and federal gas tax receipts, state and federal allocations and registration fees, U.S. Congressional apportionments, and private financing sources. The most significant funding resource comes from the federal transportation bill, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The federal and state government pays a percentage of project costs (50-100%) and, if necessary, the local community pays the remainder (often called local match).

The Town has been extremely successful in identifying, planning, and funding improvements for its transportation system. The following programs are the most significant funding sources.

State Capital Program: Vermont has an ongoing program to maintain or replace roads and bridges on the state and local transportation system. Depending on the project, the state pays a fixed percentage of the total costs, with the Town covering the local match.

State Town Highway and Bridge Program: The Vermont Districts allocate state aid funds on a rotating basis between communities in their regions. These funds cover major rehabilitation or reconstruction work. The District allocates a set grant amount and Hartford may use those funds for smaller projects or as a match for larger projects.

Federal and State Transportation Alternatives: Approximately 10% of Vermont's surface transportation funds are allocated to transportation projects that "enhance" the existing system. These enhancements are primarily for bicyclists and pedestrians but can involve aesthetic and environmental improvements. All projects are picked in an annual competitive selection process. These projects are municipally managed, with Towns receiving a set grant award to reimburse 80% and 90% of the project costs.

Private Financing: Commercial and residential development can exceed the capacity of the existing transportation system. Where projected capacity is exceeded for any one transportation mode then private developers then pay for or cost-share the necessary transportation system upgrades. These projects are unique to the scale and type of development.

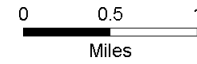
These funding options, as well as other short-term or one-time grant programs, almost always require some form of local cash match. Transportation projects can be costly even with small local matches of 10-20% that are required within a singular construction season. When appropriate, Hartford does build capital reserves to meet project-match requirements and this process should continue.

For more than a decade, the Town has actively pursued "municipally managed" projects that would have been implemented by the State. This local management has reduced project delays and ensured a more effective project for Hartford's transportation needs.

Hartford has been fortunate that the development community often works closely with Town officials to build projects that mitigate transportation impacts and ultimately enhance the quality of our transportation system. It is through this cooperative process that the Town can best achieve a functional transportation system while preserving the safety, efficiency, and aesthetic values of our transportation resources.

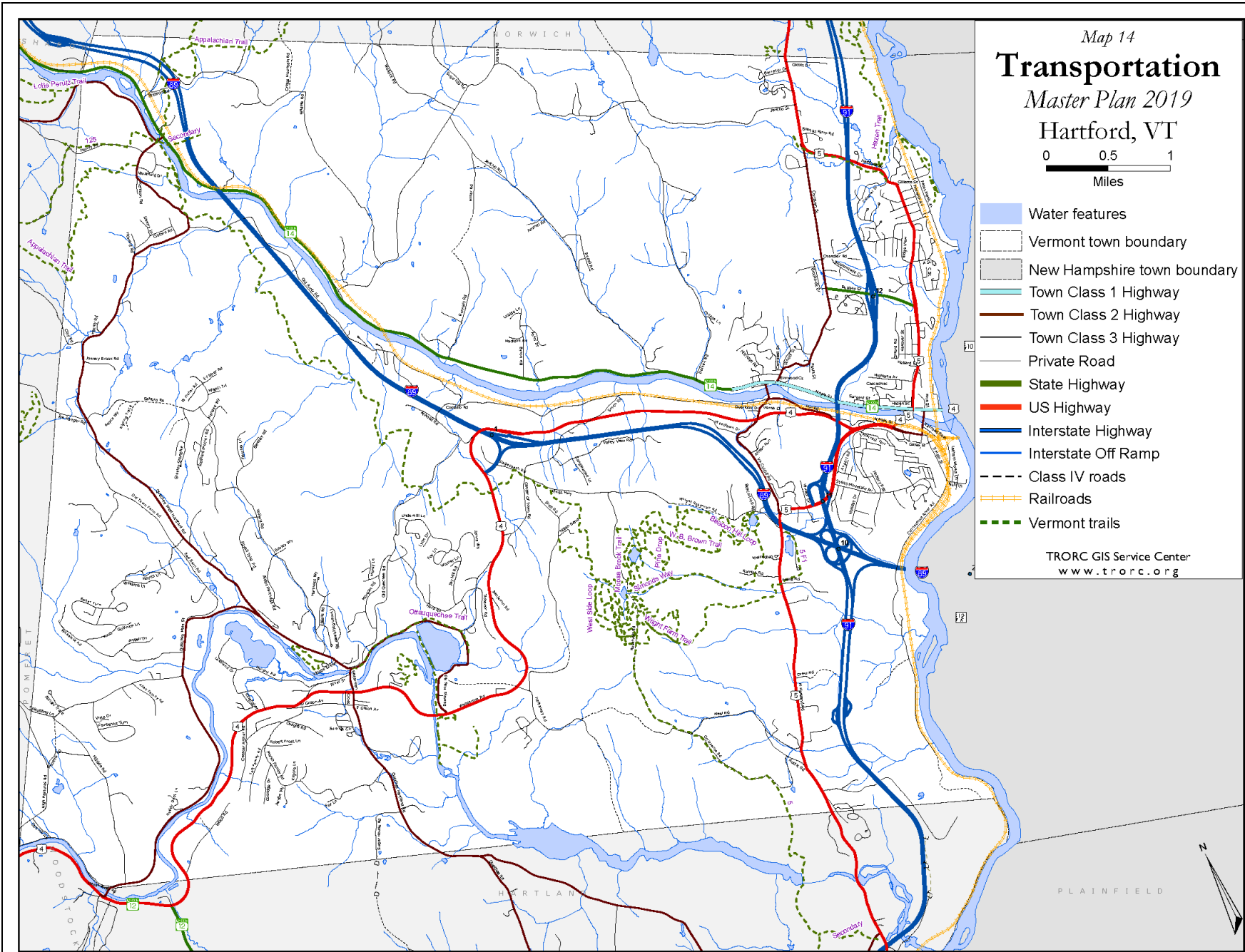


Map 14  
**Transportation**  
*Master Plan 2019*  
 Hartford, VT



- Water features
- Vermont town boundary
- New Hampshire town boundary
- Town Class 1 Highway
- Town Class 2 Highway
- Town Class 3 Highway
- Private Road
- State Highway
- US Highway
- Interstate Highway
- Interstate Off Ramp
- Class IV roads
- Railroads
- Vermont trails

TRORC GIS Service Center  
[www.trorc.org](http://www.trorc.org)



## **UPPER VALLEY TRANSPORTATION MANAGEMENT ASSOCIATION**

The Upper Valley Transportation Management Association (UVTMA) is a partnership of municipalities, schools, transportation providers, planning agencies, and private-industry groups that focuses on traffic impacts to preserve and enhance Upper Valley economic growth and community livability. The UVTMA goals are mitigating traffic congestion, improving mobility choices for all Upper Valley residents, and reducing our dependency on single-occupancy vehicle commuting. The UVTMA works under the wing of Vital Communities of the Upper Valley, a regional nonprofit organization based in Downtown White River Junction that fosters community dialogue and action regarding the long-term balance of cultural, economic, environmental and social wellbeing in the region. Vital Communities provides staff and technical support to the UVTMA, although the UVTMA is just one facet of the Vital Communities work program. Vital Communities complements Hartford's planning activities and affords the Town an opportunity to work with neighboring New Hampshire communities and transportation partners. Since its focus lies within the greater Upper Valley, Vital Communities is not restricted by Regional Planning Commission or State boundaries. Furthermore, its broad mission of improving Upper Valley community livability has allowed this organization to remain responsive to local and regional needs.

### **TRAFFIC DATA**

Traffic data plays a significant role in how Town and State officials manage our road system. The first responsibility for all transportation professionals is to ensure safe passage for the traveling public. Transportation professionals rely on recording traffic volumes, speeds, and types of vehicles, to understand how our transportation system operates. They record crash data to better understand where road failures occur. They also examine influences from major employers and residential developments to better understand trip origins and destinations.

The Regional Planning Commission and VTrans collect traffic counts within the Town by placing an automatic traffic recorder along roads for a span of one to two weeks. The data collected from these traffic volume counts is used to prioritize transportation projects and assist planners in evaluating development-related impacts. Traffic volumes and growth rates vary according to the road and its classification.

In 2002, Hartford Police began mapping vehicle crash locations that previously had only been recorded on paper forms. In 2018, there were 209 reported/investigated vehicle crashes in Hartford. Of those, 76% accounted for property damage only, 19% resulted in property damage and injuries (20%) and 1% resulted in property damage and fatalities. Of the 2018 reported/investigated crashes, 70% percent of these crashes occurred on VT/U.S. roadways, 20% on local roads and 10% on interstate highways. Based on state criteria, the Town has four "high crash areas." They include: US5/Sykes Mountain Avenue, White River Junction area by (US4/US5/VT14 intersection to the NH town line), Quechee Gorge Bridge and US4/Waterman Hill Road. In general, the crash data is correlated to traffic volumes, with more traffic along roads or intersections equaling more crashes.

Currently, there is not much data on road and intersection level of service. Having this information would be very helpful in evaluating future improvements to intersections, especially when reviewing the impact from a proposed development.

## **PUBLIC ROAD SYSTEM**

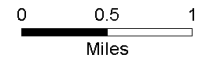
In the State of Vermont, all municipal roads are designated as Class I, II, III, IV, or legal trails. These are legal designations used by the State in defining the amount of State funding for towns. Class I roads include all state highways under the jurisdiction of the town. Class II roads usually provide access to neighboring towns. Class III roads are the lower traffic volume roads that access adjacent neighborhoods and properties. All these roads must be passable year-round, under normal conditions, by a regular passenger vehicle. They all have to meet certain design and maintenance standards, but they can be paved or gravel and receive remarkably different types and volumes of traffic. These classifications also are used by the Town to distinguish development standards, maintenance practices, and access requirements.

The final two classifications have no state aid attached to them and receive little or no maintenance. Class IV roads are nominally maintained by the Town, but receive no winter maintenance. These roads may or may not be passable by regular or off-road-type vehicles. Legal trails receive no official town maintenance, although civic groups and volunteers actively maintain selected segments. Trails are unique from the other municipal travel ways in that motorized vehicular access is prohibited.

The public road system in Hartford totals approximately 187 miles. The state actively maintains 25% of the roads that are the most significantly traveled in town (45 miles). Hartford actively maintains 70% of all the roads classified as being Class I, II, or III (129 miles). There are another 5% of roads designated by the state as being Class IV, but only 10 miles of Class IV roads in Hartford have actually been recorded on the state highway system map, with the total mileage still unknown.

In addition to the legal road designations, local roads can be described according to a particular “functional class.” Major and minor arterial roads serve to carry traffic across Town and to neighboring towns. This category includes interstates and connecting roads that tie the arterials together. Examples of the major arterials are Interstate Highways 89 and 91, U.S. Routes 4 and 5, and VT Route 14. Collector roads serve, as the name suggests, to carry traffic between residential areas and the main traffic arteries. Collector streets include such roads as Chandler Road, Center of Town Road, Dothan Road, Jericho Road, Quechee Main Street, and South Main Street.

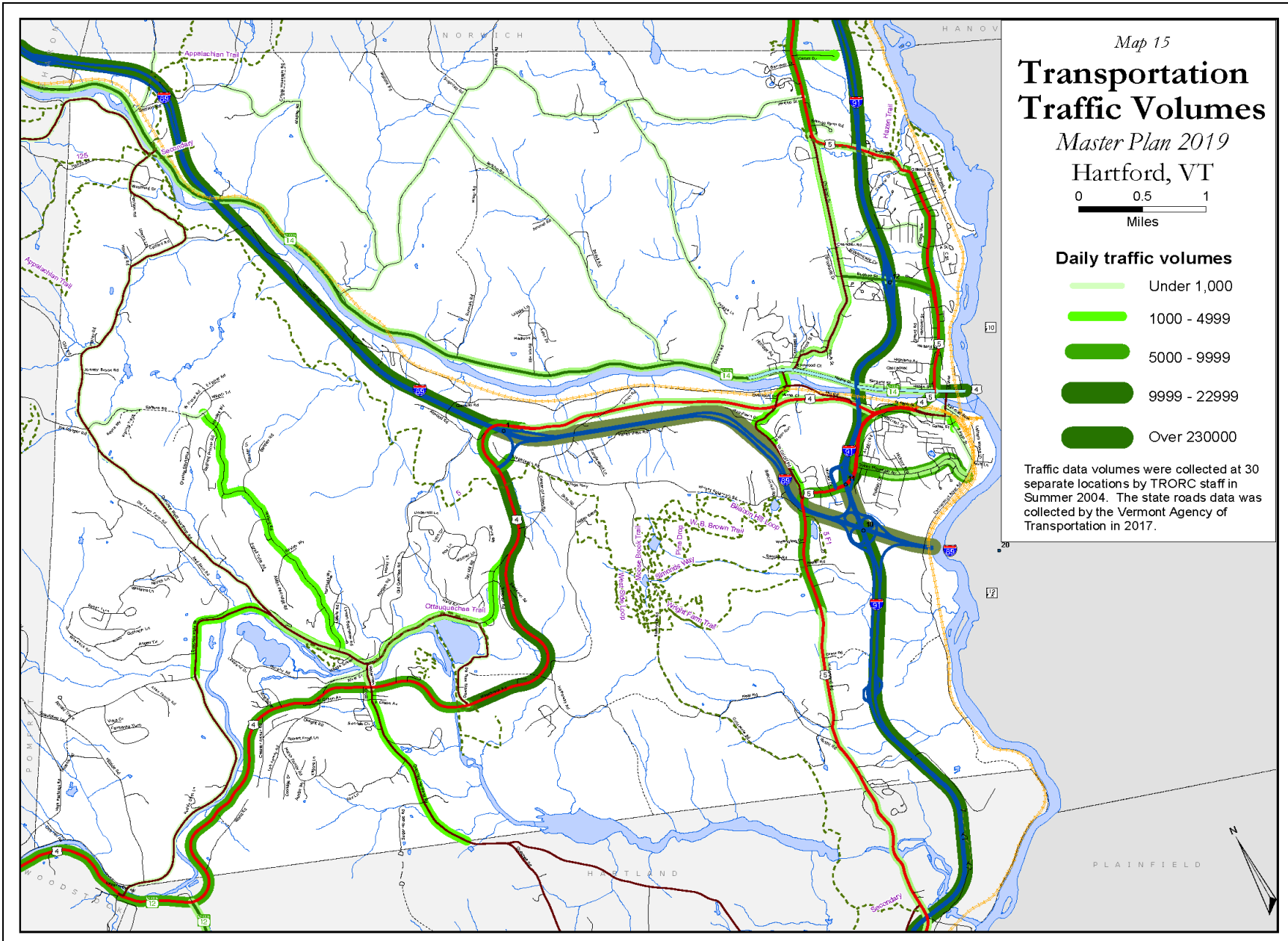
Map 15  
**Transportation  
 Traffic Volumes**  
 Master Plan 2019  
 Hartford, VT



**Daily traffic volumes**



Traffic data volumes were collected at 30 separate locations by TRORC staff in Summer 2004. The state roads data was collected by the Vermont Agency of Transportation in 2017.



## **LOCAL ROAD SURFACE CONDITION**

Public roads have been and will be Hartford's single largest Town asset requiring significant financial investments paid by every taxpaying resident. Good roads are the connective element to the entire community and should be managed wisely and effectively. Town citizens want roads with a smooth riding surface, adequate lighting, proper markings, and minimal interruptions due to maintenance and construction-related activities.

Hartford has an ongoing management system that includes an inventory and 10-year capital program. The inventory identifies road conditions. The capital program identifies roads for routine maintenance and reconstruction. Preventative maintenance on an ongoing basis has proven to be a more cost-effective approach than reconstruction and replacement. Deferred investment results in greater road deterioration and requires significantly more dollars in the future. This continued commitment to preserving and enhancing the road system by emphasizing preventative maintenance over deferred reconstruction is a critical part of the Town's fiscal responsibility. Hartford's budget for paving in 2018 was \$716,065. In the 2015-2018 Road Surface Management System evaluation, 63% of paved roads were rated good to very good, while 99.5% of gravel roads were rated good.

## **LOCAL PUBLIC ROAD DEFICIENCIES**

There are a few road segments and intersections that have a history of crashes, but more often intersections are just inefficient and create traffic nuisances, near-miss collisions, and other unreported problems. Some of the transportation deficiencies include: poor road geometries, narrow winding roads, and obstructed sight distances. The areas of concern (not mentioned elsewhere) are:

- U.S. Route 4 intersections with Quechee Main Street and Waterman Hill Road
- VA Cut-Off Road intersections with U.S. Route 4, Old River Road, and VT Route 14
- U.S. Route 5 intersections with Chandler Road and A Street
- Quechee-West Hartford Road and Quechee Main Street intersection
- Christian Street intersections with U.S. Route 5 and VT Route 14
- Sykes Mountain Avenue and South Main Street intersection

Further investigation of the conditions and possible solutions is needed for these intersections.

## **STATE-CONTROLLED ROAD SYSTEM**

The Vermont Agency of Transportation has been systematically addressing the State roads within Hartford in the last ten years. US4 from the Hartland town line to US5 was resurfaced in 2013 with installations of rumble strips to address at the time a series of unfortunate vehicle accidents involving crossing into the other lane. The I-89 and I-91 sections have been fairly well maintained. There are other State road sections that are currently in poor condition and are of priority to the town:



- U.S. Route 5 – from Hartland town line to the Aquatic Center
- U.S. Route 5 – from Aquatic Center to US5/US4/VT14 intersection. There is currently a VTrans corridor study that encompasses this area which will be reviewing multiple areas of deficiencies related to access management, congestion and vehicle conflict zones.
- U.S. Route 5/Sykes Mountain Avenue – Roundabout that is scheduled for construction in 2020
- U.S. Route 4 – Resurfacing from just east of Hartland town line to US5 and will include Quechee State Highway
- Interstate I-89 bridges from Hartford to Lebanon, NH – this NHDOT led project will replace both bridges with a single bridge deck and widening of each direction to 3 travel lanes. This project is scheduled for construction starting in 2019.
- Class 1 paving – VTrans has a scheduled paving project to address the Class 1 sections in town which include US4 (from US4/US5/VT14 intersection to the New Hampshire line) and VT14/Maple Street (from US4/US5/VT14 intersection to just past Hartford Village). This project is tentatively scheduled for 2021.

## **LOCAL PUBLIC GRAVEL ROADS**

The Town has approximately 34.5 miles of publicly maintained gravel roads. These gravel roads impose a distinct scenic character to the surrounding land, reduce cut-through traffic, require greater driver caution and slower travel speeds, and encourage low-density development land use patterns. In many cases, town residents use these roads for bicycling and walking to enjoy the rural countryside.

Gravel roads make sense for traffic volumes up to 1,500 trips per day. At these lower volumes, gravel roads are much more cost effective to construct and maintain. However, traffic alone is not the sole determining factor; choosing to pave also can depend on soils, drainage, steepness of slope, and winter maintenance policies. There also is significant diversity in the design and condition of the Town’s gravel roads; some operate at or near typical road standards, with smooth travel surfaces and regulation road widths, while preserved narrow back-country roads meet few of these contemporary road standards, and seasonally can offer less smooth traveling.

Appropriately constructed and maintained gravel roads do have a traffic volume limit. When too many vehicles use a gravel road, it becomes potholed and bumpy, requiring frequent road grading that is costly and time consuming. The conventional wisdom is that after traffic volumes exceed a maximum number of vehicles per day, gravel roads should be paved. While there is no set traffic number, this is evaluated against other factors such as environmental conditions (e.g., poorly drained soils), maintenance history (e.g., frequent grading), and whether the gravel road meets standards.

Gravel roads are an important resource to a Town’s transportation system. Paving should not be considered “improving” a gravel roadway. In most instances, existing gravel roads lack the base and sub-grade materials needed for pavement, resulting in gravel roads needing full-depth road reconstruction. In other instances, gravel roads help discourage motorists who would otherwise leave state roads and other principal arterials to cut through neighborhoods. And finally, gravel



roads are outside development nodes, and preserving these roads indirectly helps preserve the land use patterns supported in this Town Plan.

Balancing these diverse functional needs of gravel roads with the demands on the road system and the desire to preserve the rural character of the areas they serve is a challenge for the Town. This is especially important when considering development proposals that would create traffic volumes exceeding what the existing gravel road can support. Conversion to asphalt roads should only occur when the change is determined to be necessary. Although the financial cost to maintain a gravel road may over time be more than the cost to pave, this should not be the sole determining factor, and particularly for a gravel road that has demonstrated public value in its present aesthetic and/or functional condition.

## **CLASS IV ROADS**

Class IV roads primarily offer access to Town and conservation resources and provide unique insights into an agrarian landscape long abandoned. Many Class IV roads have been incorporated into the natural landscape whereby very little development has occurred along these roads. Even though the Town owns the Class IV roads and right-of-way, there is no legal obligation to maintain the road surface, culverts, or bridges. Public utility services or other municipal infrastructure that typically accompany roads are nearly nonexistent. Often these roads are our scenic travel corridors for hikers and bicyclists and provide limited access to hunting and conservation lands.

It is important that the Town explore the role of Class 4 roads in our land use development policies, traffic circulation, emergency management access, and natural and historic resource impacts. On July 1, 2006, Act 178 went into effect. The law required that towns identify and map all Class IV Roads or lose all public claim to them by July 1, 2015. The Town of Hartford complied with the law and has mapped all class IV roads.

## **DEVELOPMENT REVIEW ROAD STANDARDS**

The Town currently uses highway rules and regulations that were adopted by the Selectboard in 1990. The standards were amended in 2000 and again in 2012. This ordinance details road construction standards and policies for road classifications, right-of-way, access, road acceptance, and numerous other construction and maintenance related activities. The responsibility of ordinance implementation rests with the Selectboard and the Department of Public Works. Insofar as guidelines for development review can contribute to this process, the following planning considerations should continue or be expanded upon in future ordinance updates:

- Emergency management services will have guaranteed access to all development.
- Within bicycle and pedestrian priority corridors, the minimum right-of-way width should include both the roadway and an allowance for existing or planned bicycle and pedestrian facilities.
- Since local and state road construction follows State of Vermont design standards, private roads should be constructed to those standards, thereby minimizing changes if the road is accepted by the Town at a later date.

- Road design and construction should adhere to the relevant Town Plan goals and objectives – land use, natural resources and transportation elements.
- All roads will reflect a context-sensitive design that preserves and enhances the adjacent land uses and transportation system.
- Private road and driveway standards should be adopted to ensure stormwater is not discharged onto public highways or drainage systems.

Over the last few decades, transportation projects have placed greater emphasis on contemporary engineering design standards. However, in some instances, the design and engineering of our roadways and bridges failed to consider the Town’s unique historical and natural landscapes. These improvements did not account for a road being historic, scenic, pleasant to drive, or respectful to the people and businesses living alongside it. While engineering sufficiency criteria are important factors for road and bridge improvements, compatibility with existing and future development patterns also are important considerations.

## **ACCESS MANAGEMENT**

According to the Vermont Agency of Transportation (VTrans) definition, access management is a process that provides or manages access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity needs, and speed. Access management is an important process to provide reasonable accessibility to adjacent land uses while maintaining a safe and efficient flow of traffic. Transportation professionals have established that a single, well-designed access to a public highway presents few concerns for the traveling public. However, if access has been poorly designed and/or its frequency increases, the road’s health declines proportionally. The result is increased traffic congestion, crash rates, and road maintenance obligations to handle surface water improperly channeled to the road surface or shoulders. Ironically, these factors eventually compromise access to all land uses along the affected roadway. In many instances, towns are forced into costly highway expansion projects.

Hartford’s emphasis on access management for national and state highways is particularly critical in order to effectively maximize our development capacity. These roads support the majority of our commercial and industrial activities, and their continued operations greatly depend on the proper functioning of our road system. Given that the State of Vermont has the legal authority and control for permitting access along our state and national highways, it is critical that this is accomplished in cooperation with the Town and in concert with our local and Act 250 land use planning processes. A top priority for access management is US Route 4, a winding narrow road that serves as a major local and regional travel corridor. Unlike all other State-controlled highways, there are no parallel roads or alternative travel options. Route 4 will likely continue to be the only major east-west highway in the region.

The Town recognizes the value of access management and can implement access management strategies through its planning and public works related ordinances and policies. The following are some of these strategies for all public and private transportation and development projects impacting local and state public roads as well as private roads:

- Utilize State of Vermont design standards for all temporary and permanent access, to include emphasis on drainage, sight distance, and access for emergency services;
- Encourage use of shared driveways and/or permitting access that may result in a future shared driveway;
- Require the review of access for existing development whenever a change of use, ownership, or other application process is brought before the Town;
- Encourage commercial properties to use existing development nodes in order to preserve or create road segments with few accesses;
- When practical, approve subdivisions with private and public road designs that allow shared access with other adjacent subdivisions and/or have the private rights-of-way reserved so an access may be built to connect to existing and future development;
- Encourage permanent landscaping and roadside enhancements to visually define access points and contribute to the roadway's aesthetic character;
- Use sight-distance standards based on the actual travel speeds and not the posted speed limits. If no such data exists or is not current, then Hartford and the State will work with the Regional Planning Commission and/or Hartford Police to obtain the appropriate data;
- Utilize access or an access easement from a local road rather than a State highway

## **BRIDGES AND CULVERTS**

The Town has a wide array of bridges and culverts, ranging from huge-span Interstate 91 bridges to 12-inch culverts along gravel roads. All these structures serve a common purpose of enabling transportation infrastructure to exist harmoniously with various scales of water features. To the average citizen, only the larger bridges are seen on the landscape, while much of the other infrastructure operates invisibly. Often bridges and culverts represent a “pinch point” along a roadway. This is because the road has been expanded over the years to accommodate more vehicles, pedestrians, and bicyclists. This is relatively easy to accomplish with additional pavement and shoulder work, but the bridge and culvert infrastructure are not so easily expanded, and these facilities are not as frequently replaced or upgraded.

Within the local transportation system alone, there are 1,038 culverts, 29 short-span bridges, and four long-span bridges (excluding privately owned culverts and bridges). In current dollars, this system could be valued at approximately \$6 million dollars' worth of infrastructure. In good condition, a culvert or bridge can last 50 to 75 years. The Town conducts regular safety inspections of bridges and establishes priorities for improvements. Maintaining this system absorbs significant resources, and even small maintenance steps like bridge painting have significant costs. In general, our system of culverts and bridges is in good condition. For the 2018 construction season, \$8,000 was budgeted for rehabilitation and replacement of culverts and short-span bridges. More funding is needed in the future to maintain our existing assets.

Whenever a bridge is repaired or reconstructed, every effort should be made to maximize safety while providing an attractive design and accommodating the space needed for a multimodal transportation environment. It also is important that the design and construction of new culverts and bridges not just reflect transportation standards, but also include consideration of natural resources and emergency-management standards. This includes building small drainage

structures to withstand 25-year storm events, considering hydraulic and sediment transport capacities, and preserving the environment surrounding the improved area.

## **BICYCLE TRANSPORTATION**

Bicycles are used both for transportation and recreation. Many bicyclists can be seen riding throughout Hartford and the Upper Valley region. Bicycle transportation is used for work, school, or conducting errands. Recreational users include residents who see the health benefits of the sport and visitors who come to Vermont to experience the outstanding scenery.

Hartford receives many benefits promoting bicycle use, ranging from tourism opportunities to mitigating vehicle congestion. Bicyclists do not create air pollution, produce little noise, add diversity to an automobile-dominated road system, and rarely cause traffic congestion. Bicyclists contribute to a better-functioning transportation system and render a community more attractive to all residential and commercial uses.

Bicycle facilities fall under three general categories: road improvements, such as the addition of bicycle shoulders, bicycle path networks, and designated bike lanes; transportation service improvements, such as bus bike racks; and land use development accommodations, such as commercial-center bike-storage facilities. All these improvements encourage more citizens to bicycle.

Hartford depends on the planning and design guidance provided by the Vermont Agency of Transportation (VTrans) through the 2008 Vermont Bicycle and Pedestrian Plan and the 2002 Vermont Pedestrian and Bicycle Facility Planning and Design Manual. VTrans requires that all road and intersection design/redesign consider the accommodation of bicycles. However, flexibility in design standards is needed if it proves unreasonable to install bicycle facilities as part of a public or private development. These standards include providing bicycle facilities on principal arterials, on roads with high speed and traffic volumes, in town/village centers, around schools, and sections that have significant obstacles or deterrents to local and/or regional bicycle routes (e.g., U.S. Routes 4 and 5). The priority is accommodating bicyclists along the existing roadway network, rather than providing separate facilities that are more costly. The State also stresses accommodation of bicyclists with on-street or off-street facilities, connecting bicycle paths to adjacent developments, and providing areas for bicycle parking and/or storage.

Valley roads with gentle grades and lower traffic volumes include Old River Road, Quechee Main Street and Connecticut River Road. Other more challenging rides on roads with scenic views and relatively low traffic volumes include Jericho Street, Jericho Road, Dothan Road, Old Quechee Road, Quechee/West Hartford Road and Quechee/Hartland Road. The Town also has many Class IV roads that are well-suited for mountain biking.

In Hartford, there are many challenges to bicycling. The steep grades in many of the Town's roads deter all but the hardest of bicyclists, while many of the roads with gentle grades tend to be narrow, with high traffic volumes. These conditions deter all but the most experienced bicyclists. Parents often are reluctant to allow their children to ride their bicycles beyond their own immediate neighborhood. As a result, a significant amount of bicycling occurs along

roadways with no bicycle-specific infrastructure or accommodations. This is an acceptable condition along low-volume rural roadways in low-density areas of town. This also is acceptable on roads with significant grade challenges. However, there are several roads with sufficiently high traffic volumes and narrow shoulders. These include Route 4, Route 5, Christian Street, Sykes Mountain Avenue, and Maple Street (Route 14). Improvements to shoulders will create safer conditions for bicyclists and will likely increase bicycle use. Providing sensors at signalized intersections that can be triggered by bicycles also contributes to bicycle safety. The 2009 *Hartford Pedestrian and Bicycle Plan* identifies several road segments with recommended bicycle infrastructure improvements.

In the late 1990s, the Upper Valley Trails Alliance initiated the Upper Valley Bike Loop, a four-town loop through Hartford, Norwich, Hanover, and Lebanon, to encourage increased bicycling. The Bike Loop was completed a few years later and includes the Wilder Multi-Use Path, a mile-long paved path that connects the north end of Wilder Village to the Dothan Brook School. In addition to use by Dothan Brook students during the spring and fall, the path is used extensively throughout the year by walkers, joggers, and bicyclists. There have been two bicycle feasibility studies that examined expanding the multi-use path north to Norwich. However, neither study came up with a suitable alignment or strong community support necessary to usher a project forward. The Town should continue to work toward finding an acceptable solution to making this section of the Upper Valley Bike Loop safer for bicycling.

In addition to travel ways, having adequate bicycle racks in commercial developments, village centers, and community facilities is an important part of Hartford's multi-modal transportation system. Bicycles are allowed on Amtrak trains and all Advance Transit buses are outfitted with bicycle racks. Additionally, the Connecticut River Scenic Byway runs through Hartford along Route 5 and the Crossroads of Vermont Scenic Byway runs through Hartford on Route 4. These byways are likely to foster increased bicycle use along the corridor. Having adequate bicycle facilities also will benefit local businesses that cater to tourism.

## **PEDESTRIAN TRANSPORTATION**

Walking is an important part of community life and, much like bicycling, actively contributes to our road's vitality, reduces our dependence on the automobile, and provides a healthy recreational opportunity. The Town and private developers build roads based on anticipated vehicle traffic volumes; likewise, the Town should promote the construction of sidewalks and other pedestrian amenities based on anticipated and desired pedestrian traffic volumes and needs. The type and location of pedestrian facilities are based on objective criteria involving roadway geometry; vehicle volumes, speeds, and classification; connectivity to existing facilities; development densities; and economic development opportunities.

In Hartford, there are approximately ten miles of sidewalks, most of which tend to be in the villages and along segments of busy roads such as Route 5, Route 4, and Route 14. In the last twenty years, the Town has completed a total of 1.5 miles of new sidewalks on South Main Street, Railroad Row, Maple Street, Route 4 at Quechee Gorge, and Sykes Mountain Avenue with the assistance of several state/federal grants. However, more sidewalks are needed. The



2009 *Hartford Pedestrian and Bicycle Plan* identifies several road segments with recommended sidewalks.

In village centers, along dense development nodes, and within appropriately scaled subdivisions, sidewalks are an important transportation facility. Hartford's goal is to strive for a continuous system of high-quality, connective sidewalks within these areas. While year-round facilities are optimal, pedestrian facilities that accommodate three seasons of travel remain preferable over no facility. Additionally, it is reasonable to expect that developers provide for pedestrians either by constructing the actual facility, developing the site to accommodate the facility, participating in federal grant programs by providing the local match requirement, and/or deeding the public the rights-of-way to provide the land needed for facility construction. It is important that these goals and objectives are considered during the review process for municipal and private development projects.

For more than a decade, the Dothan Brook School has participated in the Federal Safe Routes to School Program. The Program is intended to eliminate obstacles that discourage schoolchildren from walking or bicycling to school. The Town should work with the School District to consider including other Hartford schools in the Program.

Once new sidewalks are constructed, the Town takes on the responsibility for maintaining these pedestrian facilities. Maintenance of sidewalks has become an increasing concern, and several are in poor condition. Since reconstruction of sidewalks is not an eligible activity for state/federal grants, these improvements must be financed with local funds. A comprehensive inventory of conditions and criteria for prioritizing projects is needed to guide the Town in budgeting for these expenditures along with the budgetary needs for new sidewalk construction. In many ways, this would be similar to the process that is used for the Town's highway maintenance budget.

## **TRAFFIC CALMING**

Traffic calming is the physical design or redesign of a road to reduce the inappropriate impacts of vehicular traffic. When successfully employed, traffic calming can decrease cut-through traffic volumes, lower traffic speeds, and improve safety for all transportation modes. Less measurable benefits include an improved aesthetic quality of streets such as trees and other landscaping. A better-looking roadway evokes a psychological reaction whereby motorists identify a road's character as a neighborhood asset supporting a community as opposed to a highway that supports ever improving mobility.

There are many different types of traffic-calming facilities. Roundabouts, such as the one proposed for US Route 5 and Sykes Mountain Avenue, can significantly lower traffic congestion while also lowering traffic speeds. These facilities should be properly examined whenever intersection redevelopment projects are proposed. Road narrowing and curb-line bump-outs, found in Hartford Village, decrease travel lane widths, better articulate parking, and allow pedestrians safer passage. Other examples are radar speed feedback signs and rapid flashing beacons that alert drivers of their speed and inform them of pedestrian crossings. These facilities should be considered within village centers, development nodes, and within all condominium and subdivision projects. Speed humps, bumps, speed tables, and raised crosswalks force the driver to slow in order to navigate a raised roadway feature. Although there are only a few

examples of these measures in Hartford, there are many examples in adjacent communities and throughout the region. These facilities should be promoted within village centers, development nodes, and all condominium and larger subdivision projects.

Traffic-calming measures should not necessarily be restricted to public roads, but can be employed on local roads and developments as well, particularly those adjacent to schools and commercial activities and serving large volumes of bicyclists and pedestrians. However and whenever they are considered, it is important to consider the benefit of slowing traffic while considering access for emergency vehicles and roadway maintenance.

## **PARKING**

Historically, the Town Plan has not put much attention on parking – parking was needed, so it was built. However, over time we are recognizing that parking comes with significant planning, financial, environmental, and community livability responsibilities as well as costs. While having full parking in downtown White River Junction and other village centers is an indicator of successful revitalization efforts, it also poses challenges where the concentrated land use patterns make land a valued commodity. It also impacts strip or sprawl-type development because sizable parking lots tend to discourage public transit, bicyclists, and pedestrians.

There also are varying and sometimes competing needs and interests in the community. Businesses want high-turnover spaces for customers and long-term use spaces for employees. In medium/high-density residential developments, parking needs to accommodate the long-and short-term usage patterns of residents and visitors. All parking facilities need to be convenient, safe, appropriately sited and well-maintained for year-round usage.

National standards for defining parking space and location requirements are typically linked to land use categories, peak usage rates, and near structures. In some instances this can work, but more consideration needs to be given to lowering parking requirements if it is likely citizens would access the development by using public transportation, bicycling, and walking. The proximity of parking spaces should be balanced with the needs of the particular land use to include other needed amenities such as community space, sidewalks, and traffic calming. It also is important, especially in village centers, to focus parking in the rear of lots behind buildings.

Parking benefits should be extended to the greatest possible number of constituencies. Shared parking facilities with compatible development; on-street parking with time limitations to encourage customer and short-term delivery usage; and use of Town, County, and State parking lots by area businesses or for special events are some of these options. As the market for curbside parking increases, Town officials should consider establishing market prices (meters) to help defray the costs and encourage short-term usage.

Given that Downtown White River Junction has been experiencing a steady stream of redevelopment for more than a decade, parking occupancy has increased making it challenging at times to find parking. To address this issue and plan for future needs, the Town initiated a parking study in 2016. The *Downtown White River Junction Parking Study*, completed in 2017, concluded that parking occupancy is likely to continue to increase and the Town will need to

make the most of existing capacity, reduce demand for parking, manage parking turnover and develop new parking capacity. Since parking is an expensive commodity, it is important that the Town explore creative funding options. The Town is currently working toward implementation of the Plans' recommendations.

As residential and non-residential development and redevelopment opportunities arise, it is important that parking space requirements and parking lot placement do not result in a change to the character of a neighborhood or village by creating excessive, highly visible paving. Furthermore, it is in the best interest to the integrity of the Downtown and other village centers not to encourage the demolition of buildings to make way for additional parking. The site development review process should seek all opportunities to promote shared parking, rear-lot parking access, covered parking, and other techniques.

## **PARK AND RIDE FACILITIES**

Park and ride facilities enable motorists to drive from their homes, park, and then carpool or use public transit to arrive at their destination while reducing traffic congestion and pollution. Regional public-transit providers often depend on park and rides for commuter-based ridership. Rather than having multiple stops to gather a dispersed residential population, public transit can utilize a single park and ride to shuttle commuters to their employment destinations. The use of park and rides is an important public-transit resource, and facilities should be planned and constructed to better support fixed-route services.

Ideally park and rides are located within short distances of our major transportation corridors— I-89, I-91, US Route 4, US Route 5, and VT Route 14. To meet demand, park and ride facilities must offer at least 20 parking spaces. These facilities also can be unique stand-alone parking lots or situated with existing businesses or public parking facilities. Public/private shared park and ride lots are preferred in areas of active commercial development and constrained land use. Dedicated facilities should only be planned in areas where limited commercial development is present and/or anticipated.

For over a decade, the State has initiated studies to identify possible locations for Park and Rides in Hartford, with emphasis at the interchange of I-91 and Route 5, where historically commuters have established their own ad-hoc park and rides on private property. Unfortunately, the State has been able to find a site at this location. As an interim measure at the Town's request, the State designated a portion of the South Main Street Parking Lot in Whit River Junction as a Park and Ride facility in 2006. That designation was revoked at the Town request in 2017 following increasing demand for parking downtown. The Town also worked with VTrans to establish the Wilder Park and Ride Facility on Route 5 near Bugbee Street with easy access to Exit 12 on I-91 in 2009.

## **PUBLIC TRANSPORTATION**

Over the past decade, public transportation has become a more active part of Hartford's transportation system. Fixed-route services allow access to employment, commercial centers, and schools. Elderly and disabled transportation services give alternatives to people partially or

wholly unable to drive on their own. For some of our citizens, public transportation remains their only available transportation option. The State of Vermont has extensively studied public transportation use, and all projections indicate those demand trends for the State and this region will continue to increase.

There are many benefits of public transportation. Public transportation allows us to increase the capacity of our roads by reducing traffic congestion, giving additional options for bicyclists and pedestrians, and connecting residents to a greater network of bus, rail, and air transport.

Hartford has consistently supported public transportation through planning, participation on transit boards, and appropriating funds for fixed-route services. To meet increasing demands, the Town should continue or raise this level of support.

The private sector, in partnership with the Town and public transportation agencies, also has an opportunity to support public transportation. On existing bus routes, commercial and large-scale residential development should be expected to provide the necessary public rights-of-way for bus pull-offs. These accommodations should be developed in coordination with the public transportation service providers. Conversely, the Town could encourage more intensive development patterns along public transportation routes through site planning and design criteria. Particularly important is that developments include pedestrian facilities that provide safe and efficient access to those bus stop locations/shelters.

The school district has an opportunity to expand public transportation use as well. An increase in public transportation would mitigate parking demands, reduce traffic congestion, and facilitate a safer walking and bicycling environment. Where possible, the Town should work with the school district to provide public transportation services for school and after-school related trips. Hartford has a significant number of public transportation options: Advance Transit, Stagecoach Transportation Services, Connecticut River Transit, Bugbee Senior Center, Go! Vermont, Dartmouth Coach, Vermont Translines, Greyhound, UV CarShare and Taxi Service.

### **Advance Transit**

Based at its headquarters at the Billings Commercial Park in Wilder, Advance Transit, Inc. (AT) is the principal provider of public transportation for the core of the Upper Valley. Serving White River Junction, Hartford Village, and Wilder, the system links Hartford residents with Hanover, Norwich, Lebanon, West Lebanon, Enfield, and Canaan. AT also provides linkages to the other transportation services coming from Randolph, Springfield, and St. Johnsbury. It has five fixed-routes of which the orange and green routes pass through Hartford. Contracted shuttle service is provided to Dartmouth College, Dartmouth Hitchcock Medical Center and special events.

All AT buses are equipped with lifts for the handicapped. New requirements of the Americans with Disabilities Act (ADA) resulted in complimentary paratransit service provided to ADA eligible riders with origins and destinations within 3/4 of a mile of a fixed route. Also, all buses in the AT system are equipped with bicycle racks year-round. This has created greater opportunities for multi-modal commuting.

## **Stagecoach Transportation Services**

Stagecoach Transportation Services is a provider of public transportation in Windsor County and Orange County with its offices in Randolph. Stagecoach is a secondary transit provider to Hartford. It has a fleet of vans, small buses and taxis to provide transportation services to commuters, the elderly, disabled as well as Medicaid and social service recipients. Stagecoach offers fixed-route service for commuters on the 89er Route from Randolph to Lebanon, Hanover, with several stops in White River Junction; and the River Route from Wells River to Hanover, Lebanon with several stops in White River Junction and a stop at King Arthur Flour in Wilder. Stagecoach also offers the West Lebanon Shopper Route every Saturday from the Randolph area. In 2018, Stagecoach added the Woodstock Route which provides service from Randolph to Woodstock and Quechee and operates twice a month on the first and third Wednesday's.

## **Connecticut River Transit**

Connecticut River Transit is a provider of public transportation primarily serving Windham County and Southern Windsor County, with daily trips to White River Junction (VA Hospital), Hanover, and Lebanon. Its focus is on commuters and elderly and disabled transportation services.

## **Bugbee Senior Center**

The Bugbee Senior Center provides transportation services for residents age 60 and over for medical appointments, shopping trips, and transportation to the Senior Center. The fleet consists of one van. In fiscal year 2018, the Center provided transportation services to 76 Hartford residents. The Center's transportation services are supported by donations, state funding, their own funding, and volunteer resources.

## **Rideshare**

There are two free on-line services that connect people with a carpool for commuting or other trips. Go! Vermont connects carpoolers who live in or commute to Vermont. CommuteSmart New Hampshire provides resources for people who live in or commute to New Hampshire. In addition, several major employers in the Upper Valley provide internal rideshare matching.

Hartford residents who carpool are eligible for the Upper Valley Transportation Management Association Emergency Ride Home Program. This covers the cost of a cab, ride hailing service, or rental vehicle (including Zipcar, located in Hanover and South Royalton) if an emergency arises and they don't have a car to get home, to a child's school or daycare, or to the hospital. Though infrequently used, the Emergency Ride Home Program can provide some peace of mind for those nervous about leaving their car at home.

## **Car Share**

UV CarShare is a grassroots effort to provide affordable motor vehicle access to residents, students, and people working in the White River Junction area for the purpose of increasing mobility while helping to reduce greenhouse gas emissions, the need for parking and road infrastructure, and an individual's transportation costs. As of the writing of this chapter, the program is near to launching with its first car.



## **Greyhound**

Greyhound operates a regional bus terminal on Sykes Mountain Avenue in White River Junction. It provides direct bus service from White River Junction to major urban areas in and outside Vermont with daily service to Boston, Montreal and New York City.

## **Vermont Translines**

Vermont Translines operates daily passenger bus service on the Route 4 corridor to and from Rutland through the Greyhound Bus Terminal on Sykes Mountain Avenue.

## **Dartmouth Coach**

Dartmouth Coach in Lebanon provides daily service from Hanover/Lebanon to Logan Airport and South Station in Boston. Dartmouth Coach also provides daily bus service to New York City.

## **AIR TRANSPORTATION**

Although an airport once existed off Sykes Mountain Avenue and provided service between 1929 and 1950, the Lebanon Regional Airport (LRA), is the closest air facility to serve Hartford residents and economic interests. The LRA offers a limited array of passenger and freight services. It has been steadily expanding operations over the last twenty years, and projections indicate that the growth rate will continue. It is important that Hartford be a participant in regional planning efforts that seek to enhance the LRA facilities and/or expand passenger and freight services. While the airport itself falls within New Hampshire boundaries, air transportation users reside on both sides of the Connecticut River, so bi-state planning activities among the two states departments of transportation are important.

National and international air flights are available at Manchester, NH and Burlington, VT airports. In favorable driving conditions, these airports can be accessed within one and a half-hours. Both airports have been increasing their operations and have become the major northern New England air facilities for this region. Prior to much of this growth, residents were forced to access airports further away in Boston, MA, and Hartford, CT. Insofar as Town policies can influence these regional airports, Hartford should take a supportive position on proposals that increase their passenger and freight capacities.

## **RAIL TRANSPORTATION**

The Town is uniquely located as a railroad hub offering connections north-south in the state and east-west through Vermont and New Hampshire, with two railroad lines running through the community. The rail lines are the Washington County Railroad Company Connecticut River Subdivision (WACR Connecticut River) line, which travels north to south, and the New England Central Railroad (NECR) line, which goes primarily northwest to southeast. WACR Connecticut River is owned by the State of Vermont and operated by a leaser that uses the rail line for freight

services. NECR is privately owned and supports freight and Amtrak passenger services. In freight service, the NECR is one of the most active in the state in both frequency of trains traveling along the rail line and the tonnage of freight it moves. With Amtrak service, the “Vermont” runs two trains a day between St. Albans, Vermont and Washington, D.C., seven days a week, with stops in White River Junction. Between 2011 and 2014, ridership in White River Junction increased by 15.2%.

Over the last two decades, rail has become a more active transportation mode for freight and passenger services throughout the Northern New England region. A local consequence is that the Town has seen greater activity along its rail lines. The State of Vermont has significantly invested in rehabilitation of the ballast, rail ties, and other supporting rail infrastructure. The state has been sufficiently successful that, in certain areas, the traveling speeds for trains have been allowed to increase.

Hartford’s downtown and surrounding areas could make increased rail service more feasible. Vermont’s Rail Plan encourages the use of this valuable rail corridor, and the State Rail Program enables companies to access the rail line. While it is important to promote active use of the railroad for freight travel, this needs to be compatible with development in the surrounding neighborhood and commercial centers. The type of use, hours of operation, noise, and truck traffic are some of the issues that need to be addressed.

It is important that the State’s rail and road bridges that cross the rail lines are in good condition. In the last decade, several bridges in Hartford were either reconstructed or replaced. They included the Gillette, Passumpsic, and Bridge Street bridges. A rail bridge that is currently listed on the Regional Planning Commission Pre-Candidate Town Highway Bridge Project List is the Jericho Street Bridge in West Hartford. Failure of bridges will cutoff significant areas of the community from itself, hinder economic development, and restrict or discourage bicycle and pedestrian traffic.

Efforts have been made to better utilize the Connecticut River NECR rail bridge to encourage greater walking and bicycling between White River Junction to West Lebanon. Having bicycle and pedestrian access so close to White River Junction would be a significant benefit to the downtown area. A rail with trail feasibility study, initiated by the Upper Valley Trails Alliance, was completed in 2007. The study identified several alternatives for pedestrian and bicycle accessibility. However, the cost of the improvements was extremely expensive. Furthermore, the new Route 4 Bridge over the Connecticut River was built with sidewalks and bicycle lanes.

A safety concern among Town residents is the number of illegal rail crossing paths and trails. This becomes an increasingly problematic issue as frequency of train crossings and train speeds increase. These crossings typically occur along sections of rail lines where train operators do not anticipate pedestrian and bicycle traffic. Whenever illegal rail-crossings are found, there should be an effort to curtail traffic at that location and provide an adequate crossing opportunity in the immediate area.

Another safety issue is at-grade road/driveway vehicle crossings of railroad tracks. Hartford has several public roads that cross railroad tracks, some of which have signals but not gates. “Four quadrant crossing gates” is the rail term for gates that are activated by sensors from an

approaching train and are lowered to prevent vehicles from crossing the tracks until the train passes. Gates can effectively reduce the risk of accidents but are very expensive to install. Several legal private driveway crossings also exist in Hartford. These have no signals or gates and are a potential safety issue for unaware travelers.

Ensuring emergency access to areas of Town where there is a single access crossed by the railroad tracks has been a long-term concern of the Town. One such area, the Latham Works/Nutt Lane residential neighborhood is off South Main Street. Periodically, trains on the line and derailments would hinder emergency responder's access to the neighborhood. However, the Town completed a secondary emergency access through the rail yard that connects to Railroad Row near the train station.

## **ROADWAYS AND ECOLOGY**

Transportation systems can create negative impacts on soil, water, and air quality and often contribute to the fragmentation of land tracts and wildlife habitats. For wildlife, bridges and culverts can discourage fish passage, roads can physically prevent the seasonal movement of amphibians, and traveling vehicles can dissuade or collide with our indigenous mega-fauna. For air quality, choices in fuel and fuel economy can result in significant changes in the production of greenhouse gases and federally regulated pollutants. And for water quality, failing culverts, deteriorating gravel roads, improper roadside ditching, and other insufficient stormwater mitigation techniques can allow the discharge of polluted sediment into our streams and rivers.

Hartford has worked to define these transportation system impacts and develop mitigation strategies that minimize disturbances. Not all impacts can be controlled, but there are mitigation strategies the Town can implement. While adequate resources and sometimes differing philosophies present challenges for addressing these impacts, the Town should continue to pursue opportunities to advance the planning and construction of projects that preserve or enhance soil, water, and air quality. Culverts and bridge replacements appropriately designed to handle stormwater runoff, promote fish passage, and minimize the discharge of road sediment are a high priority. The Town will seek to implement on-site stormwater mitigation measures in road and bridge construction projects. The Town also will encourage the construction of transportation facilities that mitigate impacts to the surrounding environment.

The Vermont Agency of Transportation undertakes numerous transportation projects that require on-site and off-site environmental preservation. Often these projects occur in urban or suburban areas where the land is already developed. While these large-scale projects are unlikely to occur within Hartford, the Town should work to obtain these environmental mitigation funds, especially for culverts and bridges adjacent to our large preserved tracts of land.

## **GOALS, STRATEGIES AND ACTIONS**

### **Transit Goal 1: Expand public transportation options and access.**

#### **Strategy 1: Increase the number of transit routes and options including connectivity between transportation systems and destinations.**

##### Actions:

- h. Continue to financially contribute to public transportation provider operations.
- i. Work with the State Agency of Transportation to pursue locating park and ride facilities along each interstate exit. Prioritize park and ride investments in locations that would best serve public transit needs.
- j. Work with commercial and large-scale residential developers to accommodate public transportation. Ensure these accommodations occur with adequate consultation from our regional public transportation providers.
- d. Pursue construction of bus pull-offs and bus shelters at busy bus stop locations with transit maps and information at each bus stop.
- e. Encourage the coordination for Hartford transit connections among the many different transportation service providers.
- f. Expand bus routes to include more frequent access through Town, during the day, in evenings and on weekends.
- g. Develop multi-modal connections to the street system within and between new developments. Use built roads, sidewalks, deeded rights-of-way, and other planning tools to develop transportation connections.
- h. Actively promote bi-state air transportation planning activities between Vermont and New Hampshire departments of transportation.
- i. Support Amtrak passenger service and encourage a fuller integration of passenger rail with other transportation modes and related infrastructure.
- j. Actively support rail-based tourism and guide adjacent land development to preserve and enhance scenic and natural resources.

### **Pedestrian/Bicycle Transportation Goal 1: Improve safety and availability of pedestrian and bicycle routes.**

#### **Strategy 1: Ensure compliance with the Vermont Complete Streets requirement.**

##### Actions:

- a. Update the 2009 Hartford Pedestrian and Bicycle Plan including an inventory/audit of assets, needs and priorities, and incorporate updated information into the Capital Improvements Program.
- b. Require that commercial and residential development projects accommodate pedestrians and bicyclists, and provide pedestrian and bicycle-friendly designs and amenities.
- c. Participate in the Safe Routes to School Program and actively educate parents and children on the benefits of bicycling and walking.
- d. Provide facilities solely for the use of pedestrians and wheelchair users.

- e. Accommodate pedestrians and bicyclists in all new construction or major reconstruction of roads and highways to meet Complete Streets requirements.
- f. Actively pursue pedestrian and bicycle facility projects under the State’s Transportation Alternatives Program and the Bicycle/Pedestrian Program.
- g. Work with State highway officials to address the deficiency of pedestrian and bicycling infrastructure along the Town’s most critical regional links, US Route 4, US Route 5 and VT14..
- h. Proactively design and engineer pedestrian and bicycle facilities so plans are “on the shelf” should construction funds become available.
- i. Annually set aside transportation funds to leverage state grants or private investments.
- j. Continue referencing State of Vermont current design standards and integrate pedestrian facility design with traffic calming and landscaping improvements.
- k. Consider establishing rail with trail facilities along rail lines to accommodate pedestrians and bicyclists where they continue to cross and/or travel.

**Road Conditions Goal 1: Maintain 75% of local roads to a standard of good or better.**

**Strategy 1: Maintain the policies and practices of proactive road maintenance and construction in transportation budgets and policies.**

Actions:

- a. Continue to inventory local transportation conditions and integrate into the annual Capital Improvements Program utilizing regional and state resources for technical and funding assistance.
- b. Require large-scale residential and commercial development to include a level of service analysis for all roads and intersections that are proposed to be impacted. At a minimum, all development proposals should include traffic statistics referenced to national transportation standards (ITE Trip Generation), which then may be augmented with their own data-collection efforts.
- c. Maintain gravel roads in their present condition unless daily traffic volumes warrant reconstruction and paving or if paving is justified for other reasons, such as public safety.
- d. Consider traffic capacities when reviewing and approving development that plans to use gravel roads for access.
- e. Develop a more formal Class IV road policy.
- f. Amend existing Town policy and ordinance language to be in compliance with the Town Plan’s Class IV road guidance.
- g. Work with Town staff and abutting property owners to consider reclassifying some Class IV roads as trails.
- h. Hartford should not “throw-up” any Class IV roads where the public use will be forever abandoned.
- i. Evaluate if all Class IV roadways abutting low density development districts need to be upgraded by private landowners beyond what is essential to maintain access to their property.
- j. Continue to inventory culverts and maintain a culvert replacement schedule within the Capital Improvement Program. Utilize regional and state resources for technical and funding assistance.



- k. Continue the Town's policy of replacing all culverts in poor condition and in advance of paving work.
- l. Develop new bridge and culvert regulations to meet hydraulic capacity standards set forth in this Town Plan and accommodate the more recent transportation and flood requirements.
- m. Pursue State grants and funding to address roadside erosion problems and improve bridges and culverts.
- n. Advocate to the State Agency of Transportation to construct or resurface the Town's state-controlled roadways.
- o. Continue membership in the Upper Valley Transportation Management Association and utilize this forum for advancing Hartford's local, regional and State interests.
- p. Continue pursuing State and federal transportation grant funds reflective of the Town's Capital Improvements Program.
- q. Work with the Two Rivers-Ottawaquechee Regional Commission and developers to compile a database of level of service data for all major arterials and intersections.
- r. Continue to be a strong advocate for the timely construction of all State transportation projects. In Hartford, the Town should continue to maintain a project priority listing and use all available government channels to communicate those priorities.

**Road Safety Goal 1: Improve the safety of Hartford's local and state roads.**

**Strategy 1: Review Town Regulations, Ordinances, Rules and Policies that affect road safety.**

**Actions:**

- a. Review the Town's Transportation Ordinance for compliance with new state and federal standards.
- b. Conduct transportation surveys as part of updating the Transportation Chapter of the Town Plan.
- c. Continue to work with the Two Rivers-Ottawaquechee Regional Commission to implement a town-wide traffic count program.
- d. Provide educational opportunities to the Planning and Development commissions and boards addressing traffic operations and management during development review.
- e. Create driveway and private road standards.
- f. Develop and implement a Hartford local roads traffic-calming policy.
- g. Work with the State to implement traffic-calming elements in all transportation projects using their own traffic-calming guidelines policy.
- h. Require all subdivision and condominium developments to include traffic-calming planning in their traffic circulation plans.
- i. Educate Town staff, boards and civic groups on traffic-calming techniques.
- j. Continue to encourage the State to replace road and rail bridges along the rail line for double-stacking clearance and to open travel ways for multimodal traffic.
- k. Encourage the State and railroad companies to fence areas along the railroad that have illegal access.
- l. Encourage the State and railroad companies to install four-quadrant crossing gates at railroad crossings of public roads and post signs at private driveway crossings.

**Strategy 1: Work with the Vermont Agency of Transportation to ensure coordination with their access permit process.**

Actions:

- a. Revise all planning and Public Works permit procedures to ensure that the State has been consulted or has permitted access prior to initiating any Town decision.
- b. Review and amend Zoning Regulations, Subdivision Regulations and Transportation Ordinance to better promote access management.
- c. Review the minimum lot frontage standards for properties adjacent to US Route 4.

**Parking Goal 1: Ensure a sufficient supply of parking to support continued economic development respective of the environment.**

**Strategy 1: Support flexibility in the Town Zoning Regulations to address parking requirements.**

Actions:

- a. Encourage development to utilize public parking resources, shared parking opportunities, and offset parking space requirements with accessibility improvements for public transit, bicyclists, and pedestrians.
- b. Consider establishing a municipal parking fund to be paid by developers who credit municipal parking toward meeting their parking requirements.
- c. Continue to work with the State and railroad companies to develop a parking area on Railroad Row.
- d. Continue to monitor municipal parking usage in Downtown White River Junction to plan for future parking facilities.
- e. Support construction of a redesigned South Main Street Municipal Parking Lot.

## **CHAPTER IX NATURAL RESOURCES**

### **INTRODUCTION**

One of the Town of Hartford's greatest assets is the abundance and quality of its existing natural resources. Although Hartford has grown to a population of 10,000, the Town has retained much of its rural character, scenic beauty and ecosystem functions. An understanding of the Town's natural resources is basic to the formulation of a plan to guide Hartford's growth and development. Natural resources provide opportunities and constraints to development. They also support and include a biodiverse, resilient, functioning ecosystem which stretches far beyond town boundaries and provides essential ecosystem services such as vegetation that converts sunshine into essential atmospheric oxygen. Natural Resources must be carefully evaluated to ensure resource and ecosystem protection. This chapter defines the unique blend of natural resources that have helped shape Hartford's character, recognizing the threats to those resources, and identifies strategies for their protection. Careful planning and a vision for a well-balanced town will ensure that Hartford can grow while simultaneously preserving our precious natural resources and quality of life.

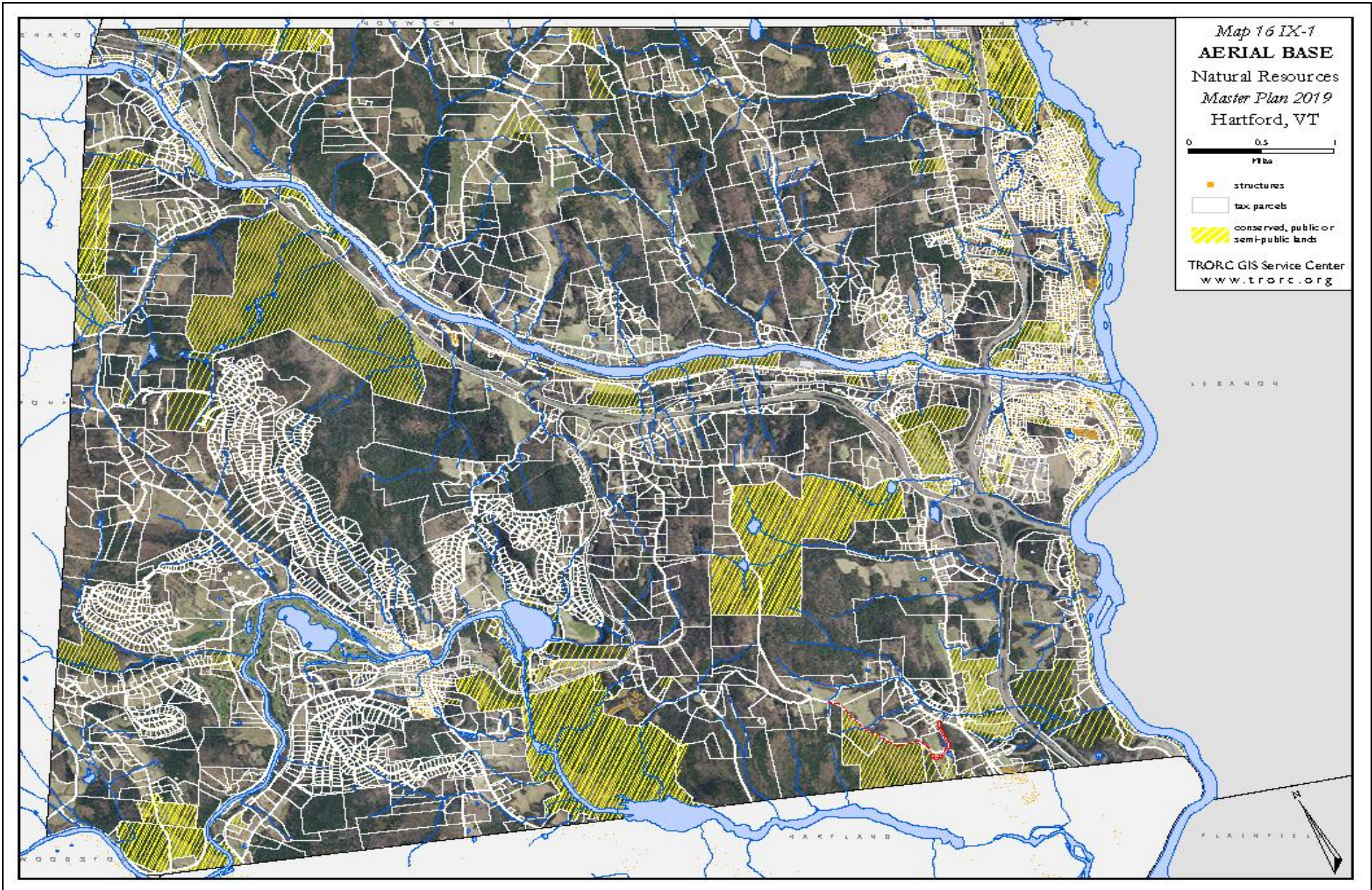
### **RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS**

The Community Forums in the summer of 2018 provided a wealth of information and public input. In many instances, these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. A summary of the outcomes of the community forums is included in this update as an appendix to recognize their importance and the commitment to further discussion.

### **SETTING**

Like many Vermont communities, Hartford has a diverse landscape: three major rivers, narrow river valleys with hillsides rising above with a mixture of farmland and forests. Scenic views abound. Hartford is home of one of Vermont's most scenic and highly visited natural attractions, Quechee Gorge, a 165-foot canyon of the Ottauquechee River. Elevations in Town range from approximately 340' along the Connecticut River at the Hartland town line to approximately 1,575' along the Pomfret town line west of Old Town Farm Road in Quechee. Historically, natural resources have had a significant influence in the initial settlement and later development of Hartford. All five villages were established along one of the three rivers. Besides serving as transportation corridors, the rivers served as a source of hydropower to support the development of mills and factories in Hartford Village, Wilder, and Quechee. Today, hydropower exists on the Connecticut and Ottauquechee Rivers and all three rivers play an important role in the recreation and tourism industry.







## **AIR QUALITY**

While the Town, State, and the region currently experience good air quality, there are local sources of air pollution that should be monitored by the Town and the State. They include emissions from truck and automobile traffic, wood stoves, backyard burning, and dust from construction and excavation sites.

## **GEOGRAPHIC FEATURES**

### **Earth Resources**

Bedrock under Hartford is the result of the collision of North America and Africa, which was then heavily glaciated. This led to a wide range of soils. Areas with more calcium have prime agricultural soils while more acidic bedrock produced less fertile soils. The Town does have significant sand and gravel deposits that were laid down at the end of the last ice age, roughly 12,000 years ago. These deposits correspond in general with the river-bottom lands and adjacent properties where eskers, kame terraces, and alluvial deposits denote both the end of the glacial period and the extensive flooding of the immediate post-glacial period. Typically, soils near rivers are good sources for sand and gravel extraction.

Hartford has excellent sand and gravel deposits. According to the Natural Resources Conservation Service, almost 19% of the soils in Hartford are suitable for commercial sand and gravel extraction. Sand and gravel are not a renewable resource. As development pressures continue within the region, the demand for sand and gravel will continue. The use and management of Hartford's earth and mineral resources are matters of public good. Maintaining local sources of sand, gravel, and other materials are essential for business development, as well as local and state highways. Impacts from the extraction and use on the environment and areas surrounding and in route to the resources, also are part of determining the public good. However, these two different interests can be in conflict. Therefore, it is important that the impacts of sand, gravel and any earth resource extraction be avoided or mitigated through careful site planning, operation, and reclamation between the Town, State and operators, including addressing site restoration and aesthetic.

### **Soils**

The physical and chemical components of soil influence the suitability of land for various land uses. The U.S. Department of Interior Natural Resources Conservation Service (NRCS) has inventoried, assessed and mapped Hartford's soils; its survey data was most recently updated in the 1990s and converted into a digital format for GIS mapping. The NRCS soil data are an excellent source of information for town-wide planning. However, site assessments may be necessary to accurately determine the type and characteristics of soils for a specific property.



## **Septic-System Suitability**

Except for the four villages that are served by Town sewer, the vast majority of land in Hartford relies on-site septic systems. Soils play an important role in determining the capability of an area to accommodate septic systems.

A substantial portion of the Town is comprised of soils that are marginally suited for septic systems, while several areas have soils that are not suited for septic systems. The Town of Hartford does not regulate septic systems. However, a state permit is required for all new, repaired, or expanded systems.

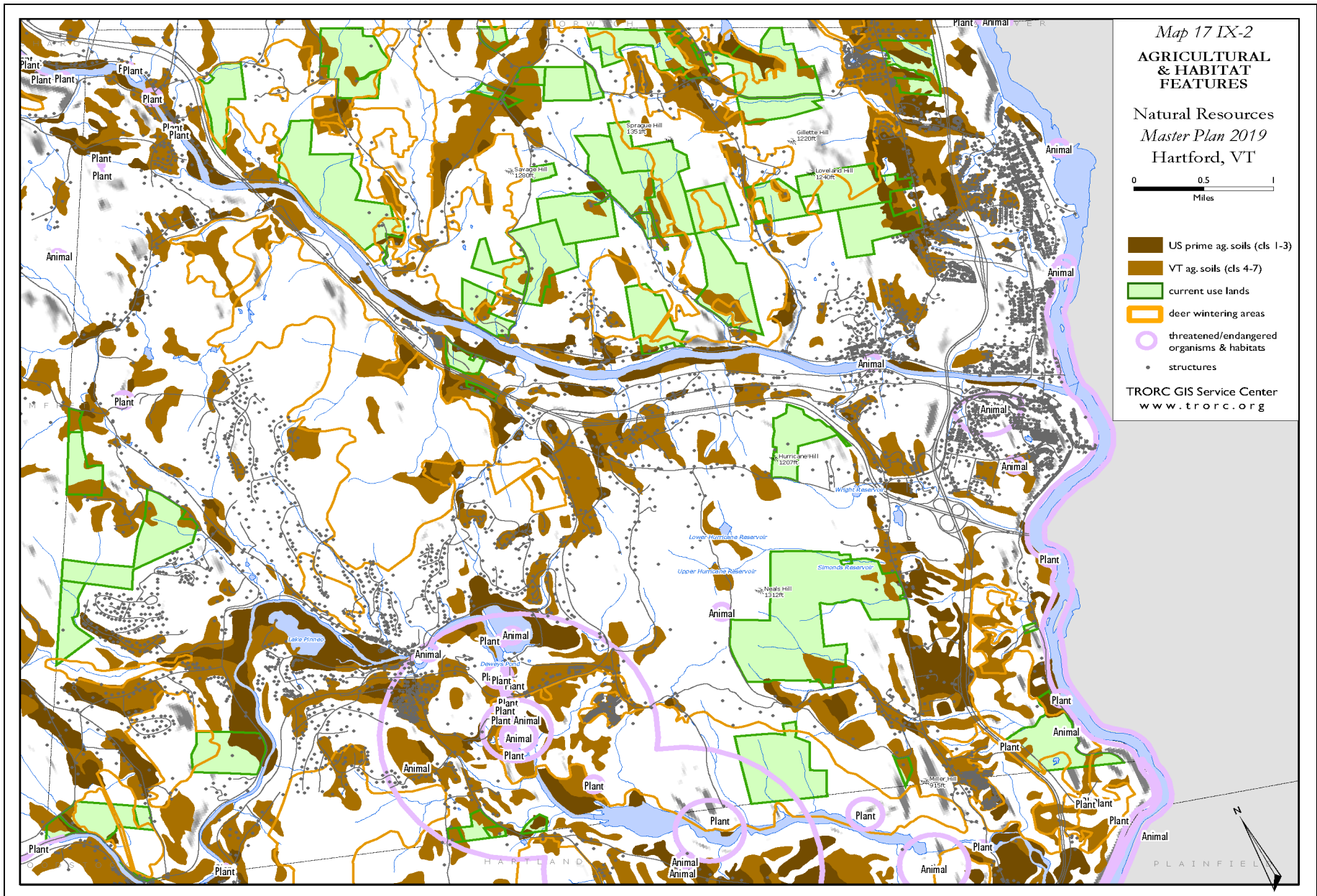
## **Agricultural Soils**

The Natural Resources Conservation Service has developed a system of evaluating the most productive agricultural soils in the nation and throughout each state. Soils best suited for farming are classified as prime agricultural soils and statewide agricultural soils. Soils in the prime category are the highest level of agricultural soils and have the greatest productivity potential and the fewest limitations for farming. Prime agricultural soils in Vermont are a valuable resource and rate as high as prime agricultural soils in the farm belt states. Soils of statewide significance are the next highest category. Soils of statewide significance are similar to prime agricultural (nationally significant) soils but because of slope or other mitigating factors may not be as productive as prime agricultural soils. Contiguous parcels of both soil categories are often essential to produce a tract of suitable size to be economically cultivated.

According to the Natural Resources Conservation Service, in Hartford, there are 1,683 acres of prime agricultural soils and 4,500 acres of statewide agricultural soils. Both prime and statewide agricultural soils have been designated as a state resource for Act 250 purposes. It should be noted that the same conditions that are well-suited for farming, such as level terrain, deep topsoil, no bedrock, and good drainage also are ideal for development. A discussion of agricultural lands follows later in this chapter under Agricultural Resources.

## **Hillsides and Ridges**

Hartford's forested hillsides and ridgelines are largely undeveloped and are important assets. They define our Village Centers, bestow scenic vistas, provide open space, and play an important role in maintaining Hartford's rural character. Besides their aesthetic appeal, these forested areas also provide high-quality water, oxygen, wildlife habitat, and recreational opportunities. Typically, these areas have had limited development potential due to their rugged character, shallow soils, and limited accessibility. In recent years however, the Town has experienced considerable development on hillsides, which has had an impact on these features and have raised citizen concern for their protection. Hartford has several ridges throughout Town that rise above 1,000' in elevation. See Map 18. The following is a list of the high elevation areas.



**TABLE IX-1  
Hartford's High Elevation Areas/Hills**

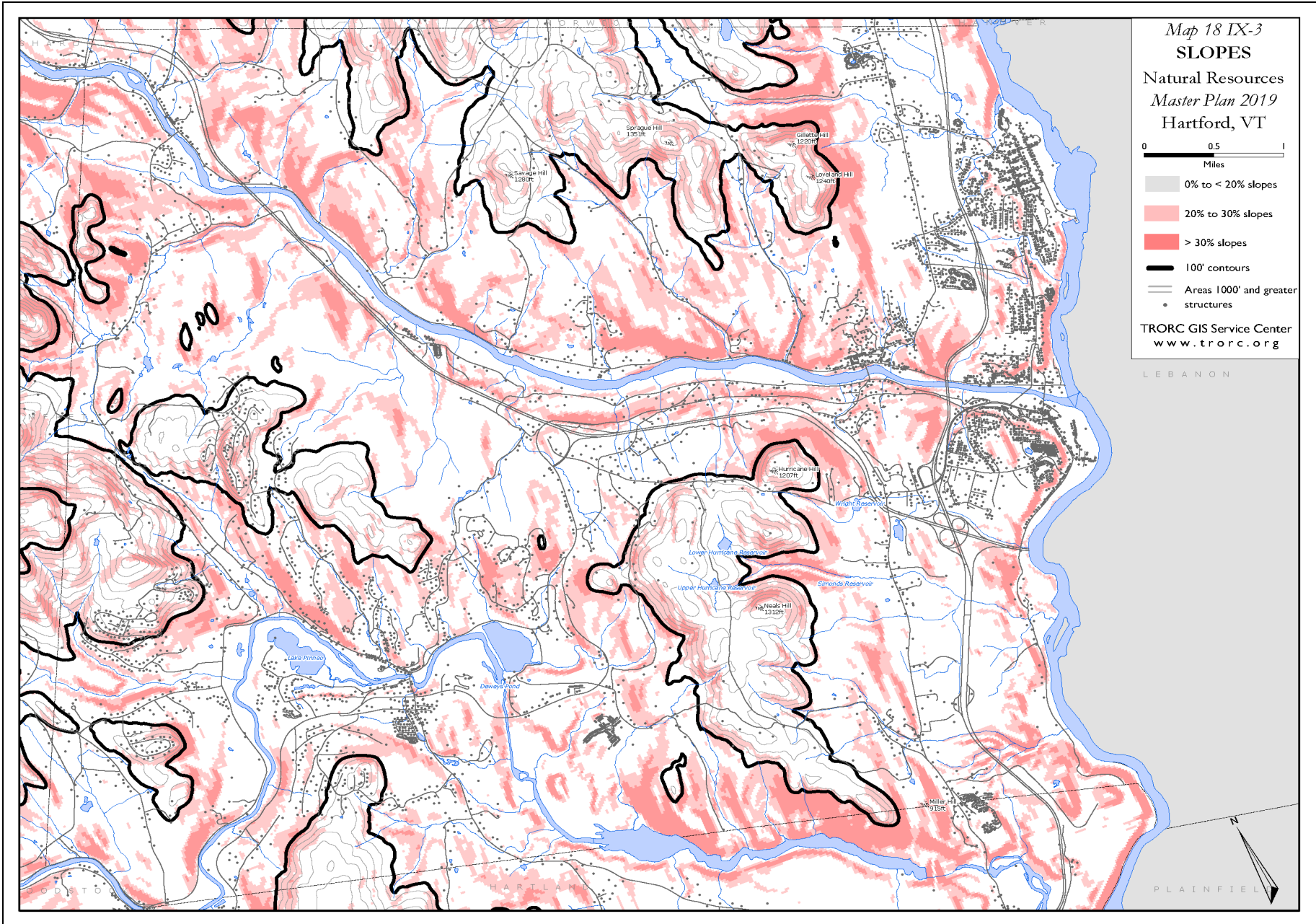
<u>Name</u>	<u>Elevation</u>	<u>Location</u>
Unnamed Ridge	1,575'	West of Old Town Farm Road, Quechee
Unnamed Hill	1,441'	West of Old Town Farm Road, Quechee
Unnamed Hill	1,351'	East of the junction of Jericho Road/Jericho St., Rural North
Neals Hill	1,312'	East of Reservoir Road, Rural South
Unnamed Hill	*1,300'	West of Willard Road, Quechee
Savage Hill	*1,280'	Between Jericho Street & Miller Road, Rural North
Beacon	1,271'	East of Reservoir Road, Rural South
Loveland Hill	*1,240'	East of Dothan Road, Rural North
Gillette Hill	*1,220'	East of Dothan Road, Rural North
Sprague Hill	*1,220'	Between Jericho Road & Dothan Road, Rural North
Unnamed Hill	*1,220'	North of Wallace Road, Rural North
Hurricane Hill	1,207'	North of Kings Highway, Rural South
Unnamed Hill	1,203'	East of Wildlife Road, Rural North
Unnamed Hill	1,202'	West of Marsh Family Road, Quechee
Unnamed Hill	*1,180'	High point of Fairbanks Turn, Quechee
Dupuis Hill	1,162'	East of Marsh Family Road, Quechee
Newton Hill	1,162'	East of Willard Road, Quechee
Unnamed Hill	1,162'	East of Newton Lane, Rural North

\* Indicates approximate elevation based on USGS Maps of Hartford

In Hartford, more than 50% of the town is characterized by hillside slopes of 15% or greater, with many areas exceeding 25%. See Map 18 (Slopes). The U.S. Natural Resources Conservation Service has identified slope categories and developed limitations associated with each category. Generally, extreme slopes, those in excess of 25%, should not be developed, and any land disturbances in these areas for agriculture, forestry, or ski area activities should be conducted with careful attention to erosion control and stormwater management practices. Development on severe slopes, those from 15-25%, should also be discouraged or be very limited. Development of slopes 8-15% is suitable for low-density development with consideration given to erosion control, runoff and septic design. The development permit and/or subdivision approval process should carefully evaluate development proposals on steep or severe slopes to minimize the disturbance of existing vegetation, control erosion, stabilize the slope, and protect down slope areas from stormwater runoff.

Steep slopes pose several land use and development challenges. They are very susceptible to erosion and high rates of runoff, particularly when cleared for roads, construction, agriculture, or forestry. Consequences of erosion include soil loss resulting in sedimentation of surface waters that negatively impact water quality and wildlife habitat. In addition to the physical constraints, development on steep slopes permanently alters the nature of the Town. Such development, especially at higher elevations, tends to stand out from many vantage points, adversely impacting the Town's scenic landscape. Special measures may be required if limited development is approved in these areas, including the careful siting of structures, lighting restrictions, and screening and landscaping requirements.





## **WATER RESOURCES**

### **Water Bodies**

Water bodies are lakes and ponds and other natural or manmade impoundments containing permanent standing water with depths exceeding two meters. They provide flood-storage capacity, wildlife habitat, and recreational and scenic value. Water bodies in Hartford are completely or partially manmade and generally used for recreation. These include Lake Pinneo, Dewey's Pond, Simonds Reservoir, Wright's Reservoir and a small portion of North Hartland Reservoir. Wright's Reservoir is drained due to safety concerns and is pending a decision by the Town as to restoration of the dam or removal.

### **Watercourses**

Watercourses are surface conduits that feed or drain water resources and include rivers, streams, brooks, or drainage swales. Hartford is in the Connecticut River watershed and contains portions of the White River Watershed and the Ottaquechee River watershed. The streams that make up these waterways are important as wildlife habitat, drainage, groundwater recharge, and recreational activities. Riverine corridors provide important habitat for mammals including fox, otter, mink, beaver, deer, moose and for waterfowl, migratory songbirds, and predatory birds such as osprey and eagles. The natural condition of the river shorelines is forested, which helps to keep temperatures cool in the summer and reduces stream-bank erosion. Wooded riparian zones also absorb nutrients and other stream pollutants.

In most cases, major roads have been built adjacent to extensive segments of these rivers, and therefore, they are extremely susceptible to contamination from sedimentation, petroleum in runoff, road salt, and other chemicals. Other threats to Town streams and rivers include pollution from failing septic systems and domestic animal waste. In addition, loss of riparian vegetation along these watercourses due to development and agriculture also threaten the resident aquatic life as well as weakens the stability of the shoreline itself. To encourage maintenance of riparian buffers and minimize removal of streamside vegetation, it is important that the Shoreline Protection Regulations be enforced.

### **Wetlands and Vernal Pools**

Wetlands are those areas that are sufficiently saturated or flooded during the growing season to support water-loving plants, to allow for the development of hydric soils, and to support aquatic life that is dependent of flooded, saturated, or seasonally saturated soil conditions. They include marshes, forested shrub swamps, bogs, fens, vegetated river channel, lake shores, ponds and pond shores, and vernal pools. Wetlands are important natural communities not only to the resident wildlife and plants but also to the public for the functions and values they provide, which include erosion control; water purification; fisheries habitat; wildlife habitat; rare natural community types; habitat for rare, threatened and endangered species; opportunities for education, research, and recreation; and maintenance of open space. Animal species dependent on wetlands for their habitat include many avian species (ducks, geese, rail, herons, shorebirds, songbirds, birds of prey); mammals, such as muskrat, beaver, otter, mink, raccoon; numerous



fish species; reptiles; amphibians; and many invertebrate faunas. Development should not occur in or close to wetland areas. Possible consequences of development may include flooding, groundwater contamination, disruption of natural drainage systems and ecosystem function. Buffers and setbacks should be used to protect wetlands.

Hartford contains a significant amount of wetland soils consisting of upland forested swamps, lowland shrub-scrub swamps, wet meadows, and both deep and shallow emergent marshes. See Map 19 (Water Features). Wetlands identified by the National Wetlands Inventory (NWI) are protected by the Vermont Wetlands Rules. The NWI was completed in 1978, but never field checked. It was not a comprehensive inventory. Therefore, a more accurate up-to-date inventory would be useful for identifying important wetlands that must be protected. Moreover, landowners should be made aware of significant wetlands on their property.

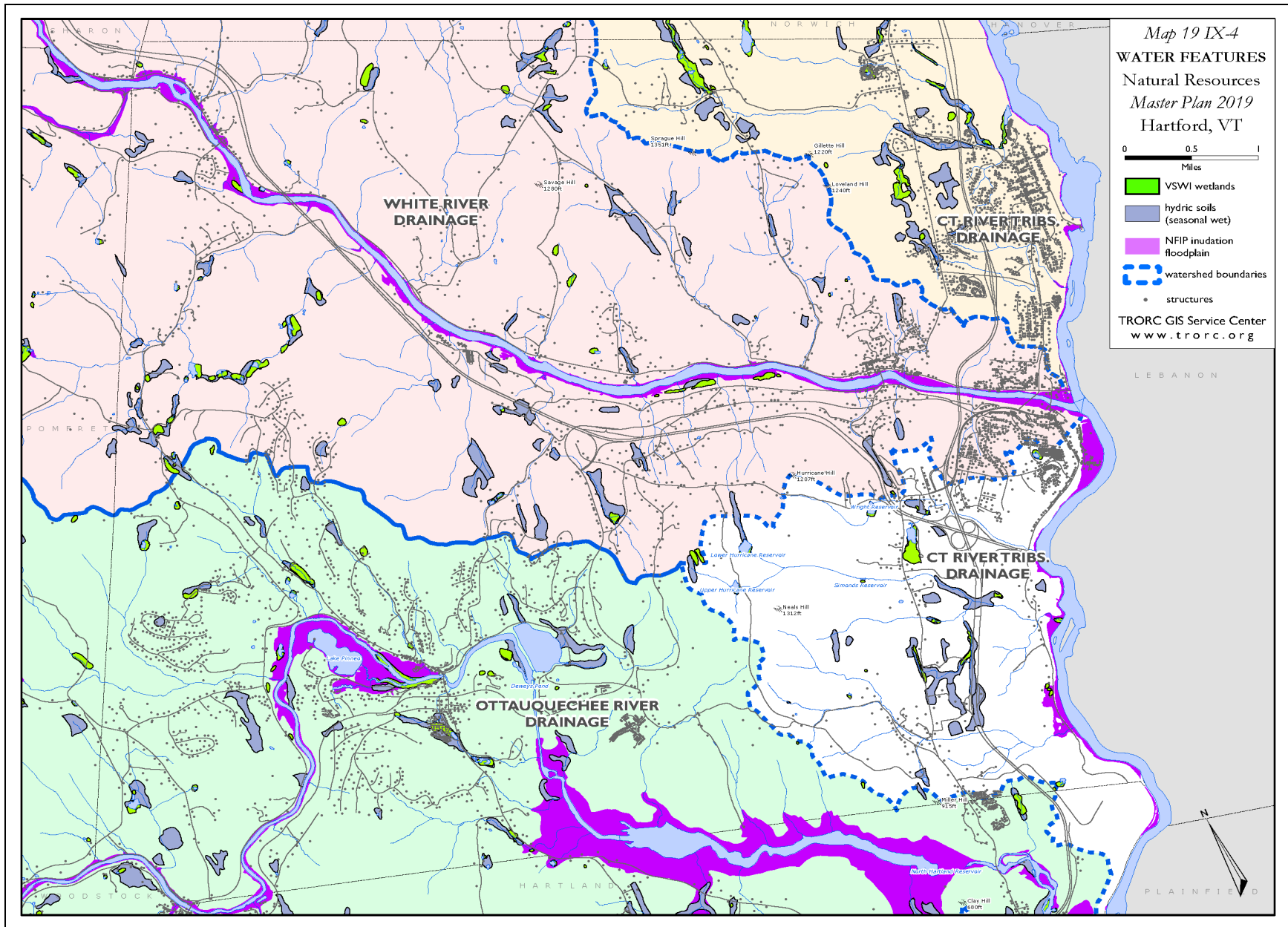
### **Aquifers**

Aquifers are subsurface deposits of coarse sand and gravel that, because of the depth of the material and the large pore sizes between sand grains and cobbles, hold vast quantities of potable water. They are extensive glacial deposits usually found along river corridors underlying floodplain areas. Hartford draws public water supplies from two main aquifers with high potential to yield drinking water including the Connecticut River shoreline from the Wilder Dam area to the Interstate 89 Bridge, and the area in Quechee Village from Quechee-Hartland Road extending northwest. The Town has a Source Protection Plan for both wells that are regularly updated.

While they contain vast quantities of drinking water, aquifers also are vulnerable to percolation of surface-water pollutants to the groundwater reserves. Aquifers cannot be easily flushed, and therefore, pollutants can remain in the subsurface water supply indefinitely. Threats to aquifer water quality include septic tank effluent, leaking underground fuel storage tanks, landfill leachate, improperly stored hazardous wastes, and development which involves extensive areas of impervious material cover and can reduce the restoration of water to the aquifer. Federal and State programs protect aquifers.

### **Floodplains**

Floodplains are periodically inundated flatlands adjacent to rivers and streams. They serve as storage areas for water during periods of heavy rain and spring thaw, thereby reducing the velocity of rivers and streams. Floodplains also provide some of the best agricultural soils and travel corridors for wildlife. They also present severe limitations for development due to the potential hazards resulting from flooding, harmful effects on channel capacity and downstream properties resulting from filling, improper functioning of sewage disposal systems caused by typically high-water tables, increased likelihood of erosion and sedimentation, and potential decrease in wildlife populations due to compromised travel corridors.



Floodplains in Hartford are shown on Map 19 having been designated by the Federal Emergency Management Agency (FEMA). Floodplain land use is regulated through the Town of Hartford Flood Damage Prevention Regulations. The enforcement of the Flood Damage Prevention Regulations is a requirement to participate in the National Flood Insurance Program, which allows Hartford property owners to qualify for low cost flood insurance.

### **Threats and Concerns**

Increased peak runoff resulting from development can have a devastating single or cumulative impact upon water resources. Such increased loads and velocities exceed the natural capacity and stability of watercourses and wetlands, resulting in scour and downstream sedimentation. Sedimentation increases turbidity, raises water temperature, adversely affects natural hydraulic characteristics, and can diminish water quality and ecological balance in these habitats. Run-off frequently contains pollutants which can endanger recreational users and disrupt ecological functions.

### **FOREST RESOURCES**

Forest land provides numerous benefits to the community:

- \* scenic and aesthetic values.
- \* wildlife habitat.
- \* the largest areas for dispersed recreation in town. It is a combination of public and generous private owners who keep their land open to fellow citizens.
- \* help prevent flooding, help moderate the temperature extremes of summer and winter and remove pollutants and particulates from the air.
- \* significant protection from and mitigation of natural and human-made disasters.
- \* raw materials that underpin a rural economy and working landscape.

The Town owns and manages forest land in the Hurricane Watershed. This includes the 423-acre Hartford Town Forest and the 142-acre Hurricane Forest Wildlife Refuge Park. Periodically, the Forest Management Plan for these properties is updated. The last update was completed in 2009. Two small, selection timber harvests including a salvage of windblown red oak occurred in the 2000s. In addition, the Town has developed a Recreation Management Plan for the Hartford Town Forest to guide the increasing amount of recreation that occurs in this largest piece of Town-owned forestland and balance recreation with the natural resource qualities. The Hurricane Watershed should continue to be managed for a variety of uses including wildlife habitat, forest resources and recreation.

While nearly all of Hartford is forested to some degree, there are three areas in Town that merit attention because they are contiguous forest blocks and relatively unfragmented by homesteads and year-round roads. These provide crucial “core areas” that are essential for maintaining the economic, recreational, aesthetic, habitat and ecosystem service benefits that all townspeople enjoy. The importance of these areas has been confirmed by both the Linking Lands Alliance, a grassroots organization that works in ten Upper Valley Towns in Vermont to address natural resource issues that transcend town borders, and the online GIS BioFinder project developed by

the Vermont Fish and Wildlife Department. These three areas correspond with the three areas of Town that are highest in elevation:

- the Hurricane Hill/Neal Hill/Ottawaquechee area, extending from U.S. Army Corps of Engineers land around the North Hartland Dam to Route 4 near Timber Village and the Town Forest and Hurricane Forest Wildlife Refuge Park near the Upper Valley Aquatic Center (~5,200-acre block, including land in Hartland);
- the Jericho/West Hartford district adjacent to the National Park Service lands of the Appalachian Trail and extending well into Norwich (~6,300-acre block) and
- the east face of the ridge running from Quechee Village to the Quechee - West Hartford Road and down to the roads by the White River, including Sections 5 of the Quechee Lakes development (~2,700 acres in Hartford separated by the Quechee-West Hartford Road from 2,200-acre and 6,200-acre interior forest blocks stretching into Pomfret containing the Appalachian Trail.

Hartford created Wildlife Connector Overlay Districts in the Zoning Regulations in 2008. It was designed to connect these three forest blocks with each other and with forest blocks in adjacent towns.

### **Forest Blocks and Critical Wildlife Habitat**

For a municipality with the 9<sup>th</sup> highest population in Vermont, Hartford is fortunate to have several large unfragmented forest blocks (noted above). These forests provide valuable wildlife habitat and connect to other large unfragmented forests within Hartford and the larger region, creating important ecosystem linkages and an important travel network for wildlife. In 2016, Act 171 was adopted and signed into law. It requires that Town Plans indicate where both intact blocks of forested land and habitat connectors are located and how their fragmentation is to be minimized. The Vermont Fish and Wildlife Department has identified two types of forest blocks with BioFinder:

Connectivity Blocks: Connectivity Blocks are also contiguous blocks of unfragmented habitat, but these lands are situated to link larger patches of habitat within a landscape, allowing the movement, migration and dispersal of animals and plants. The resulting network is particularly important for wide-ranging animals, such as bobcat and black bears, or for animals that require a great deal of space to meet their daily life needs, such as barred owls or otter. However, it is also important for animals with relatively small ranges and even for plants over long time periods as the climate changes. Connectivity blocks provide the opportunity for regional movement of wildlife and genetic exchange.

Interior Forest Blocks: are the largest blocks of contiguous forest and other natural habitats in the region that are unfragmented by roads, development and agriculture. Due to their size, Interior Forest Blocks are likely to support the biological requirements of a large diversity of native plants and animals, including those that occur only in areas away from edges or development and those that require large ranges to support their daily and seasonal needs or to find mates for reproduction. As a result, these areas ensure genetic integrity of populations. Interior Forest Blocks also help to maintain air and water quality and promote flood resilience.

The Department of Fish and Wildlife has also identified and ranked important Physical Landscape Diversity Blocks on BioFinder:

Physical Landscape Diversity Blocks: are places with uncommon natural history or geology that are likely to be important for maintaining biodiversity. These include, for example, glacial eskers and Lake Hitchcock deposits which are rare as well as moderately calcareous soils which are not rare in Vermont but are unusual in New England. One nearby example is just over the town line in Sharon next to the White River. Because of the unique physical features, The Nature Conservancy acquired 650 acres to protect this calcium-rich area and the 28 varieties of rare plant species that live there.

Hartford should study the Physical Landscape Diversity Blocks areas located in Town and develop strategies to protect them, if warranted.

According to the Vermont Agency of Natural Resources Biofinder Map, Hartford has blocks of the four main categories.

- Highest Priority Connectivity Blocks: Sections of Jericho and West Hartford extending into Norwich, Sharon and beyond.
- Priority Connectivity Blocks: Sections of Quechee extending into Pomfret that connect to the Highest Priority Connectivity and Highest Priority Interior Forest Blocks of Pomfret, Sharon and Norwich.
- Highest Priority Interior Forest Blocks: Sections of Jericho and West Hartford extending north into Norwich. Sections west of Old Town Farm Road extending into Pomfret. Sections between Quechee Lakes and the White River.
- Priority Interior Forest Blocks: Land between Jericho Street, Jericho Road and Dothan Road. Sections south of Route 4 extending into Hartland. Sections west of the Quechee-West Hartford Road and north of Joe Ranger Road extending into Pomfret.

Fragmentation reduces the core habitat areas that are critical to wildlife communities. If the landscape becomes a collection of small, isolated pockets of natural areas, it loses its capacity to support diverse and thriving wildlife communities. In the 2000s, the Hartford Conservation Commission began working with nine other area towns in the region to identify core forest blocks and work together to ensure wildlife connectivity at a regional level. This led to recommendations in the 2007 Town Plan to create a Wildlife Connector Overlay District to protect these important corridors and habitats and their connections to adjacent towns. Two other overlay districts also were developed at the same time (Agricultural and Rural Lands) to carefully review development proposals to protect natural resources, including forest blocks, agricultural land and rural character. In 2008, the three overlay districts were incorporated into the Zoning Regulations. In 2016, the Hartford Subdivision Regulations were amended to include standards for wildlife habitat and habitat blocks and to minimize fragmentation. Care should be taken to enforce the Zoning Regulations Overlay District standards and the Subdivision Regulations standards. Efforts should also continue to learn more about wildlife corridors and work closely with the Vermont Fish and Wildlife Department and surrounding communities to



mitigate the impacts of fragmentation of connectivity blocks and interior forest blocks. Map 20 (Wildlife Habitat Fragmentation) identifies the intact forest lands in Hartford.

Hartford has zoning overlay districts to help protect large habitat blocks and the corridors that connect them, but some connectivity is still tenuous. Housing, roads and guardrails are barriers that keep some species from passing through. Wooded riparian zones and brushy/woody fence lines can offer narrow but critical travel corridors, while land cleared all the way to riverbanks or stone walls offer no safe travel cover. Hartford should assess the edges of large habitat blocks as well as corridors between them to find the most vulnerable sites. Once identified, Hartford can work with owners to maintain or improve these critical connections between large habitat blocks.

There are many non-regulatory ways to keep forestland and open space from being converted to other uses. Owners who learn and experience the natural history of their land will consider those values when the time comes to pass it on. Hartford can help keep forestland ownership interesting by supporting learning opportunities. Owners who break even or profit from their forest ownership are less apt to sell or develop their land. Hartford can help keep forestland ownership affordable by supporting low ownership costs and local markets for forest products. Furthermore, Hartford can support landowners in the following ways:

- Support programs that provide information about forest stewardship and incentives for management.
- Demonstrate forest stewardship on the Hartford Town Forest including vegetation management and harvests.
- Eliminate or reduce Town application fees for wood processing facilities that use locally harvested wood.
- Build or upgrade public roads to accommodate seasonal, temporary use of heavy trucks.
- Encourage citizens with concerns about logging, including erosion to report them to the Vermont Department of Forests, Parks and Recreation which collaborates with the Vermont Department of Environmental Conservation to correct and prevent erosion and adverse wetland impacts from logging jobs.

## **Urban Forestry**

The benefits of trees extend beyond forests. Trees play an important role in-town too and enhance our village and neighborhood character. In addition to their aesthetic values, urban trees cool the surrounding area and are often part of the “green infrastructure” that helps control and treat runoff from the pavement and roofs that dominate urban settings. In 2003, Hartford established a Tree Board. Shortly thereafter, Hartford became a Tree City USA. The Tree Board mission is “to maintain and plant trees and advocate for community tree stewardship.” The Tree Board is dedicated to advocating for the beautification of street and park landscapes and sponsoring tree plantings and tree education walks. The Tree Board works closely with the Town Tree Warden. They recently established their first tree nursery at the Maxfield Park. The Tree Board is currently working on a tree inventory and preparing for the impending arrival of the invasive insect, the Emerald Ash Borer.

## **WORKING LANDSCAPE: AGRICULTURAL AND FORESTRY RESOURCES**

Since Hartford was settled in the late 18<sup>th</sup> century, Hartford's agricultural and forestlands have played an important role in the Town's economy. Today, agricultural and forestlands still play an important role also in the town's ecosystem, provide Hartford residents and visitors outstanding scenic and recreational opportunities, and help keep tax rates down. Going forward, it is important to recognize these benefits and develop methods and strategies to protect the working landscape and the occupations it supports.

### **Forest Resources**

In Vermont, approximately 75% of the land is covered in trees. That accounts for 4.6 million acres statewide. Much of Hartford also is forested. While some forestland in Hartford is owned by federal, state and town governments, most of it is owned by private individuals or entities. Forestland is an important resource because it provides the raw materials that underpin a rural economy and working landscape - loggers, foresters, firewood processors, sawmill and kiln workers, home-sawmill operators, furniture and sign makers, maple sugar producers, and every landowner who realizes income from the sale and management of their forestlands. Statewide, in 2011, the wood manufacturing industry generated \$1.4 billion in economic benefit.

Forest fragmentation has been a major threat to the integrity of forests in Vermont. According to a 2013 US Forest Service's National Forest Inventory and Analysis Program report, between 2007 and 2012, Vermont lost nearly 75,000 acres of forestland. Between 1980 and 2010, developed land in Vermont increased by 67%. Since 2010, development pressures have eased. However, much of the damage has been done with many smaller tracts of land less conducive to timber harvesting.

Today, forestland in Hartford contributes a great deal to the Town's economy and rural character. In the past decade the Town has recognized this importance and has encouraged preservation of forestland and development that is sensitive to preservation. In 2008, a Rural Lands Overlay District and a Wildlife Connector Overlay District were established in the Zoning Regulations to protect natural resources, including wildlife habitat and the fragmentation of forest and agricultural lands. See Map 9 (Current Zoning Overlay Districts). In addition, other zoning changes were made in 2008 to reduce residential density throughout the rural areas of Hartford and to allow clustering of residential development to minimize the footprint of development to protect agricultural land and other important natural resources. The Town also created a Forest Conservation Zoning District in the Rural South that maintains large lots suitable for forest management. The Town should continue to look at ways to protect forestland in Hartford. The Town also encourages sound forest management practices including adherence to the State of Vermont Required Acceptable Management Practices to protect natural resources.

Numerous tax studies from Vermont, New England, and across the U.S. demonstrate that keeping land forested and undeveloped is one way to keep a town's tax rate low because dispersed housing requires a disproportionate share of local services including education, public utility and public safety. In order to reduce private ownership costs which encourage sales, subdivision or development, Hartford supports reduced taxes on productive forestland. The

Vermont’s Current Use Program reduces taxes on enrolled parcels and reimburses towns for otherwise lost revenues. The intention of the Current Use Program is to limit development, parceling and fragmentation of forests and farmland. In Hartford, forestland enrolled in the current use program has increased 36% between 2006 and 2018. In 2018, 4,776 acres of forestland were enrolled in the program and accounts for 16% of the Town’s land area. Combined with agricultural land in current use, 20.2% of the land in Hartford is enrolled. This is considerably below the 46% rate of the Region’s land in current use. The amount of forestland enrolled in current use under-represents the total amount of land in forest management since not all owners of forestland enroll in the current use program.

**TABLE IX-2  
HARTFORD LAND IN CURRENT USE  
CHANGE BETWEEN 2006 - 2018**

	<b>2006</b>	<b>2018</b>	<b># Change</b>	<b>% Change</b>
<b>Forestland in Current Use</b>	3,519 Acres	4,776 Acres	+1,257 Acres	36%
<b>Agricultural Land in Current Use</b>	1,055 Acres	1,166 Acres	+111 Acres	11%
<b>Total Land in Current Use</b>	4,574 Acres	5,942 Acres	+1,368 Acres	30%

Source: Hartford Lister’s Office

### **Agricultural Resources**

Agricultural lands provide numerous benefits to the Town, including a reduced tax rate, a source of agriculturally related jobs and the working landscape, scenic and aesthetic values, wildlife habitat, stormwater mitigation, and a local, reliable source of food and fiber. Hartford has a long tradition as a farming community that is an important component of the Town’s heritage.

Agriculture in Vermont has experienced major changes in recent years. The dairy industry has been hit particularly hard with many operations closing, including those in Hartford. According to 2013 report, Sustainable Agriculture: Agricultural Land Conservation, Agricultural Land Use Planning Task Force, Farm to Plate Network, Vermont lost nearly 8,000 acres of farmland a year. Since 2013, the trend has slowed, but it is still a major concern statewide. Another concern is the trend of aging farmers. In 2013, the average age of a farmer in Vermont was 56 with more than ¼ of farmers over the age of 65. Also, as farming has declined, there has been an increase in residential and commercial development.

At the same time, there are some encouraging trends. According to the U.S. Census of Agriculture, between 2002 and 2012, although larger farms in Vermont declined, the overall number of farms increased by more than 11%. The category with the highest increase was farms between 10 and 49 acres. The 2013 Sustainable Agriculture Report noted that agriculture in Vermont has almost 9,000 businesses employing nearly 30,000 people. In 2012, the USDA estimated that agricultural revenue in Vermont to be \$775 million per year. If food product

output was considered, the number increased to \$2.9 billion. Other positive considerations include Vermont as being a national leader in educational programs on local food, agriculture and healthy eating as well as a strong farm to plate movement. Also, Vermont has a strong network of land trusts and other organizations that are committed to conserving agricultural and forestlands.

Today, agricultural lands in Hartford contribute a great deal to the Town's rural character. As noted earlier in this chapter, Hartford has sizable areas of prime agricultural soils and soils of statewide importance. This is a limited resource. Therefore, the Town encourages preservation of agricultural lands as well as locally grown foods and the manufacture and marketing of value-added agriculture. These can have a positive effect on the Town's economic well-being and quality of life.

Agricultural lands are potentially threatened by development. In 2008, an Agricultural Overlay District and Rural Lands Overlay District were established in the Hartford Zoning Regulations to protect agricultural lands and areas with prime agricultural soils. See Map 9 (Current Zoning Overlay Districts) and Map 17 (Agricultural & Habitat Features.) Other zoning changes in 2008 reduced residential density throughout the rural areas of Hartford and allowed clustering of residential development to minimize the footprint of development to protect agricultural land and other important natural resources. The Town should continue to look at ways to protect agricultural lands in Hartford. The Town also encourages sound agricultural management practices including adherence to the State of Vermont Required Agricultural Practices to protect natural resources.

As with forested lands, use of Vermont's Current Use program is an important program for property owners of agricultural lands. In Hartford, agricultural land enrolled in the current use program increased 11% between 2006 and 2018. In 2018, 1,166 acres of agricultural land were enrolled in the program, an 11% increase since 2006 which accounts for 4% of the Town's land area. See Table IX-2. The amount of agricultural land enrolled in current use under-represents the total amount of land in agriculture since not all owners of agricultural land enroll in the current use program.

## **CLIMATE CHANGE**

Forested lands in Hartford provide significant protection from and mitigation of natural and human-made disasters. Climatologists agree that the northeast is experiencing and will continue to experience climate change. While precipitation volumes are fairly stable when measured annually, it tends to come in more sudden, sometimes torrential cloudbursts. We are also experiencing longer intervals between precipitation events leading to drought. Intact forests mitigate these changes by absorbing precipitation and slowing its movement downhill while using some of it for growth. Stormwater from forests is less likely to cause flash floods than runoff from fields, lawns, buildings or roads. This "green infrastructure" can save significant and expensive repairs or preparation from floods and breaking up periods of drought. At the same time, the slower, steadier release of water from forests gives us a more regular supply of water for irrigation and domestic use than from unforested lands.

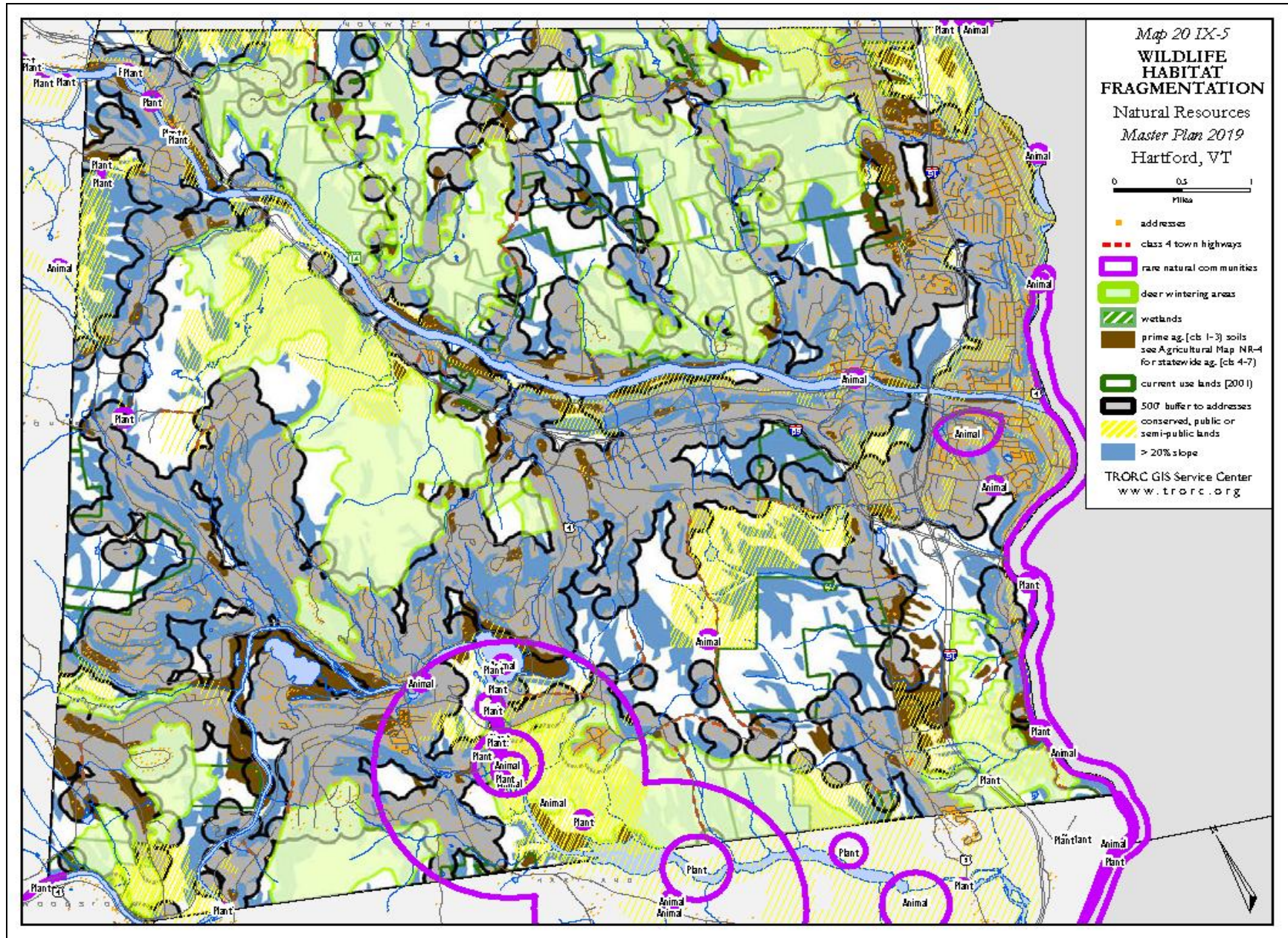
We are also experiencing more summer days with temperatures above 90 degrees F. Forests cool summer weather by absorbing heat-producing sunlight to make carbon-based compounds. Trees also transpire water and the process of evaporation from their leaves takes heat out of the surrounding air. Forests not only keep sunlight from reflecting back into the atmosphere, but also directly cool the air and remove the greenhouse gas carbon dioxide from the air. Climate change impacts forest resources, agricultural resources, biodiversity and Town and State infrastructure. Town government must do its share to ensure that the Town adapts to climate change and is more resilient in the future.

## **BIOLOGICAL DIVERSITY**

### **Defining Biodiversity (Biological Diversity) and Why it Matters**

*“Biodiversity, or Biological Diversity, is the variety of life in all its forms, and all the interactions between living things and their environment. It includes ecosystem diversity, landscape diversity, community diversity, species diversity, and genetic diversity.”* (Vermont Biodiversity Project <http://www.uvm.edu/rsenr/sal/vbp/vbp3.html> )



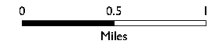




Map 21 IX-6

### FOREST BLOCKS, ROADKILL & CROSSINGS

Natural Resources  
Master Plan 2019  
Hartford, VT



#### Forest Blocks

- Highest Priority Interior Forest Block
- Priority Interior Forest Block

#### Crossing Value (ANR)

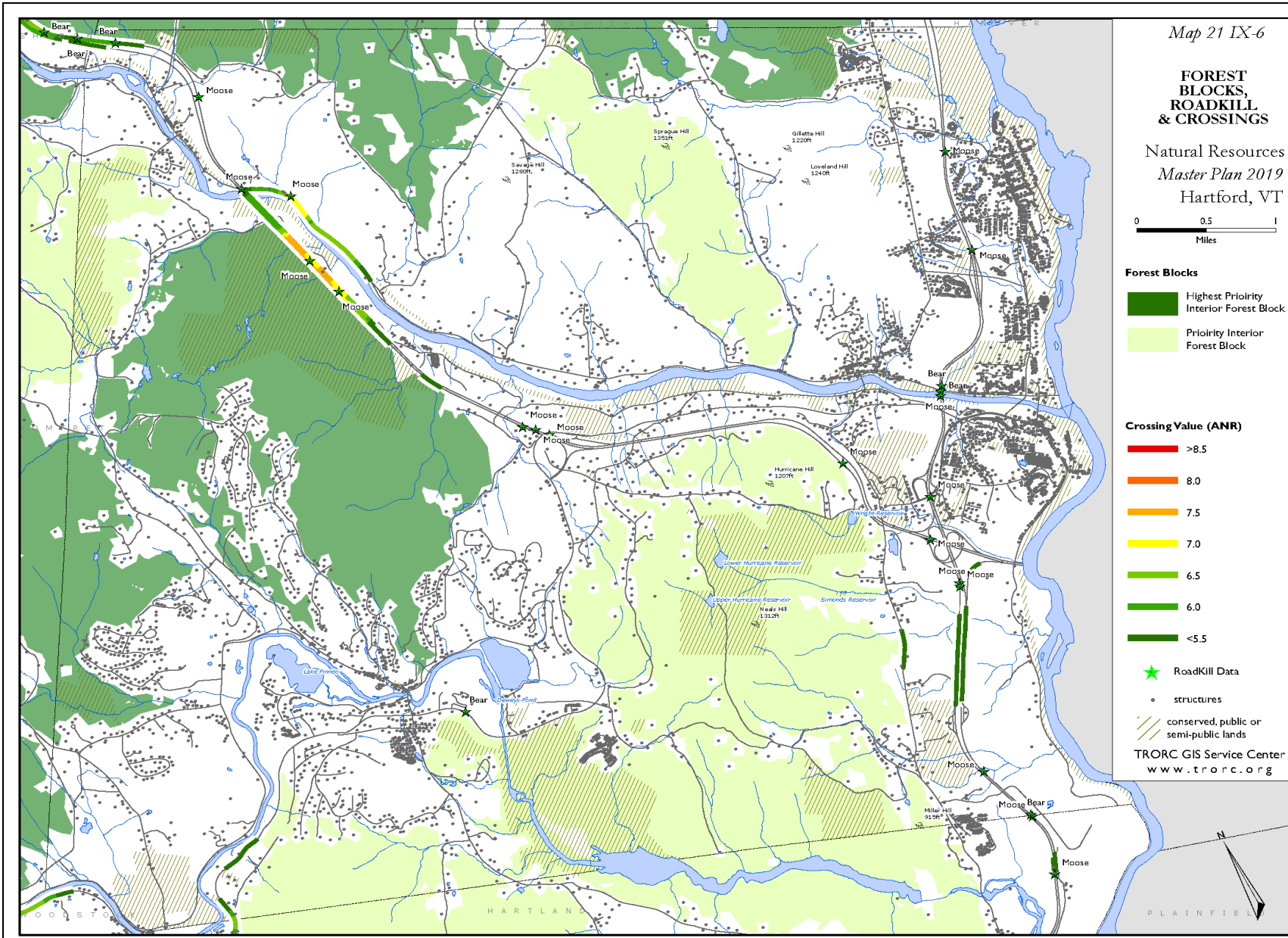
- >8.5
- 8.0
- 7.5
- 7.0
- 6.5
- 6.0
- <5.5

RoadKill Data

structures

conserved, public or semi-public lands

TRORC GIS Service Center  
[www.trorc.org](http://www.trorc.org)



## **Status of Biological Diversity in Hartford**

Hartford's interesting geology, rivers and settlement pattern have evolved varied natural communities with good biological diversity. Streams and riparian zones merge with agriculture and forest habitats. Imbedded in those larger habitats are pockets of wetlands and steep slopes. The built environment (roads, buildings, parking lots) interrupts the natural connections between these habitats and the species that live there. Imagine one species, deer, travelling north from Hartland to Norwich. Among other obstacles it needs to cross the White River and its corridor of development including Rte. 14 and the Interstate. Fortunately, relatively undeveloped forest and agriculture blocks offer good habitat for native wildlife and other organisms. We must strive to keep and connect our largest undeveloped blocks of open space.

Biodiversity – Hartford's high-quality aquatic and terrestrial habitats support substantial biological diversity. These habitats support not only residential populations of native species, but some provide important stop-over locations for migratory and wintering species. The Vermont Fish and Wildlife Department (FWD) has assembled an online Geographical Information System (GIS) mapping tool called "BioFinder" that illustrates existing information about habitat characteristics. It helps assess biodiversity.

Fish and Wildlife Resources - Many species are important to hunters and fishers throughout Hartford. Many are not game species yet are important to most Vermonters who enjoy watching wildlife. Some have specific habitat needs. White-tailed deer depend on deer wintering areas for survival when snows are deep. The Vermont Fish and Wildlife Department has roughly mapped known critical areas and has them available on BioFinder.

Rare and Endangered Species - Statewide threatened, endangered and rare species have been documented in Hartford. The Natural Heritage Program of the FWD has these records and shows their general locations on BioFinder. These unusual species are especially important to the region's and town's biodiversity. Therefore, we need to protect their habitats.

## **Threats to Biodiversity Resources**

Threats to the biological diversity of Hartford fall into three major categories: habitat degradation, habitat fragmentation and habitat loss. Habitats are degraded by, among other things, pollution and negative impacts of edge effects. Fragmentation divides larger contiguous habitat blocks into sections that lack what some wide-ranging species need. Converting land cover from forest or fields to buildings or pavement reduces wildlife habitat.

## **INVASIVE SPECIES**

Invasive Species are alien (non-native) species of all taxa whose introduction does or is likely to cause economic or environmental harm or harm to human health. (National Invasive Species Council Management Plan: 2016 - 2018) Hartford can help control the spread of some invasive species and/or prepare for the damage some species will bring. A great source of current information is at <https://vtinvasives.org/>

## **Invasive Plants**

Invasive plants can reproduce quickly, they are not controlled locally by natural predators or diseases, and once established run rampant, out-competing our native plants. They can monopolize light, water and nutrients and degrade soil and water quality. Addressing the problem of invasive plants and restoring native vegetation in Hartford is a challenging task. The following is a list of strategies:

- Prevent New Introductions: The most cost-effective way of control is to prevent the arrival of any new exotics. The State of Vermont has a list of banned invasive plants. More plants which are not banned, but may prove to be invasive, are on state and provincial “Watch Lists”. Hartford must prohibit invasives and plants on neighboring watch lists from landscape plans.
- Eradication of New Infestations: Small populations of invasive exotics can be attacked while their density and range are limited. The prospect of total elimination saves not only money, but also our ecological systems. The Department of Public Works should have a policy for controlling invasive plants in road rights-of-way.
- Managing Established Populations: Control efforts are numerous but must be tailored to fit the situation. When fighting invasive plants around endangered species and their habitats, we must be careful to not cause further damage to these fragile ecosystems. (Several aquatic invasive plants are threatening the recreation values of Dewey’s Mill Pond and Lake Pinneo. Hartford should cooperate in controlling aquatic invasives with methods that do not endanger human health.)
- Restore Native Vegetation: We must restore our native vegetation to areas where invasive plants are being controlled. If we do not replant or otherwise support native plants, the exotics will re-colonize.

## **Invasive Insects**

Several invasive insect populations are threatening Hartford’s trees. When/if they arrive, these invasive insects will have a devastating effect on our forests and landscape trees. The costs of cleaning up hazardous roadside and urban street trees alone will be expensive. Three nearby invasive species, Emerald Ash Borer, Hemlock Woolly Adelgid, and Asian Longhorned Beetle warrant special attention. Of them, Emerald Ash Borer is an imminent threat.

Emerald Ash Borer (EAB) is devastating to all North American ash species, killing trees in two or three years after infestations are visible. Hartford has an EAB plan for public ash trees which should be started because EAB populations have been confirmed as close as the far edges of neighboring Orange County, VT and Grafton County, NH.

## **SCENIC RESOURCES AND RURAL CHARACTER**

With a population of 10,000 people, Hartford is fortunate that it has grown while retaining much of its rural character and scenic beauty. The historic settlement pattern of five villages largely separated by countryside continues today. The protection of the Town's scenic beauty and rural character is an important attribute, not just for Hartford residents, but for visitors to Hartford as

well. Indeed, a large part of the Town's economy depends on the tourism attracted by the beauty of the landscape. In 2008, the Zoning Regulations were amended to designate a Rural Lands Overlay District throughout the rural areas of Hartford to ensure that new development is done in such a way that it protects rural character, scenic views and natural resources. The Town should ensure the enforcement of the overlay district standards.

### **Scenic Byways**

The National Scenic Byway Program was established in 1991. It provides the opportunity to promote the scenic and historical nature of the communities that the byway passes through. There are currently ten scenic byways in Vermont of which two pass through the Town of Hartford; the Connecticut River Scenic Byway (Route 5) and the Crossroad of Vermont Byway (Route 4).

### **Scenic Areas**

A scenic area can be one with views of farmsteads surrounded by pasture land, of compact villages nestled among the hills and mountains, and of forest tunnels cut by splashing brooks. It also can be views of mountain ridgelines, river valleys, and other traditional New England scenes. In the early 1990s, the Hartford Conservation Commission identified the following list of important scenic areas in Hartford:

1. The Hillside Road area in Quechee, that is, the area bounded by:
  - a. the Pomfret town line to the west;
  - b. the Woodstock and Hartland town lines to the south;
  - c. the Ottauquechee River to the east; and
  - d. Wheelock Road and the northern end of Quechee Lakes Greenbelt #7-GB02-001 to the north.
2. Route 4 from Lakeland Drive southwest to the Hartland Town Line and bordered on the northwest by the Ottauquechee River and on the southeast by a line running 500 feet parallel to Route 4.
3. The open lands along the Ottauquechee River from Wheelock Road down river to the Quechee Covered Bridge, including, for example, the Quechee Village Green (Lot 12-QLLA-016), the two Quechee golf courses (Lots 7-QLLA-002 and 7-QLLA-003), and the Quechee Ski Area (Lot 7-QLLA-010).
4. The open lands and waters adjacent to Deweys Mills Road such as the Ottauquechee River, Dewey's Pond, the pasture surrounding Marshland Farm, and the Polo Field.
5. Quechee Gorge, including all land owned by the United States of America along the Ottauquechee River.



6. The open lands at the intersection of Old Quechee Road and Atwood Road in the Center of Town area.
7. The open lands along Kings Highway from Reservoir Road east to where Kings Highway becomes a Class 4 road.
8. Hurricane Hill and Neals Hill above 900 feet elevation.
9. The Wright Farm on Route 5 South.
10. The open lands south of I-89 between Route 5 South and I-91.
11. The Connecticut River Road area, as follows:
  - a. the open lands along the Connecticut River Road; and
  - b. the wooded lands along this road between the Connecticut River on the east and a line running 100 feet parallel to the Connecticut River Road on the west.
12. The Connecticut River and its banks from Wilder Dam downstream to the southern end of the big island visible from Wilder Dam and the view of Mt. Ascutney from this dam.
13. The Connecticut River basin north of the Wilder Dam, including the shoreline of the River owned by the New England Power Company, the "setback" area where Dothan Brook enters the Connecticut River, and the area to the north of this "setback" area bounded as follows:
  - a. on the east, by the Connecticut River;
  - b. on the north, by the Norwich town line;
  - c. on the west, by I-91;
  - d. on the southeast, by the northern lot line of the Candlelight Terrace Condominium project; and
  - e. on the southeast, by that branch of Dothan Brook that originates on Mosley Hill in Norwich.
14. Brookside Farm on Route 5 North in Wilder.
15. The ridge line west of Route 5 north in Wilder above 800 feet in elevation as seen from Route 5 or Christian Street and bordered:
  - a. on the south, by the VELCO power line which crosses Christian Street near the height of land; and
  - b. on the north, by the Norwich town line.
16. The "Dothan Area," that is, the open lands at the intersection of Jericho Street and Newton Lane, including west for 3,000 feet on Jericho Street, and south for 2,000 feet on Jericho Street.

17. The "Jericho Area," that is, the open lands along Jericho Street and the open lands along the following roads off Jericho Street or Jericho Road:
  - a. Wildlife Road north to where it becomes a Class IV road;
  - b. Jericho Road southeast to half way between Miller Road and Ammel Road;
  - c. Miller Road south to where it becomes a Class IV road;
  - d. Wallace Road west to where it becomes a Class IV Road;
  - e. Sugartop Road; and
  - f. Jericho Street east for 3,000 feet.
  
18. The White River and the lands along the White River as follow:
  - a. the land between the White River and Route 14 upriver from Dothan Road to the Sharon town line; and
  - b. the land north of the P&C warehouse between the White River and:
    1. Old River Road upriver to I-89;
    2. I-89 upriver to where Old River Road crosses over I-89 in West Hartford;
    3. Old River Road from where it crosses over I-89 in West Hartford upriver to the Quechee-West Hartford Road;
    4. the Quechee-West Hartford Road upriver to Westfield Drive;
    5. Westfield Drive upriver to Recreation Drive;
    6. Recreation Drive upriver to the West Hartford Bridge;
    7. the West Hartford Bridge upriver to the Pomfret Road; and
    8. the Pomfret Road upriver to the Pomfret Town line.
  
19. The open lands along Handy Road in West Hartford.
  
20. The open lands along the Quechee-West Hartford Road, Old Town Farm Road, and Red Barn Road from Clay Road south to the River Road.
  
21. The open lands at the intersection of Atwood Road and Old Quechee Road in the Center of Town area.

Since the list was developed twenty-five years ago, it should be re-evaluated. Consideration should be given to hiring a consultant.

### **Wireless Communication Facilities**

Wireless communication facilities have the potential of creating significant visual impacts and need to be carefully sited. The Town adopted telecommunication facility standards in the Zoning Regulations in 2002 and the process working with telecommunication companies worked quite well. Several telecommunication facilities were approved and constructed with very little visual impact. However, over the last decade, Section 248a eliminated local permitting authority of telecommunication facilities. Currently, cellular providers apply for a Certificate of Public Good through the Vermont Public Service Board. As a result, the Town needs to take an active

role in the Section 248a permitting process to ensure that telecommunication facilities are properly sited.

### **Solar Energy Facilities**

Over the last decade, there has been tremendous growth in solar energy in Vermont. This started with roof top solar panels and in recent years has resulted in commercial solar arrays in Hartford and throughout the state. Solar energy facilities should be carefully sited.

### **Wind Energy Facilities**

Commercial wind energy facilities are not commercially viable in Hartford due to the lower elevations of ridges and therefore are not an issue currently. Small scale individual towers are possible. Therefore, the siting of wind energy facilities must be carefully evaluated to mitigate visual impacts.

### **Lighting**

Dark skies and bright stars are resources that greatly contribute to our rural quality of life. However, our ability to enjoy the night sky can be hampered by excessive and unshielded lighting. Public safety and welfare require adequate illumination, but inappropriate lighting can produce unsafe or unpleasant conditions. Unshielded lights can glare into the eyes of motorists and into neighboring homes. Excessive lighting also wastes energy and leads to sky glow. Additionally, excessive and misdirected lighting can negatively impact wildlife, especially species undergoing local and long-distance migrations (e.g., birds, amphibians).

In most cases, the careful placement, shielding, and selection of the proper type of lighting can lead to improved lighting, lower utility cost and reduced impacts. The use of down light fixtures and motion-detector lights can also reduce the negative effects of lighting. The Town should continue to ensure that down light fixtures are utilized. The Town also should consider amending the Zoning Regulations to establish specific lighting standards. The Town should provide educational material to property owners and businesses regarding appropriate lighting.

## **OPEN SPACE AND GREENWAYS**

Hartford is blessed with an important natural resource: open space. Open space is defined as any publicly or privately held, unimproved area of land, water course, or water body that may be used for agriculture, forestry, or outdoor recreation, or remain in a natural state. The character of an open space is often informed by its local context, such as whether it is in an urban/village, suburban, or rural setting. Greenways provide connections between isolated habitat areas to maintain bio-diversity, provide access to larger habitats, and allow for refuge from predators, fire or other disturbances. The interdependence of open space therefore underscores the importance of the Town's greenways as well.

## The Value of Open Space to the Public

Hartford's open space provides several benefits to the public including a sense of place and regional identity. Open space also promotes local and traditional industries such as agriculture, forestry and tourism. Traditional village centers and country sides are delineated by open space which in turn contribute to the beauty of the scenery and provide opportunities for recreation. Large tracts of open space tend to include areas of significant wildlife habitat and a capacity to maintain high-quality surface waters. Most of Hartford is forested and much of it is conserved from future development. Additionally, open spaces are undeveloped and experience some pressure to develop.

**TABLE IX-3  
TOWN OF HARTFORD OPEN SPACE**

<u>Name/Description</u>	<u>Location</u>	<u>No. Acres</u>
<b><u>Undeveloped Open Space</u></b>		
Hartford Town Forest	Reservoir Road	423
Hurricane Forest Wildlife Refuge Park	Wright Reservoir Road	142
Maanawaka Conservation Area	Route 5 North	21
David Chang Conservation Area	Route 4	6.5
Town VA Cutoff Road Property	Behind Fire Station	50
Town-owned former Computac Property	Old River Road	15
Dewey's Mills Property	Dewey's Mills Road	5.3
	<b>Subtotal</b>	<b>662.8</b>
<b><u>Developed Open Space</u></b>		<b><u>Acres</u></b>
Maxfield Property	Route 5 South	50.6
Lyman Point Park	Bridge Street	1
Frost Park	Wilder	2
Ratcliffe Park	North Elm Street	9
Watson Memorial Field	Main Street, Hartford	8
Quechee Green	Quechee	1.1
Clifford Park	Quechee/West Hartford Road	12
Fred Briggs Park	Main Street	<u>.2</u>
	<b>Subtotal</b>	<b>83.9</b>
	<b>Total</b>	<b>746.7</b>

Source: Town of Hartford, Dept. of Planning and Development Services, Recreation Dept. and Listers Office, 2018

Table IX-5 on the following page illustrates all lands held for natural and open space conservation. Total conserved land in Hartford, including parks and recreation areas totals

6,052.9 acres. This accounts for 20.6% of the Town. Consequently, a substantial portion of existing open space in Hartford is within private properties and is not being actively conserved. The Hartford Conservation Fund may be used to conserve open space. Hartford also enjoys the benefit of significant State and Federal open space lands, as well as lands owned by semi-public concerns, such as the Quechee Lakes Landowners Association (QLLA).

The Current Use Program began in Vermont in 1980. The Program allows forest and agricultural lands to be appraised at a lower rate set by the State. This property tax and land management program was developed in response to rising property taxes. Property enrolled in Current Use Program has a lien on the property for as long as the property participates in the Program. Land taken out of the Current Use Program must pay a land use change tax of 20%. Although the Current Use Program provides an economic incentive for land to remain in forestry and agricultural use, unlike a conservation easement, it is not a method of permanent protection. Land in Hartford that is enrolled in the Current Use Program in 2018 accounts for 5,942 acres, or 20.2% of the Town. Of that, 4,776 acres are forest lands, and 1,166 acres are agricultural lands. Since 2006, land enrolled in current use has increased 30%. Forest lands in current use have increased 36% while agricultural lands in current use have increased 11%.

### **Present Threats to Open Space and Greenways**

The majority of open spaces in Hartford are private, undeveloped lands with secondary-growth forest cover. The chief threat to maintain open spaces in their present form is the pressure of new development. Development alters the physical state and basic character of the land and space and can result in fragmentation of natural habitats, greenways, and open spaces. Strategic placement of cell towers, fiber optic cable and other utility structures requires a sensitive balancing of the facilities required to support steady, sustainable growth with the need to preserve and protect the essential functioning of natural habitats, open spaces, and greenways that are integral to the Town’s rural identity and character.

To address these concerns, the 2007 Town Plan developed several recommendations to encourage development in-town where the infrastructure is in place and simultaneously reduce density in the rural areas of Hartford. In addition, the Plan recommended three overlay districts (Rural Lands, Agriculture and Wildlife Connector) to carefully review development proposals to protect natural resources and rural character. These recommendations were implemented in 2008 with amendments to the Zoning Regulations and in 2016 with the updated Subdivision Regulations.

**TABLE IX-4  
NON-TOWN-OWNED SIGNIFICANT OPEN SPACE HOLDINGS**

<u>Owner/Name</u>	<u>Location</u>	<u>Acreage</u>
North Hartland Reservoir (U.S. ACOE)	Quechee Gorge/Ottauquechee Floodplain	760
Quechee Gorge State Park (VT)	Quechee	76
Wilder Dam Lands	Wilder	89
Quechee Lakes Landowners Association	Quechee	1,939



(QLLA) Greenbelt and wildlife areas		
QLLA Lake Pinneo	Quechee	55
QLLA Deweys Mills Pond and surrounding Marshland, Murphy Farm	Quechee	321
QLLA, Golf Courses/Nordic Center	Quechee	263.8
QLLA, Polo Field	Quechee	54
QLLA, Downhill Ski Area	Quechee	73
QLLA Deeryard	Quechee	780
Sterling Springs Deeryard	Rural South	30
Hemlock Ridge Deeryard	Rural North	93.8
Brookside Farm Conservation Easement	Wilder	174
Taylor Conservation Easement	Quechee	251
Wilson Conservation Easement	Jericho	6
Copeland Conservation Easement	Quechee	25
QL Resorts Conservation Easement	Quechee	34.6
QL Resorts Conservation Easement	Quechee	10
Bray Conservation Easement	Jericho	20
Appalachian Trail	West Hartford	<u>251</u>
	<b>Total</b>	<b>5,306.2</b>
<b>COMBINED TOWN AND OTHER HOLDINGS TOTAL OPEN SPACE ACRES:</b>		<b>6,052.9</b>

Source: Town of Hartford Listers Office 2018

## GOALS, STRATEGIES AND ACTIONS

**Goal 1: Preserve and enhance Hartford’s natural resources and environmental features and protect these features from the impacts of development.**

**Strategy 1: Encourage preservation and restoration of wildlife corridors, wetlands, riparian areas, large intact contiguous forest blocks and agricultural resources.**

### Actions:

- a. Ensure that any permitted alterations to wetlands do not significantly diminish their functional, ecological, or aesthetic values; comment on applications submitted to the Vermont Wetlands Office as necessary to ensure the above.
- b. Continue to encourage urban infill in established settlement areas and discourage development in outlying areas.

**Strategy 2: Promote best management practices to address surface and underground water quality.**

Actions:

- a. Encourage developers to utilize Low Impact Development (LID) site design practices as outlined in the Vermont Low Impact Development Guide for Residential and Small Sites.
- b. Consider regulating areas of earth disturbance such as grading and vegetation clearing on slopes greater than 25%
- c. Consider participation in the Federal Emergency Management Agency (FEMA) Community Rating System (CRS) to lower flood insurance costs for the community.
- d. Review policies and recommendations of the Connecticut River Corridor Management Plan and consider adopting those applicable to Hartford.
- e. Enforce shoreline protection regulations to protect riparian areas.
- f. Assess available geologic information on the two town aquifers identified by United States Geologic Survey and better define the value and threats to these resources such as uncontrolled development, adverse land use patterns, or use of adjacent earth and mineral resources.
- g. Work with landowners abutting Class IV roads in the three core forest areas to voluntarily pursue conversion of Class IV roads to (motorized or non-motorized) trails.
- h. Enforce the overlay district standards.
- i. When development does occur, encourage cluster or planned developments.

**Goal 2: Support extraction and processing of earth resources where such activities are appropriately managed, and the public interest is clearly benefited. Any support shall be balanced against the need to maintain the rural and village character valued by the citizens of Hartford.**

**Strategy 1: Consider pollution, noise and vehicle traffic as part of the decision-making process when reviewing proposed gravel, gravel or any other earth resources extraction projects.**

Actions:

- a. The following considerations shall be taken into effect when planning, constructing, or managing an extraction project:
  1. Minimize any adverse impact to existing or planned uses within the vicinity of the project site;
  2. Minimize interference with the function and safety of existing road systems serving the project site;
  3. Minimize any adverse effects on drainage, erosion, water quality, fish and wildlife habitats, view-sheds, and adjacent land uses;
  4. Reclaim and re-vegetate site following extraction;
  5. Minimize noise impacts on adjacent uses including residential areas; and
  6. Maintain the rural and village character of Hartford.
- b. Earth resource extraction shall conform to the rules set forth in the Hartford Zoning Regulations.

**Goal 3: Protect and enhance the ecological integrity of Hartford’s natural communities and wildlife habitats.**

**Strategy 1: Prevent the spread of invasive species.**

Actions:

- a. Cooperate with private, local, state, and federal groups to address the threat of invasive species and raise public awareness.
- b. When possible, involve Town personnel to control invasive/non-native species on Town properties and road rights-of-way.

**Strategy 2: Maintain and enhance the rural and urban forest cover.**

Actions:

- a. Complete the tree inventory.
- b. Develop a comprehensive plan for street trees to ensure an increase in tree stock, species diversity, and appropriate plantings.
- c. Encourage Town capital projects to include appropriate consideration of the benefits of street trees and an enhanced urban forest cover.
- d. Continue participation in the Tree City USA program.
- e. Seek grants to fund public tree planting.
- f. Ensure that the forestry and recreation management plans for the Hartford Town Forest and Hurricane Forest Wildlife Refuge Park are periodically updated and fully implemented.
- g. Identify, inventory and map existing core wildlife habitat areas, significant plant communities and aquatic habitat, together with desired greenway alignments. This effort has three parts:
  1. Regularly collect and review existing data on rare and endangered species and communities from the State of Vermont's Department of Fish and Wildlife's Nongame and Natural Heritage Program.
  2. Establish permanent wildlife monitoring locations. Coordinate a town-wide inventory of significant plant communities and fish and wildlife resources in collaboration with consultants from the State of Vermont.
  3. Encourage conservation of contiguous properties to maintain the connecting links and corridors for wildlife.
- h. Adopt Fluvial Erosion Hazard regulations for all watercourses where the Vermont Agency of Natural Resources has mapped the fluvial erosion hazard.
- i. Promote acquisition of land and/or conservation easements for sensitive natural areas, valuable open space lands, core habitats and other conservation projects through:
  1. Support and collaboration with state and federal agencies, conservation groups and developers.
  2. Annual funding of the Town’s conservation fund.

**Goal 4: Enhance the appreciation of Hartford’s natural environment.**

**Strategy 1: Promote, sponsor, and organize events that connect residents to the natural environment.**

Actions:

- a. Continue to host Conservation Commission sponsored events and collaborate with Hartford Parks and Recreation Department.

**Goal 5: Encourage the enjoyment and participation of Hartford residents in the outdoors.**

**Strategy 1: Create opportunities for recreation, preserve scenic beauty and the quality of life of residents related to trails, greenways, open space including agricultural lands, and air quality.**

**Actions:**

- a. Work with nonprofit and volunteer organizations, neighboring towns and private landowners to develop a system of trails that link with the Appalachian Trail, Hartford Town Forest, parks, schools, downtown, regional trail systems and greenways.
- b. Support state and federal programs directed at the reduction of air pollution.
- c. Collaborate with neighboring towns to develop regional greenways.
- d. Coordinate greenway planning with new development proposals so that quality open space is preserved within new development and that open space connects with neighboring open space.
- e. Consider hiring a consultant to update Scenic Resources Inventory.
- f. Continue to participate in the Connecticut River Scenic Byway and the Crossroads of Vermont Scenic Byway Program.
- g. The Town should actively participate in the Vermont Public Service Board's Certificate of Public Good process for permitting telecommunication facilities and solar and wind energy facilities.
- h. The siting of solar and wind-energy facilities must be carefully evaluated to mitigate impacts.
- i. Follow the guidelines set forth in the Vermont Scenic Landscapes: A Handbook for Growth and Protection, by the Vermont Agency of Natural Resources for development projects that are not within Scenic Areas.

**Goal 6: Maintain and enhance Hartford's heritage of working farm and forest lands as part of a sustainable, environmentally sound, resource based-economy.**

**Strategy 1: Promote sustainable farms and forests throughout the rural areas of Hartford.**

Actions:

- a. Explore ways to promote and support sustainable farming and forestry.
- b. Support the agricultural and forestry economy of Hartford. Explore opportunities for expanding the production of agricultural-based and value-added products.
- c. Continue to encourage clustered development in the Hartford Zoning Regulations and Subdivision Regulations to avoid impacting agricultural and forestry resources
- d. Produce information on the opportunities and challenges of solar installations on more marginal land as a source of income for farmers and forestland owners.

**Strategy 2: Encourage the preservation of prime agricultural soils and viable tracts of productive farmland.**

Actions:

- a. Promote landowner participation in the state's current use program.
- b. Actively promote use of the Town Conservation Fund to assist in the purchase of conservation easements for productive agricultural land.
- c. Work with local and regional land trusts to assist interested landowners with information about conservation easements.
- d. Consider creating economic incentives in addition to the state's agricultural current use appraisal program to assist landowners in preserving the Town's remaining agricultural lands.
- e. Encourage developers to permanently preserve Hartford's agricultural lands through the purchase of conservation easements on or off-site.

**Strategy 3: Encourage the conservation of working forestlands and the use of management practices that enhance forest health and long-term productivity.**

Actions:

- a. Promote landowner participation in the state's current use program.
- b. Manage town forests and other forested public land in accordance with best practices to conserve and maintain them as a long-term resource.
- c. Work with local and regional land trusts to assist interested landowners with information about conservation easements.

**Strategy 4: Create awareness, understanding and support of farm, forestry and rural enterprises based within Hartford.**

Actions:

- a. Consider the concerns and needs of local resource-based industries, including farming and forestry, and other stakeholders.
- b. Review the Hartford Zoning Regulations and Subdivision Regulations to determine ways to encourage agriculture and forestry businesses in Hartford.
- c. Work with the Hartford Area Chamber of Commerce and the Green Mountain Economic Development Corporation to promote and support local agricultural and forestry businesses.
- d. Create an environment which encourages the establishment of new farm operations or the re-establishment of shuttered farm operations.
- e. Utilize the expertise of regional and statewide organizations to identify parcels suitable for new farming operations, and for matching interested prospective farmers with landowners open to restoring farm operations on these parcels.
- f. Work with the Green Mountain Economic Development Corporation and other organizations to incentivize value-added agricultural and forest products.



# CHAPTER X

## ENERGY

### INTRODUCTION

The purpose of a Vermont town energy plan is to guide actions that will reduce overall energy consumption, reduce greenhouse gas (GHG) emissions, and plan for in-Town generation of energy from renewable sources, as outlined in Act 174.<sup>1</sup> If a town's energy plan complies with the Act 174 requirements, that town is granted "substantial deference"\* in evaluating applications for the siting of renewable energy projects within its borders. The goals and targets of the energy plan are largely specified by the State and Regional Commission, as outlined in Act 174, the VT Comprehensive Energy Plan (CEP) of 2016<sup>2</sup> and the Two Rivers Ottauquechee Regional Commission's (TRORC's) Regional Energy Improvement Plan (REIP).<sup>3</sup>

Hartford faces a substantial challenge in meeting its energy goals. The overarching goals of the VT CEP relate to the benchmark of GHGs emitted in 1990: "40% reduction below 1990 levels by 2030, and 80% to 95% reduction below 1990 levels by 2050".<sup>4</sup> Between 1990 and 2015, however, Vermont's GHG emissions *increased* by approximately 16%, adding to the difficulty of achieving the CEP interim goals (see Figure 1).<sup>5</sup>

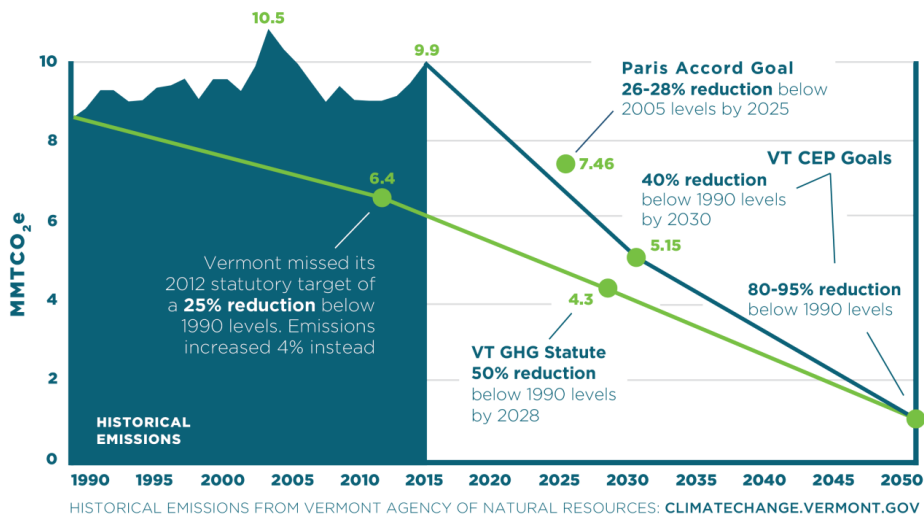


Figure 1 – Vermont's Historical GHG Emissions vs. Emissions Targets<sup>6</sup>

<sup>1</sup> No. 174. An Act Relating to Improving the Siting of Energy Projects. S. 260. 2016.

<https://legislature.vermont.gov/assets/Documents/2016/Docs/ACTS/ACT174/ACT174%20As%20Enacted.pdf>

<sup>2</sup> Vermont Department of Public Service. *Comprehensive Energy Plan 2016*.

[https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP\\_Final.pdf](https://outside.vermont.gov/sov/webservices/Shared%20Documents/2016CEP_Final.pdf).

<sup>3</sup> Two Rivers-Ottawakee Regional Commission. *Regional Energy Implementation Plan: A Pathway to Achieving Vermont's Energy Goals* (July 26, 2017). <https://www.trorc.org/wp-content/uploads/2015/09/Regional-Energy-Implementation-Plan-Adopted-7-26-17.pdf>.

<sup>4</sup> VT DPS. *CEP*. 4.

<sup>5</sup> Vermont Department of Environmental Conservation, Air Quality and Climate Division. *Vermont Greenhouse Gas Emissions Inventory Update: Brief 1990 – 2015* (June 2018). [https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/\\_Vermont\\_Greenhouse\\_Gas\\_Emissions\\_Inventory\\_Update\\_1990-2015.pdf](https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/_Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990-2015.pdf)

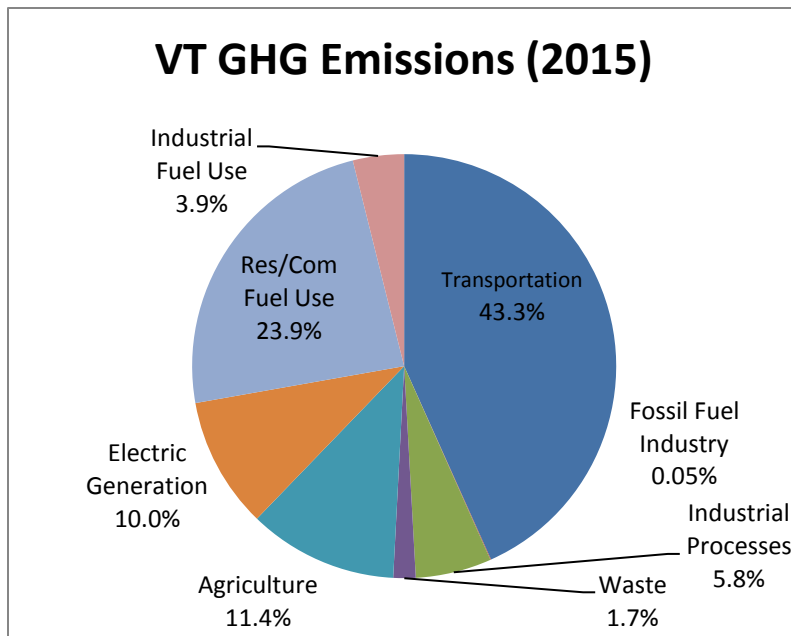
<sup>6</sup> Energy Action Network. *Annual Report 2017*. <http://eanvt.org/2017annualreport/>

Hartford alone cannot solve climate change or any of the other environmental crises facing us today, but what we can do by implementing this plan is to create a model for rural communities that others will want to emulate.

Hartford’s goals are ambitious, and will require major behavioral changes on the part of all Town residents. Yet the work required to achieve these goals should not be seen as a burden or sacrifice, but rather as an opportunity. Since energy costs represent a significant portion of household and municipal spending, ongoing cost savings can be a significant incentive for all residents and the municipality to reduce GHG emissions. Furthermore, if implemented effectively this plan will help Hartford achieve the aspirations identified in its 2018 “Strategic Vision for the Future of Hartford, Vermont” (“the Strategic Vision”).<sup>7</sup> In addition to its goal of “Environmental Sustainability”, most of the other aspirational goals laid out in the Strategic Vision are addressed in this energy plan; namely “Equitable Opportunities”, “Strong and Stable Local Economy”, and “Functional Infrastructure”.

## STRUCTURE OF THIS CHAPTER

The energy used to power transportation and building conditioning (heating/cooling) accounts for two-thirds of the GHG emissions in Vermont (see Figure 2). For this reason, one section of this chapter has been devoted to transportation and another to building integrity. The final two sections address meeting renewable energy generation targets and the criteria for siting renewable energy installations.



**Figure 2** – Based on figure from VT DEC, GHG Emissions Inventory Update, 6.

The Transportation, Building Integrity, and Renewable Energy sections each include the following:

- Overview (considerations related to the sector)
- Opportunities and challenges (factors promoting, or challenging, success)
- Goals (measurable targets; green boxes)
- Strategies (ways to confront the challenges noted)
- Actions (specific tasks to be undertaken)

The goals in this plan are all either directly prescribed by the State of Vermont or TRORC (i.e. Goals T1, T2, T3, BI1, BI2, BI3, and RE2), or are based on, and aligned with, the state and regional goals (i.e. T3, BI1, BI2). Goal RE1 is a Hartford-specific goal, and RE2 is more aggressive than VT’s

\* Substantial deference in this case means that when an application is reviewed by the Public Utility Commission, the town’s policies “shall be applied in accordance with its terms unless there is a clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy” (Vermont Legislative Council. *Definitions of “Substantial Deference”*, April 29, 2016).

<sup>7</sup> Town of Hartford Selectboard. *Strategic Vision for the Future of Hartford, Vermont* (October, 2018).

<https://www.hartford-vt.org/DocumentCenter/View/1622/Strategic-Vision-for-the-Future-of-Hartford--Approved>

goal of 90% renewable energy by 2050. All of Hartford’s “targets” are prescribed and determined based on analysis completed by TRORC. While many of Hartford’s energy targets are included in the body of this chapter, a complete list of Hartford’s targets, as well as estimates of current energy use across all sectors, is included as Appendix B.

The planning horizon for this chapter extends to 2050, consistent with the Vermont State energy goals. However, the intention of this version of the energy plan is to establish the trajectory toward achieving 2050 goals while focusing on interim goals and actions planned for roughly the next decade.

## RESULTS FROM THE TOWN PLAN COMMUNITY FORUMS

The “Opportunities”, “Challenges”, “Strategies”, and “Actions” in this plan were largely developed through a process of public engagement and participation. This included an Energy and Transportation Community Forum, held on June 25, 2018, as well as three sector-specific working groups – one for transportation, one for building integrity, and one for renewables. As noted above, these three sectors are covered in detail throughout the remainder of this chapter. The working groups used the input received at the Community Forum as a starting point to conduct more research and prioritize recommendations. These recommendations then served as the basis for the writing of the chapter.

## TRANSPORTATION

### OPPORTUNITIES AND CHALLENGES

#### Hartford Transportation Facts:

For each vehicle, Hartford commuters spend \$1,410 for gas and drive 11,356 miles annually.<sup>8</sup>

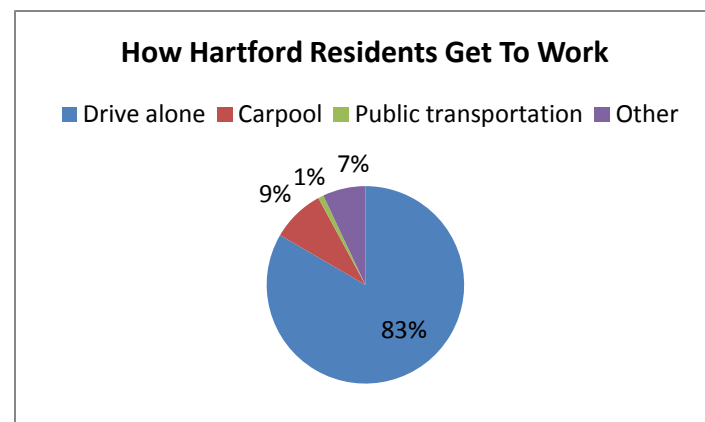
Travel by private automobile is ingrained in our culture. Decades of cheap fossil fuel, vast land area, land use policies that do not take into account transportation emissions, low population density, and aggressive lobbying on the part of the fossil fuel and auto industries have produced our current auto-centric culture with high demands for mobility and autonomy.

Hartford residents have very real transportation needs – getting to work, school, stores, clinics and so on. The tempting solution to reducing fossil fuel and total energy demand for transportation is to replace gas and diesel fueled vehicles with their electric counterparts (“fuel switching”). Electric vehicles (EVs) can be powered by renewable energy and are significantly more efficient (for example, an all-electric vehicle is approximately 4 times as efficient as a gas powered vehicle). With additional renewable electricity generation and EV charging station

infrastructure, Hartford residents could replace many of their vehicles in the next decade or two.

However, simply fuel switching while continuing to rely on our current model for transportation – primarily trips in single-occupant vehicles (SOV) – is not sustainable for reasons including the following:

- Fuel switching will result in a reduction in GHG emissions and energy use, but does nothing to address traffic volume and



Source: U.S. Census Bureau. *Commuting and Employment Data, Table 4* (April 25, 2017). <https://www.census.gov/data/tables/2010/demo/metro-micro/commuting-employment-2010.html>

the resulting side effects. As population continues to grow in Hartford, so too will the number of vehicles on the road without a targeted focus on reducing SOV trips.

- Fuel switching does not address a growing demand for vehicles, thus ignoring the unsustainable resource extraction needed to meet this demand for vehicles. The raw (and in some cases scarce) materials needed to produce vehicles such as steel, aluminum, glass, plastic, and rubber, necessitate a dependence on polluting and energy intensive industries.
- A continued dependence on SOV-based transportation would mean that household expenses for private vehicle ownership will remain a burden for Hartford residents. While EVs have significantly lower operational costs than internal-combustion engine vehicles, ownership still requires loan or lease payments, insurance payments, and continued operational expenses.
- It requires more energy to power a transportation system dependent on SOVs than it does to power a system dependent on shared transportation, regardless of the fuel powering that system. Thus, the energy required to power a SOV-based transportation system will consume a larger and ever expanding land area (to site renewable energy facilities) compared to its shared system alternative.

This plan recognizes that fuel switching (the use of non-fossil fuel) is part of the solution, particularly in the short-term as other services ramp up, and for non-private vehicles (those used by transit and delivery services and tradesmen, for example). This plan also recognizes the long-term benefits of altering land use policy to reduce vehicle miles traveled and transportation energy demand. Most importantly, public transit and other shared forms of transportation are critical to reducing GHG emissions, energy demand, and to making transportation more affordable and sustainable for Hartford commuters.

Public transit and other forms of shared transportation, supported by strategic land use policies and augmented by fuel switching, are the most effective ways for Hartford to improve the sustainability of its transportation.

Hartford and Upper Valley communities have the resources and technology to deliver efficient, affordable, safe, convenient public and shared modes of transportation. The biggest challenges in making this shift are the necessary behavioral and cultural changes and coordinating efforts among groups of individuals and organizations.

Developing a shared transportation system that meets the needs of Hartford residents and addresses the concerns in the

bulleted list above will be expensive. But considering the expense of the current modes of transportation, there is ample incentive to make the change. Consider the following: According to the 2016 Vermont Basic Needs Budget, transportation expense for rural families with a single parent and one child is \$516 per month (\$1,019 per month for rural families with two adult wage earners).<sup>9</sup> Hartford has 4,483 year-round households with a mean of 2.22 persons per household.<sup>10</sup> Using expense data from the 2016 Vermont Basic Needs Budget (\$516-\$1,019 per household each month) we can estimate that *Hartford commuters are spending between \$27 and \$54 million on transportation annually.*<sup>11</sup> Since approximately 83% of residents are commuting by single occupancy vehicle, the bulk of this expense is for loan/lease payments, fuel, insurance, and maintenance of private vehicles. By contrast,

<sup>9</sup> Vermont Legislative Joint Fiscal Office. *Basic Needs Budgets and the Livable Wage* (January 15, 2017). <https://legislature.vermont.gov/assets/Documents/2018/WorkGroups/House%20Ways%20and%20Means/Basic%20Needs%20Budgets/W~Sara%20Teachout~Basic%20Needs%20Budgets%20and%20the%20Livable%20Wage~1-25-2017.pdf>.

<sup>10</sup> United States Census Bureau. Decennial Census, 2010 Demographic Profile Data: *Profile of General Population and Housing Characteristics: 2010* (April 1, 2010).

<sup>11</sup> VT JFO. *Basic Needs Budgets*. 2017.

in the most recent budget Hartford voters approved only \$77,050 to fund Advance Transit, and Advance Transit's budget for the same year was a little over \$4.5 million.

With public and shared transportation there is enormous potential for easing the burden on commuters' pocketbooks while moving Hartford toward reaching transportation goals defined in the State CEP and TRORC REIP.

The three goals in this sector share opportunities as well as challenges.

*Opportunities include:*

- significant reduction in overall GHG emissions from vehicles;
- less air and noise pollution especially in downtown areas;
- potential to reduce transportation expense for Hartford commuters and, by extension, money that leaves the State for vehicles and fossil fuel;
- partnership with neighboring VT and NH towns with similar energy goals, including towns that have adopted the Sierra Club Ready for 100% Clean Energy pledge;
- reduced traffic at chokepoints which in turn makes shared and public transit more efficient;
- less demand for parking in downtown areas;
- health benefits of self-propelled transportation (e.g. walking/biking);
- decreasing purchase price and cost of ownership of electric vehicles (EVs); and
- social benefits of public transit<sup>12</sup>

*Challenges include:*

- lack of public awareness of high GHG emissions related to transportation proportional to VT's overall GHG emissions;
- dispersed population;
- habit of using personal vehicles;
- diversity of transportation needs and preferred timing;
- expense and complexity of developing public shared transportation system capable of meeting diverse needs;
- design challenges (space, right of ways, etc.) and high cost of implementing "Complete Streets";<sup>13</sup>
- preference of many residents to live remotely;
- inability of many residents to walk/ride bicycles;
- lack of local dealerships selling/servicing EVs; and
- small number of public EV charging stations

## TRANSPORTATION: GOALS, STRATEGIES, AND ACTIONS

---

<sup>12</sup>Litman, Todd. *Evaluating Public Transportation Health Benefits* (June 14, 2010). Victoria Transport Policy Institute.

[https://www.apta.com/resources/reportsandpublications/Documents/APTA\\_Health\\_Benefits\\_Litman.pdf](https://www.apta.com/resources/reportsandpublications/Documents/APTA_Health_Benefits_Litman.pdf)

<sup>13</sup>Smart Growth America. *What Are Complete Streets?* <https://smartgrowthamerica.org/program/national-complete-streets-coalition/publications/what-are-complete-streets/>



**GOAL T1: REDUCE THE NUMBER OF SINGLE OCCUPANCY VEHICLE (SOV) TRIPS BY AT LEAST 20% BY 2030**

**Hartford's Targets – Goal T1**

Hartford needs to meet the following targets for number of residents commuting by mode:

Mode of commuting	2020	2030	2040
SOV	3,607	2,791	2,149
Carpool	613	825	1,099
Public Trans.	71	680	999
Other Means	424	558	750



**What can you do?**

Shared transportation is one of the best ways to cut back on emissions from transportation. Consider taking Advance Transit (AT) to work or to the store – the best part: it's free! If you don't live close to an AT route, try carpooling or go a step further and start a vanpool. You can save big through Go! Vermont (<https://www.connectingcommuters.org/vanpool/>) when you commute to work with 5+ people.

**STRATEGY 1: PUBLIC EDUCATION AND OUTREACH**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Launch public education campaign (outreach to community groups, signs, official Town communications, social media posts) concerning high % of VT GHG emissions related to transportation, and cost savings related to public and shared transportation options.</li> <li>2. Investigate possible public education collaborations with neighboring towns, energy committees, and statewide organizations such as Vermont Energy and Climate Action Network, Vermont Transportation Efficiency Network, and Upper Valley Transportation Management Association.</li> </ol>
----------------	--

**STRATEGY 2: DEVELOP/EXPAND RIDESHARING OPTIONS THAT USE EXISTING VEHICLES**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Develop a ridesharing system for the Quechee area (not currently served by Advance Transit).</li> <li>2. Create a publicized regional system of "mini" (2-3 vehicle) park and ride areas on participating/approved business lots, private land, and DOT rights-of-way.</li> <li>3. Investigate possibility of non-school-hour use of Town's leased school buses for nonstudent transportation.</li> <li>4. Pilot a neighborhood-based ridesharing effort, with supportive scheduling software.</li> <li>5. Promote the use of the existing car-sharing effort in downtown White River Junction, and continue to develop the program (i.e. secure more vehicles specifically for car-sharing in White River Junction and expand the program to other village centers).</li> <li>6. Publicize non-vehicular regional transit options (e.g. inter-city trains). Once more non-SOV options are available, limit and charge for parking in downtown to discourage private vehicle use.</li> <li>7. Once more non-SOV options are available, encourage businesses to develop ridesharing benefits for their employees.</li> </ol>
----------------	---

**STRATEGY 3: EXPAND PUBLIC TRANSPORTATION OPTIONS**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Provide substantial monetary support for public transportation, including Advance Transit.</li> <li>2. Consider adopting recommendations from Advance Transit’s Transit Development Plan (TDP) and other regional transportation studies.</li> <li>3. Pursue transportation collaborations with neighboring towns’ population centers.</li> </ol>
----------------	---

**STRATEGY 4: EVALUATE, PUBLICIZE AND REVISE PLAN**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Evaluate progress against goal annually and revise plan as needed</li> <li>2. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li> <li>3. Report progress publicly (in annual Town report, for example)</li> </ol>
----------------	---

**GOAL T2: HOLD VEHICLE MILES TRAVELLED (VMT) PER CAPITA TO 2011 LEVELS**

**Hartford’s Target – Goal T2**

Goal T2: Hartford residents drove on average 11,356 miles in 2011 (per capita vehicle miles travelled [VMT])

**STRATEGY 1: SUPPORT MIXED-USE DEVELOPMENT CLOSE TO TOWN CENTERS**

<b>Action</b>	<ol style="list-style-type: none"> <li>1. Continue to support Downtown- and Village Center-focused mixed use development.</li> <li>2. Continue to exercise transportation demand management, defined as “a broad set of strategies that reduce single occupancy vehicle travel in favor of biking, walking, taking transit, car/vanpooling, and telecommuting.”<sup>14</sup> Refer to the Upper Valley Transportation Management Association’s “Mobility Checklist” when reviewing development proposals.<sup>15</sup></li> </ol>
---------------	---

**STRATEGY 2: PROMOTE AND SUPPORT NON-VEHICULAR TRANSPORTATION**

<b>Action</b>	<ol style="list-style-type: none"> <li>1. Continue Town policy of developing “Complete Streets” when feasible, to make walking/bicycle riding safer.</li> </ol>
---------------	---

**STRATEGY 3: MODEL MINIMIZING VEHICLE MILES TRAVELLED**

<b>Action</b>	<ol style="list-style-type: none"> <li>1. Implement Town policies to reduce municipal fleet miles travelled.</li> </ol>
---------------	---

<sup>14</sup> Vital Communities and RSG. *Downtown White River Junction Parking Study* (May 31, 2017). <https://www.vitalcommunities.org/transportation/wp-content/uploads/sites/3/2018/09/WRJ-Downtown-Parking-Study-Final-Report-VC-RSG-5-31-17.pdf>

<sup>15</sup> Upper Valley Transportation Management Association. *Mobility Checklist: Guidelines for Efficient, Livable Communities* (2014).

**STRATEGY 4: EVALUATE, PUBLICIZE AND REVISE PLAN**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Evaluate progress against goal annually and revise plan as needed</li> <li>2. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li> <li>3. Report progress publicly (in annual Town report, for example)</li> </ol>
----------------	---

**GOAL T3: SUPPORT USE OF LOW-EMISSIONS VEHICLES**

<b>Hartford's Target – Goal T3</b>			
	<b>2025</b>	<b>2035</b>	<b>2050</b>
<b>% of Hartford vehicles powered by electricity</b>	5	38	82

**STRATEGY 1: BECOME AND REMAIN A MODEL FOR ENERGY-EFFICIENT TRANSPORTATION**

<b>Action</b>	<ol style="list-style-type: none"> <li>1. Revise Town purchasing and use policies for vehicles to support purchase and use of lowest emission vehicles and equipment, taking into account lifecycle costs.</li> </ol>
---------------	---

**STRATEGY 2: ENCOURAGE BUSINESSES AND RESIDENTS TO SWITCH TO LOW-EMISSIONS VEHICLES**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Install, and encourage others to install, EV charging stations in high-use locations.</li> <li>2. Increase availability of public information on and demonstration of low-emissions vehicles;</li> <li>3. Encourage regional car dealerships to sell and care for electric vehicles.</li> </ol>
----------------	---

**STRATEGY 3: EVALUATE, PUBLICIZE AND REVISE PLAN**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Evaluate progress against goal annually and revise plan as needed.</li> <li>2. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li> <li>2. Report progress publicly (in annual Town report, for example).</li> </ol>
----------------	---

**BUILDING INTEGRITY**

Heating buildings generates about 24% of Vermont’s greenhouse gas emissions. In addition, buildings need energy to meet other needs, including cooling, lighting, and powering appliances, all associated with further GHG emissions (captured under “Electric Generation” in Figure 2). Vermont CEP goals (reduce total energy consumption by one-third, meet 90% of remaining energy requirements from renewable sources, and reduce greenhouse gas [GHG] emissions by 90% by 2050) require both reducing the energy used for heating and cooling buildings, and using renewable (non-fossil) fuels to achieve building comfort. Given the severity of Vermont’s winter climate, maintaining comfortable buildings is essential to the health and comfort of Hartford residents.

The three goals in this sector share opportunities as well as challenges.

*Opportunities include:*

- making progress towards Vermont’s energy goals in proportion to Hartford’s population;
- generation of less pollution, in particular less air pollution, resulting from the combustion of fossil fuels;
- long-term savings on energy for Hartford households and businesses;
- lower energy burden, especially for low- and moderate-income households; and
- highest energy efficiency gains at the least cost for new construction and major renovations

*Challenges:*

- age/quality of existing housing stock;
- upfront capital cost of energy efficiency upgrades and deep energy retrofits;
- lack of awareness about the available incentives and financing opportunities;
- little incentive for landlords to invest in building efficiency when tenants pay for utilities;
- inability to enforce building codes because of lack of building inspectors;
- no requirement for landlords and realtors to show energy costs when renting/selling a unit;
- measuring progress toward the goals;
- meeting the increase in demand for electricity with renewable energy;
- long life cycle of heating and cooling equipment, which limits opportunity to install new systems; and
- few Home Performance with ENERGY STAR (HPWES) contractors in the region

**GOAL BI1: REDUCE ENERGY USE IN BUILDINGS BY ONE-THIRD BY 2050**

Achieving this goal is possible through both efficiency and conservation measures.

The acceptance of cooler buildings in winter and warmer buildings in summer offers opportunities for energy savings. However, weatherization, a loosely defined term that generally refers to air sealing and insulating existing building structures to reduce their energy requirements, allows occupants to be more comfortable in all seasons, while simultaneously saving energy.

Hartford, like most of Vermont, has older housing stock. One-fifth of houses in Hartford were built before 1930, and nearly 95% of homes were built before 2000.<sup>16</sup> Minimal or no insulation and air sealing in many older homes presents a significant challenge for reducing energy consumption in buildings. As of 2017, only 2.4 – 5.2% of Hartford’s housing stock (about 220 homes) had been weatherized.<sup>17</sup> This is a largely untapped area for improvement in Hartford and should be prioritized.

<b>Hartford’s Targets – Goal BI1</b>			
<b>Thermal Efficiency Targets – Structures to be weatherized</b>			
	<b>2025</b>	<b>2035</b>	<b>2050</b>
Residential	1,940	3,900	5,816
Commercial	25	37	73

<sup>16</sup> Town of Hartford. *Master Plan* (May 27, 2014). <https://www.hartford-vt.org/DocumentCenter/View/216/Hartford-Master-Plan-2014-PDF>

<sup>17</sup>TRORC. *REIP*. 2017.

### What can you do?

Having an energy audit performed by a Home Performance with ENERGY STAR (HPwES) professional is the best way to learn about the most effective steps you can take to reduce energy use in your home. Even if you decide to do some or all of the work yourself, HPwES professionals are trained to look at your home holistically and make prioritized recommendations that will have the biggest and/or quickest payback, while avoiding introducing problems like mold, poor air quality, etc. In addition, your contractor can inform you about the significant incentives and low-interest financing available to make improvements more affordable. Check out [Efficiency Vermont's Find a Contractor tool](#) to find the right contractor for you.



Because there are varying degrees of “weatherization”, from simple DIY measures to comprehensive whole-home retrofits performed by Home Performance with ENERGY STAR certified contractors, it’s likely that meeting the above weatherization targets alone will not achieve Goal B1.1. It is important to recognize that weatherization is a means to an end – **reducing energy consumption in Hartford’s buildings is the goal**, and weatherization is one pathway to achieving this. Hartford’s ability to achieve the above targets should be viewed as one indicator of success, rather than the measure of success itself. Nonetheless, meeting the weatherization targets is an important step towards Goal B1.1, and comes with co-benefits such as improved comfort for building occupants.

## STRATEGY 1: MAKE CAPITAL AVAILABLE TO HARTFORD RESIDENTS AND BUSINESS OWNERS FOR ENERGY EFFICIENCY PROJECTS.

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Establish revolving loan fund or green bank, considering prudent repayment plans that minimize debt and risk for the borrower, starting with a fund for income-qualified homeowners. Income-qualification should be tied to a Vermont/federal standard.</li><li>2. Expand revolving loan fund or green bank to include loans and/or incentives to non-income-qualified residents, businesses, and landlords.</li><li>3. Work with Green Mountain Power to leverage on-bill financing (i.e. the utility incurs the cost of an energy efficiency upgrade, and the customer repays the utility through a charge on their utility bill).<sup>18</sup></li></ol>
----------------	--

## STRATEGY 2: PROVIDE INFORMATION RESOURCES TO RESIDENTS AND BUSINESSES

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Establish education program for loan/incentive applicants to help ensure successful energy efficiency projects</li><li>2. Work with the Hartford School District to include education about energy in the curriculum, and establish a “Green Impact Campaign” to get students working with businesses to reduce their energy consumption.*</li><li>3. Provide education and outreach to builders on energy saving construction methods including net-zero construction.</li><li>4. Track residential and commercial heating fuel use in Hartford.</li></ol>
----------------	--

<sup>18</sup>U.S. Department of Energy, State and Local Solution Center. *On-Bill Financing and Repayment Program*, <https://www.energy.gov/eere/slsc/bill-financing-and-repayment-programs>

\* Green Impact Campaign is a 501(c)3 nonprofit organization that provides students with the skills, training, tools, and resources to conduct energy assessments for local businesses. The mission of Green Impact Campaign is to “better equip the next generation of climate leaders while reducing the environmental impact of small businesses” ( <https://greenimpactcampaign.org/about/>).



### STRATEGY 3: INCENTIVIZE LANDLORDS TO COVER COST OF ENERGY CONSUMPTION

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Require landlords to provide an energy disclosure, a statement of previous occupants' energy usage and expenses, when advertising and leasing properties.</li><li>2. Develop and implement a Town certification program for "Green Landlords" based on the energy efficiency of their rental units. Certification would be a condition of loan award identified in Strategy 1.</li><li>3. Explore other possibilities of incentivizing landlords to weatherize.</li><li>4. Explore the possibility of hiring a part-time building inspector to enforce energy codes.</li></ol>
----------------	---

### STRATEGY 4: SERVE AS A MODEL FOR ENERGY EFFICIENT BUILDINGS

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Develop a schedule to complete weatherization of all municipally owned buildings.</li><li>2. Work with the School Board to develop a similar schedule to weatherize all school buildings.</li></ol>
----------------	--

### STRATEGY 5: USE DATA TO ACCELERATE PROGRESS TOWARDS ACHIEVING GOALS

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Partner with other organizations to track and disseminate data</li><li>2. Study marketing techniques</li><li>3. Develop displays</li></ol>
----------------	---

### STRATEGY 6: EVALUATE, PUBLICIZE AND REVISE PLAN

<b>Actions</b>	<ol style="list-style-type: none"><li>1. Evaluate progress against goal annually and revise plan as needed</li><li>2. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li><li>3. Report progress publicly (in annual Town report, for example)</li></ol>
----------------	---

## GOAL BI2: MEET 90% OF REMAINING HEATING DEMAND FROM RENEWABLE SOURCES BY 2050

Much of this demand will be met by heat pumps, including both ground- and air-sourced heat pumps, powered by electricity. The use of electricity as a heat source is both a move towards renewable heat in the near term and an investment in a greater share of renewable heat for the future. Green Mountain Power (GMP), the utility that serves Hartford, has a largely carbon free electricity generation profile, and as of 2018, 60% of GMP's power sources were renewable.<sup>19</sup> Moving from oil (which is the heat source for close to 50% of Hartford's households) or propane (which serves close to 30% of Hartford's households) to heat pumps would have an immediate and significant impact on Hartford's share of renewable heating. Furthermore, as Hartford moves towards its renewable energy goal of 90% renewable by 2040, the source of power for heat pumps will become increasingly renewable. Because heating systems have long lifecycles (40+ years in some cases), investing in heat pumps today not only immediately reduces GHG emissions and increases Hartford's share of heat provided by renewable sources, but also avoids locking in buildings to decades of continued fossil fuel use. Hartford will need to meet the following targets for installations of heat pumps:

<sup>19</sup> Green Mountain Power. *GMP's Energy Supply is 90% Carbon Free* (December 13, 2018). <https://greenmountainpower.com/2018/12/13/fuel-mix/>.

**Hartford's Targets – Goal BI2**

**Residential and Commercial – Heat Pumps**

	2025	2035	2050
New Heat Pumps (units)	455	1,202	2,518

In addition to heat pumps, Hartford should consider the use of wood systems for central and district heating. While TRORC’s modeling did not produce a target for Hartford for new wood systems, “efficient wood heat systems” are encouraged.<sup>20</sup> More research needs to be completed to determine what is considered “efficient”, and also how much biomass can be sustainably harvested from our region’s forests.

**STRATEGY 1: MAKE CAPITAL AVAILABLE TO HARTFORD RESIDENTS AND BUSINESS OWNERS TO INSTALL HEATING SYSTEMS POWERED BY RENEWABLE ENERGY**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Establish a revolving loan fund or green bank, considering prudent repayment plans that minimize debt and risk for the borrower, starting with a fund for income-qualified homeowners. Income-qualification should be tied to a Vermont/federal standard.</li> <li>2. Expand revolving loan fund or green bank to include loans and/or incentives to non-income-qualified residents, businesses, and landlords.</li> <li>3. Work with Green Mountain Power to leverage on-bill financing (i.e. the utility incurs the cost of an heating system upgrade, and the customer repays the utility through a charge on their utility bill).<sup>21</sup></li> </ol>
----------------	---

**STRATEGY 2: PROVIDE INFORMATION RESOURCES TO RESIDENTS AND BUSINESSES**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Establish an education program for residents and business owners to increase awareness of the benefits of renewably-powered heat.</li> </ol>
----------------	--

**STRATEGY 3: SERVE AS A MODEL FOR MEETING HEATING AND COOLING DEMAND FROM RENEWABLE SOURCES**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Put in place a policy for municipally-owned buildings that replacement heating systems are dependent on renewable fuel sources, with limited exceptions.</li> </ol>
----------------	---

<sup>20</sup> Two-Rivers Ottauquechee Regional Commission. *Municipal Summary Worksheet – Hartford* (April, 28, 2018).

<sup>21</sup> U.S. Department of Energy, State and Local Solution Center. *On-Bill Financing and Repayment Program*, <https://www.energy.gov/eere/slsc/bill-financing-and-repayment-programs>

**STRATEGY 4: SUPPORT EQUITABLE CARBON POLLUTION FEES AT THE REGIONAL AND STATE LEVELS, AND CONSIDER IMPLEMENTING EQUITABLE CARBON POLLUTION FEES IN HARTFORD**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Research carbon pricing proposals at the regional and state levels. Support those that promote the goals of Hartford’s Strategic Vision, or encourage changes to proposals that do not align with the Strategic Vision.</li> <li>2. Initiate a task force to explore the possibility of implementing a carbon pollution fee in Hartford. This task force would work to determine if policies and procedures could be designed to create an effective and manageable (i.e. for Town staff) price on carbon in keeping with the goals of the Strategic Vision.</li> </ol>
----------------	---

**STRATEGY 5: EVALUATE, PUBLICIZE AND REVISE PLAN**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Evaluate progress against goal annually and revise plan as needed</li> <li>2. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li> <li>3. Report progress publicly (in annual Town report, for example)</li> </ol>
----------------	---

**GOAL BI3: REACH 30% OF NEW BUILDINGS BUILT TO NET-ZERO BY 2020, 100% BY 2030**

New construction is another important piece of the building energy equation. Given that new buildings can last for generations, it is critical that new construction be built to the highest standards of energy efficiency in order to limit energy consumption for decades to come.

A net-zero (NZ) building is defined by the US Department of Energy as a building that “produces enough renewable energy to meet its own annual energy consumption requirements, thereby reducing the use of nonrenewable energy in the building sector”.<sup>23</sup> A net-zero ready (NZR) building is one that, while it may not produce enough

A recent analysis conducted by an architectural firm in partnership with Efficiency Vermont demonstrated that both net-zero (NZ) and net-zero ready (NZR) new construction is a cost-saving investment for residential and open and closed floor plan office buildings from year one when compared to building to current energy code.<sup>22</sup> This means that the energy savings achieved in year one from NZ and NZR construction outweigh the additional energy efficiency capital cost required to meet these standards. Furthermore, NZ construction can save up to \$59,000 over 30 years for residential buildings, and up to \$300,000 over 20 years for commercial buildings.

renewable energy to meet its own consumption requirements at the time of construction, is capable of doing so in the future. For example, a NZR building could be one that is air sealed and insulated to NZ standards, is equipped with high efficiency appliances and heat sources, and has renewable electricity generation potential (i.e. a sufficiently large, south-facing roof), such that it is capable of

being powered by a renewable energy source in the future, even if the renewable technology is not installed at the time of construction.

<sup>22</sup> Maclay Architects. *Net Zero Energy Feasibility Study Full Report*. (January 30, 2015). <https://www.encyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-net-zero-energy-feasibility-study-final-report-white-paper.pdf>.

<sup>23</sup> U.S. DOE. *A Common Definition for Zero Energy Buildings*. <https://www.energy.gov/eere/buildings/downloads/common-definition-zero-energy-buildings>

The technologies exist to make NZ construction feasible and affordable. Besides building materials and design, other factors such as site selection and building orientation can keep the energy demand of buildings low. New construction presents an opportunity to take advantage of the best design, technologies, and building practices. In addition, the incremental cost of building to NZ can be offset by the elimination of utility bills as illustrated in Appendix C.

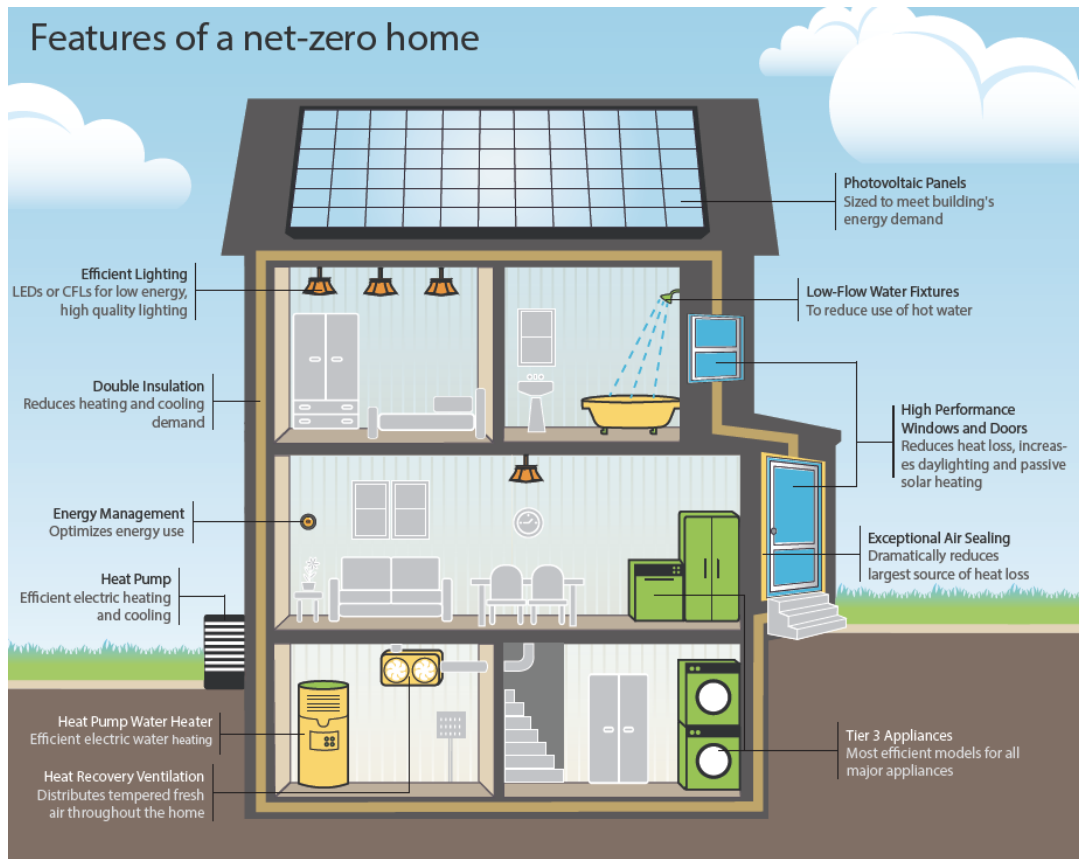


Figure 2 : Features of a net zero Home  
Source: Efficiency Vermont

New construction is a critical opportunity to achieve the greatest efficiency at the lowest cost (see text box in Goal B13 section for more information). Missing this opportunity by building only to current code means higher energy use and higher energy costs for the lifetime of the building, and/or costly retrofits. Meeting this requirement is critical to the success of this plan, and will also keep more money in Hartford's economy by reducing spending on wasteful energy usage.

**STRATEGY 1: REQUIRE NET-ZERO READY NEW CONSTRUCTION**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Research what other towns, states, or countries have done to implement and enforce a similar requirement.</li> <li>2. Synthesize the existing literature on the incremental cost of building to net-zero versus meeting the current State of Vermont Residential Building Energy Standards and Commercial Building Energy Standards.</li> <li>3. Determine criteria for variances.</li> <li>4. Develop a transition plan toward making net-zero ready a condition for receiving a Certificate of Occupancy.</li> <li>5. Serve as a resource for builders and residents on net-zero construction.</li> </ol>
----------------	---

**STRATEGY 2: EVALUATE, PUBLICIZE AND REVISE PLAN**

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Evaluate progress against goal annually and revise plan as needed.</li> <li>2. Spread awareness about the decreased operational costs of NZ construction.</li> </ol>
----------------	--

**RENEWABLE ENERGY**

One goal of Vermont municipal energy planning is to plan for in-Town generation of energy from renewable sources. In the transition to renewable sources of energy, Hartford faces several challenges and opportunities.

*Opportunities include:*

- promote equity, self-sufficiency, and a culture of energy awareness by involving the majority of residents and businesses in achieving State goal of 90% renewable by 2050 and the GHG Emission Reduction mandate;
- with broad participation, no one part of the community bears the burden of having “all the renewable generation in their backyard”;
- storage capacity and/or micro-grids, provide significant potential for resilience during grid disruptions;
- having renewables results in savings on energy for Hartford households and businesses;
- local energy insulates Hartford residents and businesses from fossil fuel price volatility;
- local energy results in fewer dollars being exported out of the State or Country; and
- Hartford generates less pollution, in particular less air pollution from the combustion of fossil fuels

**It will be necessary to adopt a culture of sufficiency, using only as much energy as needed, in order to achieve and sustain the level of energy consumption required by this plan. The renewable electricity generation targets presented herein depend on reaching this reduced level of energy consumption.**

*Challenges include:*

- upfront capital cost of generation equipment;
- lack of awareness about economic benefits of and navigation of the application process for renewables;
- low availability of opportunities for renters and sites that do not lend themselves to generation;
- reducing per capita energy consumption and holding energy demand steady so that our new energy system is sustainable (i.e. not requiring ever increasing land allocation, investments, and resource extraction); and



- accurately quantifying total energy consumption and total renewable generation (i.e. improving on estimates based on disaggregation of state-wide data)

There are a number of challenges that warrant further explanation.

**Power density:** Our current energy system is primarily based on fossil fuels which have high power densities (aggregate space required for a given capacity) while renewable sources have lower power densities. The space required for Solar PV installation is 10 to 1,000 times more than the space required for coal or natural gas generated electricity.<sup>24</sup>

**Reliability:** Fossil fuels permit the stockpiling of energy allowing consistent delivery, or “reliability” to use the industry term. Renewable energy sources, particularly solar and wind, are variable, offering less reliability. This challenge will require storage for renewable energy using technologies best suited to our region and the least exploitative in terms of types and amounts of natural resources required.

An important component of increasing the awareness and involvement of the Hartford community in energy issues and opportunities is understanding and promoting “Environmental Justice.” According to the federal Department of Energy, environmental justice “is the fair treatment and meaningful involvement of all people—regardless of race, ethnicity, income, or education level—in environmental decision making.” To achieve this, it is important to have programs that are “designed to build and sustain community capacity for meaningful participation for all stakeholders”.

Finally, in addition to technical challenges, Hartford faces social, cultural, and political challenges. Our society has become accustomed to high energy lifestyles, using many more times the energy used annually per capita than our great grandparents’ generation did. Individually and as a municipality, we will need to adjust our lifestyles and our expectations for what we demand of the natural world.

## RENEWABLE GENERATION TARGET AND ANTICIPATED PORTFOLIO

Hartford’s target for electricity generated from new renewable sources (rounded to the megawatthour (MWh)) is 56 - 68 MWh/year. Hartford has no sites where commercial-scale wind would be viable.<sup>25</sup> Commercial-scale hydro resources in Hartford have already been developed. With future technology upgrades, these hydro facilities might deliver additional capacity, but would not make a significant contribution to the new generation target. There are opportunities in Hartford for both micro-hydro and small scale wind. The Town encourages development of micro-hydro and small scale wind taking into consideration the environmental and social impacts. However, these sources will not make a significant contribution to the new generation target.

The greatest opportunity for new generation is solar (PV). Despite our region’s weather, latitude, and topography, Hartford has sufficient rooftops, parking lots and land area to meet the new generation target. Land use estimates are included in Appendix D. Solar thermal (heating water) is also viable and encouraged by the Town.

Several forms of biomass also offer opportunities for renewable energy, such as cord wood, wood pellets and wood chips. Since a significant percentage of the energy is lost in the conversion of woody biomass to electricity, these resources are more suitable for heating or combined heat and electricity generation. Also, the amount of

<sup>24</sup> Smil, Vaclav. *Power Density Primer: Understanding the Spatial Dimension of the Unfolding Transition to Renewable Electricity Generation (Part I – Definitions)* (May 8, 2010). <http://vaclavsmil.com/wp-content/uploads/docs/smil-article-power-density-primer.pdf>

<sup>25</sup> TRORC. REIP. 2017.

biomass that can be sustainably harvested from our regions forests needs to be better understood (see Goal RE2 [Strategy 4](#) below). Other sources of renewable energy are human and farm waste and compostable materials that can be used as feedstock for anaerobic digesters. The technical and operational feasibility of dry anaerobic digester technology and the use of its energy (either in the form of biogas or electricity) also requires research and analysis.

## RENEWABLE GENERATION PLAN DETAILS

Hartford’s general approach to transitioning to renewable energy will need to be two-phased. Phase one involves significantly increasing involvement of residents and business owners. After 5-10 years, phase two involves measuring the increase in renewable energy generation against the generation targets. This information will be used to identify what needs to be done to expand capacity to satisfy the targets, and/or increase efforts to reduce energy consumption. This two-phased approach is reflected in goals [RE1](#) and [RE2](#).

### GOAL RE1: 90% PARTICIPATION BY 2030

By 2030 90% of Hartford residents and businesses are producers of renewable energy from sources including solar, wind, hydro, and biomass.

#### What can you do?

Consider putting solar panels on the roof of your home or business. The cost to do so might be a lot lower than you think, and it doesn’t hurt to get a free estimate from a local solar contractor. Go a step further and consider a home battery for backup power. Combining solar with storage can make your home self-sustaining, even during a power outage.

Don’t own your home? Roof not suitable for solar? Consider joining a community solar array. You’ll get the same clean energy benefits from a remote site.



### STRATEGY 1: MAKE CAPITAL AVAILABLE TO HARTFORD RESIDENTS AND BUSINESS OWNERS FOR RENEWABLE ENERGY PROJECTS.

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Establish a revolving loan fund or green bank, considering prudent repayment plans that minimize debt and risk for the borrower, starting with a fund for income qualified homeowners. Income qualification should be tied to a Vermont/federal standard.</li> <li>2. Expand revolving loan fund or green bank to include loans and/or incentives to non-income qualified residents, businesses, and landlords.</li> <li>3. Work with Green Mountain Power to leverage on-bill financing (i.e. the utility incurs the cost of an energy efficiency upgrade, and the customer repays the utility through a charge on their utility bill).<sup>26</sup></li> </ol>
----------------	--

### STRATEGY 2: PROVIDE INFORMATION RESOURCES TO RESIDENTS AND BUSINESSES

<sup>26</sup>U.S. DOE, *On Bill Financing*.

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Establish an education program for loan/incentive applicants to help ensure successful renewable energy projects resulting from Strategy 1.</li> <li>2. Develop a set of Hartford-specific case studies for renewable energy projects with economic benefit and process details.</li> <li>3. Research and disseminate procedures and documents, such as contract templates, and make them available to the public. (e.g. process for parking lot solar canopies.)</li> <li>4. Research energy storage technologies and advise Hartford Selectboard, residents and businesses on recommendations.</li> </ol>
----------------	---

---

### STRATEGY 3: PROMOTE COMMUNITY PROJECTS AND ENERGY CO-OPS

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Lease Town facilities and land to developers to create community solar projects. Start by evaluating the potential of the undeveloped area at the landfill.</li> <li>2. Research and disseminate procedures and documents required to establish community projects and/or co-ops and open source these to lower the startup burden for groups of Hartford residents or businesses.</li> </ol>
----------------	---

---

### STRATEGY 4: EVALUATE, PUBLICIZE AND REVISE PLAN

<b>Actions</b>	<ol style="list-style-type: none"> <li>1. Implement process for tracking resident and business generation in cases where production is not grid-tied (two examples are biomass used for heat or off-grid electricity generation).</li> <li>2. Evaluate progress against goal annually and revise plan as needed.</li> <li>3. Establish annual targets to reduce GHG emissions, method(s) to evaluate annual progress in meeting GHG emission goal, and revise plan as needed.</li> <li>4. Report progress publicly (in annual Town report, for example).</li> </ol>
----------------	---

## GOAL RE2: 90% RENEWABLE BY 2040

By 2040, 90% of Hartford's energy comes from renewable sources.

#### **Hartford's Target – Goal RE2**

Hartford's target for electricity generated from new renewable sources (rounded to the megawatt-hour (MWh)) is **56 - 68 MWh/year**. Hartford's goal is a percentage of the statewide goal and is proportional to Hartford's population.

STRATEGY 1: SUPPORT AND INCENTIVIZE TRANSITION TO SUSTAINABLE RENEWABLE ENERGY

Actions	<ol style="list-style-type: none"><li>1. Adjust property tax assessment policies to exempt renewable generation assets from assessed value.</li><li>2. Lobby for divestment from fossil fuels.*</li></ol>
---------	---

STRATEGY 2: SUPPORT EQUITABLE CARBON POLLUTION FEES AT THE REGIONAL AND STATE LEVELS, AND CONSIDER IMPLEMENTING EQUITABLE CARBON POLLUTION FEES IN HARTFORD

Actions	<ol style="list-style-type: none"><li>1. Research carbon pricing proposals at the regional and state levels. Support those that promote the goals of Hartford’s Strategic Vision, or encourage changes to proposals that do not align with the Strategic Vision.</li><li>2. Initiate a task force to explore the possibility of implementing a carbon pollution fee in Hartford. This task force would work to determine if policies and procedures could be designed to create an effective and manageable (i.e. for Town staff) price on carbon in keeping with the goals of the Strategic Vision.</li></ol>
---------	--

STRATEGY 3: LEVERAGE EXISTING DATA TO ADJUST COURSE

Actions	<ol style="list-style-type: none"><li>1. Conduct field surveys to develop better estimates of how much renewable energy can be produced on the State’s preferred siting locations (e.g. parking lot and rooftop solar PV capacity)</li></ol>
---------	--

STRATEGY 4: LEVERAGE REGIONAL RESOURCES AND DIVERSIFY ENERGY PORTFOLIO

Actions	<ol style="list-style-type: none"><li>1. Develop estimates for sustainably harvested wood biomass (e.g. the amount and frequency of harvesting).</li><li>2. Research feasibility of alternate forms of biomass such as dry anaerobic digester technology</li></ol>
---------	--

---

\* The organization 350.org has called for divestment from fossil fuels since its founding in 2008. They define divestment as, “...the opposite of an investment – it simply means getting rid of stocks, bonds, or investment funds that are unethical or morally ambiguous”. (<https://gofossilfree.org/divestment/what-is-fossil-fuel-divestment/>) To date, almost \$8 trillion have been divested from fossil fuels around the globe, and government institutions are responsible for 15% of this divestment (<https://gofossilfree.org/divestment/commitments/>). While Hartford does not have any direct investments in fossil fuels, pension and other funds that the town invests in but does not manage likely do support fossil fuels. Hartford can lobby the State of Vermont to divest.

## COMMERCIAL-SCALE RENEWABLE ENERGY SITING

When evaluating proposed renewable energy developments, the Town will apply the siting guidelines as described by TRORC in the Regional Energy Implementation Plan, with some additional Hartford-specific criteria. These guidelines are shown below in Table 1, and the Hartford-specific criteria are bolded.

**TABLE 1 – HARTFORD’S HIERARCHY OF SUITABILITY FOR COMMERCIAL-SCALE RENEWABLE ENERGY SITING**

Preferred Locations	<ul style="list-style-type: none"> <li>• A parking lot canopy over a parking lot, provided that the location remains in use as a parking lot and is not located in an area identified as unsuitable by this plan <b>(note: Hartford does not require that the parking lot be paved)</b>.</li> <li>• A new or existing structure that is not located in an area identified as unsuitable by this plan. Land certified by the Secretary of Natural Resources to be a brownfield site as defined under 10 V.S.A. § 6642, provided that the location is not in an area identified as unsuitable by this plan.</li> <li>• A sanitary landfill as defined in 10 V.S.A. § 6602, provided that the Secretary of Natural Resources certifies that the land constitutes such a landfill and is suitable for the development of the plant.</li> <li>• The disturbed portion of a gravel pit, quarry, or similar site for the extraction of a mineral resource, provided that all activities pertaining to site reclamation required by applicable law or permit condition are satisfied prior to the installation of the plant.</li> <li>• A site listed on the National Priorities List (NPL) that has received confirmation from the U.S. Environmental Protection Agency or the Vermont Agency of Natural Resources (ANR), and is not located in an area identified as unsuitable by this plan.</li> <li>• A new hydroelectric generation facility at a dam in existence as of January 1, 2016, or a hydroelectric generation facility that was in existence but not in service for a period of at least 10 years prior to January 1, 2016 and that will be redeveloped for electric generation, if the facility has received approval or a grant of exemption from the U.S. Federal Energy Regulatory Commission.</li> <li>• A tract previously developed for a use other than siting a plant on which a structure or impervious surface was lawfully in existence and use prior to July 1 of the year preceding the CPG application.</li> </ul>
Prime Areas	<p>Prime areas are identified on the maps in Appendix B (Municipal Summary). Prime areas exclude unsuitable areas and locations with constraints, and must be located in an area with safe, reliable access to the grid (as determined by the local power provider).</p>
Constraints	<p>TRORC defines constrained areas as those that “have the potential for renewable energy generation, but include known or possible constraints that may make these locations less desirable on a site-by-site basis. These areas are neither preferred nor unsuitable. Development in these areas will require more detailed mapping at the site level as well as an evaluation of the impacts on the particular resources present”.<sup>27</sup> These areas include:</p> <ul style="list-style-type: none"> <li>• Historic districts, landmarks, sites and structures listed, or eligible for listing, on state or national historic registers</li> <li>• State or federally designated scenic byways, and municipally designated scenic roads and viewsheds</li> <li>• Special flood hazard areas identified by National Flood Insurance Program maps (except as required for hydro facilities)</li> </ul>

<sup>27</sup> TRORC. REIP. 2017. P. 49.



	<ul style="list-style-type: none"> <li>• Public and private drinking water supplies, including mapped source protection areas</li> <li>• Primary agricultural soils mapped by the U.S. Natural Resources Conservation Service</li> <li>• Agricultural Soils (VT Agriculturally Important Soil Units)</li> <li>• Protected Lands, including State Fee Lands and Private Conservation Lands</li> <li>• Deer Wintering Areas (as Identified by ANR)</li> <li>• Act 250 Agricultural Soil Mitigation areas (as Identified by ANR)</li> <li>• ANR's Vermont Conservation Design Highest Priority Forest Block Datasets</li> <li>• Priority Forest Blocks – Connectivity, Interior and Physical Land Division (as Identified by ANR)</li> <li>• Hydric Soils (as Identified by ANR)</li> <li>• River Corridor Areas as identified by the Vermont Department of Environmental Conservation</li> <li>• Class 2 Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis</li> <li>• Vernal Pools (as Identified by ANR or through site analysis)</li> <li>• State-significant Natural Communities and Rare, Threatened, and Endangered Species</li> <li>• <b>Locations that were forested within 3 years prior to the application of the proposed development.</b></li> <li>• <b>Locations identified as riparian buffers.</b></li> </ul>
Unsuitable Areas	<ul style="list-style-type: none"> <li>• Floodways shown on FEMA Flood Insurance Rate Maps (except as required for hydro facilities)</li> <li>• Class 1 Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis</li> <li>• Wilderness Areas, including National Wilderness Areas</li> <li>• <b>Hartford Town Forest and Hurricane Forest Wildlife Refuge</b></li> </ul>

## **CHAPTER XI FLOOD RESILIENCE**

Following the impact of Tropical Storm Irene in 2011, the Vermont Legislature added a requirement that all communities address flood resilience as part of their municipal plans. Interpreted broadly, “resilience” means that an entity—a person, neighborhood, town, state, region or society— when faced with a situation or event, could effectively return to its previous state or adapt to change(s) resulting from the situation or event without undue strain. As such, “resilience” is an overall preparedness for a future event. For the purposes of this chapter, flood resilience will mean the ability of Hartford to effectively understand, plan for, resist, manage and, in a timely manner, recover from flooding.

The focus of this chapter is to identify and plan for both natural and manmade flood hazards facing the Town of Hartford, and to develop strategies to reduce long-term risks. Hazards cannot be eliminated, but it is possible to determine those hazards that are most likely to occur, where they may be most severe and cause the most damage, and what can be done to reduce their impacts on the community. Benefits of planning include:

- increased public awareness of hazards and community vulnerabilities;
- improved understanding of potential risks and possible risk reduction measures associated with existing and future development;
- strengthened partnerships and lines of communication among diverse interests, including opportunities to leverage and share resources;
- increased community and voter support for specific actions the Town may propose to reduce future losses;
- a reduction in physical, financial and emotional losses caused by disasters;
- increased community resilience to withstand and more quickly recover from disasters; and
- community eligibility for federal hazard mitigation grants and aid prior to and following federally-declared disasters, and for additional state matching funds for associated repairs and improvements.

### **TYPES AND CAUSES OF FLOODING**

There are two types of flooding that impact communities in the state of Vermont - inundation and flash flooding. Inundation flooding occurs when rainfall over an extended period and over an extended area of the river’s basin leads to flooding along major rivers, inundating previously dry areas. This type of flooding occurs slowly, but flood waters can cover a large area. Inundation flooding is slow and allows for emergency management planning if necessary. However, unlike during a flash flood, it may take days or weeks for inundation flood waters to subside from low areas, which may severely damage property.

Flash flooding occurs when heavy precipitation falls on the land over a short period of time. Precipitation falls so quickly that the soil is unable to absorb it, leading to surface runoff. The quick-moving runoff collects in the lowest channel in an area - upland streams, in small tributaries, and in ditches - and the water level rises quickly and moves further downstream.

Flash flooding typically does not cover a large area, but the water moves at a very high velocity, and the flooding manifests quickly, making flash floods particularly dangerous. Due to the velocity of the water, a flash flood can move large boulders, trees, cars, or even houses.

The collecting of water in channels in steep areas also causes fluvial channel erosion, which can severely damage roads and public and private property. Fast moving water in the stream channel may undermine roads and structures and change the river channel itself, predisposing other roads and structures to future flooding damage. Flash floods can also mobilize large amounts of debris, plugging culverts and leading to even greater damage. In Vermont, most flood-related damage is caused by flash flooding and fluvial erosion (erosion of stream banks). Due to steep slopes, three rivers running through the Town with several tributaries, Hartford is vulnerable to flash flooding and fluvial erosion.

Floodplains and river corridors fill an important role, as flood waters and erosive energy must go somewhere. Development in the floodplain can lead to property damage and risks to health and safety. Development in one area of the floodplain or river corridor can also cause increased risks to other areas by diverting flood flows or flood energy. Debris carried by the floodwater from one place to another also poses a danger. Flooding is worsened by land uses that create impervious surfaces that lead to faster runoff, and past stream modifications that have straightened or dredged channels, creating channel instability.

## **FLOOD EVENTS IN HARTFORD**

**Flooding:** With three rivers, Hartford has a history of major flood events. Flooding can happen at any time of the year, but historically has resulted from ice jams and snowmelt runoff in the spring, and severe storms in late summer and fall. The most widespread and damaging floods – including the November 1927 flood and most recently Irene in August 2011 – have been associated with hurricanes or tropical storms tracking up the northeast coast. In each case, heavy rainfall, on top of already saturated soil conditions, resulted in very large volumes of runoff over a short period of time. Other notable flood events occurred in 1867, 1913 and 1936. A less impactful, but significant flooding in isolated sections of Hartford occurred on July 1, 2017. This event also was caused by heavy rainfall in a very short period that overwhelmed streams and existing drainage systems that could not manage the volume of water.

In Hartford, the magnitude and impact of flooding from Tropical Storm Irene rivaled and potentially exceeded that of the 1927 flood. The White River, which flows into the Connecticut River at White River Junction, has a total drainage area of 712 square miles (1,840 sq. km.). During Irene, the river basin received, on average, more than six inches of rain, resulting in a peak discharge of 90,100 cubic feet per second, as measured at the West Hartford gauge station before it stopped transmitting data. The river at West Hartford crested at 28.36 feet – more than 10 feet above flood stage. The Ottauquechee River and tributaries above it also overflowed causing extensive damage to the Quechee Bridge and surrounding properties and roads.

Local flooding and erosion damage to public and private property and infrastructure from Irene was extensive. It included five Town parks, municipal water and sewer systems, and local roads, bridges and culverts. Roads washed out in more than sixty locations; and the West Hartford and

Quechee bridges both suffered extensive damage. Many homes and businesses, including the West Hartford Library, post office and village store also flooded. Total losses were estimated at around \$10,000,000.

**Ice Jams:** Spring flooding due to ice jams, though not nearly as devastating, is a much more frequent occurrence, and sometimes very destructive. Ice jams along the White River frequently result in minor flooding and bank erosion. They cause more damage during periods of high water. The most destructive jams reported since 1867 have occurred at the confluence of the White and Connecticut Rivers – including jams that took out the Bridge Street Bridge on US 5 across the White River in 1964, and again in 1990. The bridge was replaced in 1992 with cells to monitor ice loading. Another severe ice jam on the White River occurred in 1908.

Ice jams on the Connecticut River are much less frequent, but tend to form near White River Junction at the confluence of the White River, in the vicinity of the I-89 Bridge. When jams do occur, flash flooding is a real concern. Ice jams on the Ottauquechee River occasionally result in flooding behind the Quechee Club and the Quechee Green. Over the years the Town has taken measures to reduce the impacts of ice jams and flash flooding in areas prone to flooding, including Quechee Main Street and Route 14, and River Road near the Taftsville Covered Bridge. Work completed in 2007 to build up the River Road has reduced the amount of flooding in this area.

## **FLOOD HAZARD AND RIVER CORRIDOR AREAS**

There are two sets of official maps that govern development in floodplains in Vermont. They are the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs) and VT Agency of Natural Resource's River Corridor area maps. FEMA has calculated the floodplain on the FIRMs to show the 100-year flood boundary, or a flood that has a 1% chance of any given year of occurring. This area of inundation is called the Special Flood Hazard Area (SFHA). FIRMs may also show expected base flood elevations (BFEs) and floodways (smaller areas that carry more current). FIRMs are only prepared for larger streams and rivers. Hartford has FEMA FIRM maps that are used in the administration of the Flood Hazard Bylaw. FEMA FIRM Maps were last updated for the Town of Hartford on September 28, 2007. The Flood Insurance Studies (FIS) were completed for Hartford on September 28, 2007. FEMA FIRM Maps are available for the Ottauquechee River, White River and the Connecticut River. During Tropical Storm Irene, several homes were damaged or lost that were not in FEMA mapped floodplains. These were due to fluvial erosion and not inundation flooding.

Recent studies have shown that a significant portion of flood damage in Vermont occurs outside of the FEMA mapped areas along smaller upland streams, as well as along road drainage systems that fail to convey the amount of water they are receiving. Since FEMA maps are only concerned with inundation, and these other areas are at risk from flash flooding and erosion, these areas are often not recognized as being flood-prone. It should be noted that small, mountainous streams may not be mapped by FEMA in NFIP FIRMs (Flood Insurance Rate Maps), flooding along these streams is possible, and such flooding should be expected and planned for. Property owners in such areas outside of SFHAs are not required to have flood insurance. Flash flooding in these reaches can be extremely erosive, causing damage to road

infrastructure, threatening topographic features including stream beds, the sides of hills and creating landslide risk. The presence of undersized or blocked culverts can lead to further erosion and streambank/hillside undercutting. Change in these areas may be gradual or sudden. Furthermore, precipitation trend analyses suggest that intense, local storms are occurring more frequently. Vermont ANR's River Corridor maps show the areas that may be prone to flash flooding or erosion, which may be inside of FEMA-mapped areas, or extend outside of these areas. In these areas, the lateral movement of the river and the associated erosion is a greater threat than inundation by floodwaters. The ANR mapped River Corridors accurately represent the area where rivers and streams will move over time to meander, and they depict areas that are at risk to erosion due to the river or streams' lateral movement. Elevation or flood proofing alone may not be protective in these areas as erosion can undermine structures. In Hartford, mapped areas are the Connecticut River, White River and most of the Ottauquechee River. A section of the Ottauquechee below the Quechee Bridge is not mapped.

In Hartford, there are 75 properties (principal structures) identified within the mapped floodplain (1% chance of flooding), representing 1.6% of all principal structures in town. Less than 1% of the Town's residential properties are in the mapped floodplain. However, nearly 5% of the Town's commercial properties, and 50% of industrial properties, are vulnerable to flooding. Five public buildings, including the Hartford Town Hall and the West Hartford Library, are in the mapped floodplain. To help reduce the risk to health, structures, and road infrastructure, it is important to restore and improve the flood storage capacity of existing floodplains and increase the overall area for retention of floodwaters in Hartford.

## **NATIONAL FLOOD INSURANCE PROGRAM (NFIP)**

FEMA also administers the National Flood Insurance Program, which provides flood hazard insurance at subsidized rates for property owners in affected areas. To qualify for federal insurance, towns must adopt and retain a bylaw to control land development within these areas. Minimum standards must be included and approved by FEMA. Coverage is only available to landowners if a town elects to participate in the program. Hartford has had adopted Flood Hazard Area Regulations since 1979 and is recognized as a participating community in the National Flood Insurance Program.

## **HARTFORD INFRASTRUCTURE**

Hartford has more miles of road than any other municipality in the state. The state manages 45 miles of state and federal highway; the town is responsible for another 129 miles of town highway. The road system includes 1,038 culverts, 29 short-span bridges and 4 long-span bridges – several of which were damaged during Tropical Storm Irene. Many other major bridges in town are state and federal responsibilities, including the railroad bridge across the White River in White River Junction, which was repaired by the state following the Irene Flood. The West Hartford Bridge, constructed in 2006 and designed to withstand a 100-year flood, also suffered damage during Irene. The Quechee Covered Bridge was completely rebuilt in 2012 following Irene.



Flood waters from Irene also severely impacted the NECR railroad line, inflicting major damage between Montpelier and White River Junction. Two bridges over the White River were also heavily damaged, including the one in White River Junction.

The Town's municipal water system serves more than 2,000 connections in White River Junction, Wilder, Hartford Village and Quechee, and the VA hospital. The Wilder well is located above the floodplain, but the Quechee facility is at or just above the 100-year flood level. Protected by a berm, it did not flood during Tropical Storm Irene, but came close. The berm was improved following Irene to better withstand future flooding.

The White River Junction wastewater treatment plant is below the confluence of the White and Connecticut Rivers, and is within the mapped flood hazard area, but did not flood during Irene. The Quechee sewer plant is located well-above the 100-year flood elevation. It also did not flood during Irene, but the river crossing for the force main serving Quechee Village sustained heavy erosion damage from changes in the stream channel, which undermined critical infrastructure. This was subsequently repaired with funding and technical assistance from the Natural Resource Conservation Service (NRCS), with special care taken to restore stream flow and aquatic habitat to pre-flood conditions. Irene flooding damaged three pump stations in the Town, two in Hartford Village and one in White River Junction. Following the flood, the pump stations were rebuilt and elevated to one foot above Irene flood levels.

## **BUILDING COMMUNITY RESILIENCE**

A sense of community – of knowing neighbors and those who might be vulnerable in an emergency – is an important part of building community resilience. Because of Hartford's size, diversity and settlement pattern, many residents identify more with their neighborhood or village than the Town as a collective whole. Hartford's villages have especially strong social networks and ties. West Hartford's strong sense of community reflects the bonding that occurred during and following Tropical Storm Irene, when village residents felt isolated from the rest of the community. In larger places like White River Junction, in newer housing developments, and in more rural locations people tend to identify with their local neighborhood, others living in their building or along their road.

### **Community Resilience Organization of Hartford (CROH)**

The Community Resilience Organization of Hartford (CROH) is a team of Town residents and town staff working together to strengthen the Hartford community's ability to prepare and respond to natural and manmade disasters. CROH was established in 2015 by the Hartford Selectboard. Initially, CROH began as one of six towns in Vermont participating in a statewide Community Resilience Pilot Project. After a successful trial period, CROH became a formal Town Commission with members appointed by the Selectboard.

**CROH Purpose:** Recognizing the threats of floods, severe weather events, economic disturbances and interruptions of basic needs such as food, water, heat, communication and electricity, CROH seeks to promote community interdependence and preparedness by partnering with resilience building organizations and initiatives in the region. These efforts will be guided by the Hartford Hazard Mitigation Plan when and where appropriate.

Since 2015, CROH has focused its efforts on education/skill building and establishing partnerships. CROH has regular workshops on a variety of resilience topics and has hosted two resilient week events. In 2018, CROH kicked off a Community Day event that focused on neighborhood/village projects. In 2018, CROH partnered with Antioch New England Professor Jason Rhoades and the Bugbee Senior Center on the Resilient Seniors Project to help seniors to be better prepared for severe weather events.

### **Upper Valley Strong**

Another outgrowth of Irene was the creation of “*Upper Valley Strong*,” comprised of area public and nonprofit service agencies, organizations and churches that came together in the immediate aftermath of the event, which included strong participation from the Town of Hartford. The formation of this group enabled Town residents, property owners, and businesses to be well served by regional response efforts and resources in the immediate disaster recovery and long-term rebuild efforts. This group was subsequently recognized by the state and FEMA as the area’s Long-Term Recovery Committee ([www.uvstrong.org](http://www.uvstrong.org)) to strengthen, expand, mobilize and coordinate disaster recovery efforts. *Upper Valley Strong* continues to exist today and has put in place a structure to allow for immediate mobilization when a hazard hits the region to: gather and share information, assess individual and community needs, obtain and disburse financial and other resources, conduct triage and disaster case management, expedite local access to services, facilitate interim and permanent housing solutions, and collaborate to resolve the full spectrum of disaster-caused recovery needs.

## **GOALS, STRATEGIES AND ACTIONS**

### **Goal 1: Increase Hartford’s resiliency in the event of a severe flood.**

#### **Strategy 1: Actively pursue flood emergency preparedness and response planning.**

##### Actions

- a. Develop and implement a public awareness program.
- b. Compile “hazard vulnerability checklists” for residents and businesses, and information on preparing home emergency kits. Post on the town’s website, in annual reports and at town libraries.
- c. Identify other public information needed on emergency preparedness and emergency services and develop implementation schedule.
- d. Analyze what is required to organize and promote activities to increase local flood risk awareness. Identify options/strategies and consider implementation.

#### **Strategy 2: Reduce exposure and risk within known flood hazard areas through changes in the Town Plan and establishment of policies and recommendations, especially for critical facilities and infrastructure, and as required by new State law.**

##### Actions:

- a. Identify off-site, low-risk storage locations for copies of critical public records.
- b. Assemble a working group and develop draft policies and recommendations.

- c. Finalize policies and recommendations and begin implementation.

**Strategy 3: Analyze and identify options to mitigate issues regarding extended interruptions in food supply, power, fuel, and transportation and communications networks.**

Actions:

- a. Determine what issues are within local control; and what regional conversations are.
- b. Investigate public and non-public partner involvement.

**Strategy 4: Continue participation in the National Flood Insurance Program.**

Action:

- a. Review criteria and responsibilities for participation in the National Flood Insurance Program (NFIP) Community Rating System (CRS) and determine if appropriate for the Town.

**Goal 2: Use sound planning practices to address flood risk.**

**Strategy 1: Integrate flood resilience and fluvial erosion considerations into local decision-making.**

Actions:

- a. Complete current update of HM Plan, and integrate into the Town Plan.
- b. Review flooding and fluvial erosion issues when adopting Town policies and land use regulations.

**Strategy 2: Mitigate damage from future flood and erosion damage through changes in the Hartford Flood Hazard Area Regulations:**

Actions:

- a. Complete draft revision to clarify existing requirements for all development in known flood hazard areas, such as elevation certificates or surveys showing elevations for new construction. Integrate lessons learned from the Irene Flood.
- b. Analyze what is required to develop a program to promote retrofitting of historic properties within flood hazard areas and determine if the Town should proceed.

**Strategy 3: Evaluate securing tanks in flood hazard areas.**

Actions:

- a. Assemble group of vendors & town agencies.
- b. Identify options/recommendations for securing tanks.
- c. Implement recommendations.

**Goal 3: Encourage the protection and restoration of floodplains and upland forest areas to attenuate and moderate flooding and fluvial erosion.**

**Strategy 1: Mitigate impact of flooding in riverbanks, wetlands, riparian buffers, farm, forest and other open land through better management and protection of watersheds and sensitive natural resources in and around these areas.**

Actions:

- a. Assemble a working group and identify sensitive areas and opportunities for protection.
- b. Develop draft policies and recommendations.
- c. Finalize policies/recommendations and initiate implementation.
- d. Update stormwater management, sediment and erosion control regulations to comprehensively address fluvial and other erosion, steep slopes and stream buffers.
- e. Investigate developing a town-wide program to collect, map and address accurate fluvial geomorphic data for the river corridors.

**Goal 4: Ensure no net loss of flood storage capacity to minimize potential impacts from flooding.**

**Strategy 1: Avoid new development in identified flood hazard areas, fluvial erosion areas and river corridors.**

Actions:

- a. Inventory and track repetitive loss properties, including repair costs, photographs and high-water level.
- b. Update FEMA database started with Tropical Storm Irene, with most current information for public and private properties.
- c. Solicit information from property owners to document damage from other flood events.
- d. Consider use of the Hazard Mitigation Buyout Program for properties in the Special Flood Hazard Area with frequent substantial damage from flood events.
- e. Investigate adopting a “zero discharge policy” for stormwater in subdivision and site design.

**Goal 5: Protect municipal infrastructure and buildings from the potential of flood damage.**

**Strategy 1: Review the potential impact of flooding on Town buildings and infrastructure.**

Actions:

- a. Identify locations in town where properties have experienced flooding due to overflowing storm sewer systems, culverts, etc., and determine causes.
  1. Complete analysis in White River Junction.; begin pursuing recommendations.
  2. Identify other locations in town and develop analysis schedule.
  3. Complete analysis in at least one of the areas.
- b. Regularly inspect town bridges and culverts to determine if adequate funds are in the Town budget for maintenance and upgrades to meet required standards.
- c. Investigate the benefits and needed resources to develop and implement stormwater and erosion control management plans for public buildings.
- d. Identify interest and available resources to establish an annual “Clean our culverts” day during a “Hazards Awareness Week”, or fold into Green-Up Day, to encourage residents to maintain their culverts.

**Strategy 2: Design culverts and bridges, at minimum, to meet VTrans Hydraulics Manual, ANR Stream Alternation Standards, and VTrans Codes and Standards.**

Actions:

- a. Continue to maintain and update town bridge and culvert inventories. Use this information to develop a schedule to replace undersized culverts.
- b. Work with VTrans and the Two Rivers-Ottawaquechee Regional Commission on advocating for and improving the flood capabilities of State or Town-owned transportation infrastructure.



## **CHAPTER XII**

### **RELATIONSHIP OF PLAN TO DEVELOPMENT TRENDS AND PLANS**

#### **FOR ADJACENT TOWNS AND REGIONS**

An important component of any planning effort is a view beyond the focus area. An attempt has been made throughout this Plan to consider Hartford's role within the Upper Valley region. Several areas have been identified in other chapters of the Plan where it is clear that Hartford and its neighbors would benefit from continued regional cooperation relative to problem solving and the provision of services. This chapter looks more specifically at the land use plans of Hartford's neighbors.

Hartford shares its northern border with Norwich, Vermont; its eastern border with Lebanon, New Hampshire; its southern border with Hartland, Vermont; and joins Pomfret, Vermont; to the west. Hanover, New Hampshire is located to the northeast; Plainfield, New Hampshire to the southeast; Woodstock, Vermont to the southwest; and Sharon, Vermont to the northwest. Hartford, along with its neighbors to the north, south, and west is a member of the Two Rivers-Ottawaquechee Regional Commission (TRORC), which consists of thirty Vermont towns.

The Hartford Town Plan is generally consistent and compatible with plans for each of its neighboring communities, as well as the TRORC Regional Plan. Each is listed below.

A Plan for the Town of Norwich, 2018

Town of Sharon Municipal Plan, 2015

Pomfret Town Plan, 2016

Town and Village of Woodstock Plan, 2016 (Update in progress)

Municipal Plan for the Town of Hartland, Vermont, 2017

Master Plan for the City of Lebanon, New Hampshire, 2002

Hanover Master Plan, 2003

Two Rivers-Ottawaquechee Regional Commission Regional Plan, 2017

No conflicts were identified with any of the above plans.

Although each of the plans is unique, reflecting the individual character of communities, a general pattern was observed in reviewing the plans together. A common theme in the land use plans pertinent to the Upper Valley is the encouragement of future development in or near existing downtown and village areas, with surrounding areas to continue to be used for low-density development compatible with forestry, agriculture, and resource protection. This is an important foundation of the Regional Plan as well.

Hartford directly adjoins Norwich, Pomfret, Hartland, and a small stretch of Woodstock along the Ottauquechee River. The Norwich plan incorporates the Zoning Map as a guide for future land use. Both Hartford and Norwich have planned for a continued pattern of low-density development along most of the common border, with higher densities and commercial development toward the east in the Route 5/Interstate 91 area. Like Hartford, Pomfret has planned for low-density development along the shared border. Along the Woodstock line, the Ottauquechee River provides a buffer between the Taftsville hamlet area and Hartford's low-density development. Similar to the situation to the north along the Norwich line, most of the land to the south along the Hartland line has been planned by both communities to remain low density and rural in nature. Again, exceptions relate to major transportation corridors. Both communities plan slightly higher density use to continue adjacent to Route 5 in the vicinity of the existing mobile home park. As Hartford has done in several locations, Hartland has also planned an area of commercial use along Route 4, while making an attempt to mitigate the potential impacts of development on this heavily used transportation corridor.

Although separated by both the Connecticut River and a state line, the relationship between Hartford and bordering towns in New Hampshire is a strong one. As discussed in other chapters of this Plan, Hartford, Norwich, Lebanon and Hanover form the economic and service core of the Upper Valley to revitalize and enhance the physical infrastructure and economic social base in one community directly link to another and, therefore, successes resulting from these neighboring efforts benefit all communities. It is important to recognize these linkages as well as the benefits of planning for regional housing, transportation, and employment needs.

# SUMMER 2018 COMMUNITY FORUMS GOALS, STRATEGIES & ACTIONS

Based on a summary provided by Consultant Rebecca Sanborn Stone,  
Community Workshops, LLC

In June and July of 2018, five community forums were held on the following topics:

- Town Plan 101 & Community Priorities
- Energy & Transportation
- Community Facilities/ Services & Historic Preservation
- Natural Resources & Land Use
- Housing & Economic Development

The Community Forums provided a wealth of information and public input. In many instances these are reflective of current activities and aspirations. In other instances, new directions and approaches are suggested. We recognize the community forums were the beginning of a process to further explore these new ideas within the Hartford community, and would take more time than available for the current update of the Town Plan. This summary of the outcomes of the community forums is included in the 2019 Town Plan update as an appendix to recognize their importance and the commitment to further discussion.

**NOTES: Following is a condensed and simplified version of the goals, strategies and actions from Hartford’s Town Plan Forums.**

- Goals, actions and strategies from the consolidated summary are included here, reorganized by plan chapters
- All sections include only the ideas from the forums. There are likely more goals, strategies and actions to add in for each chapter.
- Duplication is removed, so that goals/actions appear in only one chapter; in many cases, they could be moved to a different/related chapter
- When there is overlap in topic or action between different chapters, cross-references are listed under “Also Supported By....”
- Action and goal language is simplified and shortened here; extra explanatory details are included below or in the “More Details” column. Those details could be deleted in the final plan, or could be added back into the main goal/action language
- “Who” column is extremely rough – based on assumptions about who might work on this, or notes from the forums. That should be reviewed carefully

## CHAPTER I: Historic Resources

<b>Historic Preservation Goals</b>
<p><b>Protect Hartford’s historic resources</b> Protect and restore Hartford’s historic buildings and facades, facilities, traditions and oral history</p>
<p><b>Balance historic preservation and modern needs</b> Develop practical guidelines that preserve historic character while allowing for modern upgrades and uses</p>
<p><b>Increase visibility and appreciation of local history</b> Showcase local history through education and stories, programs and tours, signage and interpretation</p>

<b>Strategy 1: Prevent the loss of historic buildings and historic character</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Articulate and define Hartford's rural and historic character	Include: specific features and design elements, architectural styles and elements, land use patterns	Planning Commission Historic Pres. Comm.
Ensure that design and development policies support Hartford's historic and rural character		Planning Commission Planning & Dev. Dept. WRJ Design Review Commission
Develop policies and incentives to encourage restoration and re-use of historic buildings	Examples: support adaptive re-use, shared spaces, and mixed uses	Planning & Dev. Dept. Historic Pres. Comm,
Develop practical building standards that balance historic preservation while meeting modern development needs		Planning & Dev. Dept. Historic Pres. Comm.
Provide information to property owners about historic preservation resources and techniques	Examples: tax credits, grants, technical assistance, case studies of successful projects	Historic Pres. Comm. Historical Society
Fundraise to support historic preservation efforts on critical buildings	Examples: Support for engineering reports or technical studies	Historic Pres. Comm Historical Society .
Develop partnerships for historic preservation	Examples: partnerships between developers, realtors, and owners of historic properties	Historic Pres. Comm. Historical Society
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Branding and marketing (Economic Development chapter)</li> <li>• Mixed Use development (Land Use chapter)</li> <li>• Building standards (Energy chapter)</li> </ul>		

<b>Strategy 2: Increase historical interpretation, programming and signage</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Educate the public and property owners about the location and purpose of historic districts		Historic Pres. Comm.
Develop and promote programming and information that showcases Hartford’s rich history	Examples: public tours, historic photo displays, local history storytelling events	Historic Pres. Comm. Historical Society
Develop new, visible signage and multimedia content to showcase important historic sites		Historic Pres. Comm. Historical Society
Develop school curriculum and enrichment programs to educate students about local history		School District Historic Pres. Comm. Historical Society
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Community-school interactions (Education)</li> </ul>		
<b>Strategy 3: Make historic programs and resources more culturally inclusive</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
None Listed		



## CHAPTER II Land Use & Chapter IX: Natural Resources

**NOTE: Goals/strategies/actions need attention**

Natural Resources was only covered as part of the land use discussion and there was overlap, so the goals, strategies and actions are combined below.

Land Use & Natural Resources Goals		
<b>Protect Hartford’s traditional development pattern of rural lands and dense village centers</b>		
Encourage dense development and ongoing protection of sensitive natural areas and working lands		
<b>Grow our working lands economy</b>		
Support farm, food and forest businesses that help protect the viability of working lands		
<b>Protect and enhance Hartford’s natural lands and resources</b>		
Limit development and impact on sensitive natural areas and species, while restoring damaged areas		
Strategy 1: Protect sensitive and ecologically important lands		
Actions	More Details	Who
Develop protections for critical wildlife corridors		Conservation Commission Planning & Dev. Dept. Planning Commission
Prevent development in wetlands		Conservation Commission Planning & Dev. Dept. Planning Commission
Require boardwalks or bridges for trails built over wetlands		Conservation Commission Parks & Rec Commission Parks & Rec Dept.

<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Traditional development patterns and housing models (Housing chapter)</li> <li>• Land use chapter</li> <li>• Rural and historic character (Historic Resources chapter)</li> </ul>		
<p><b>Strategy 2: Allow flexible land use and management options on rural and forest lands</b></p>		
<p><b>Actions</b></p>	<p><b>More Details</b></p>	<p><b>Who</b></p>
<p>Ensure that renewable energy generation is allowed on rural and forest lands</p>		<p>Planning Commission Energy Commission</p>
<p>Ensure that compatible on-farm businesses and cottage industries are allowed on working lands</p>		<p>Planning Commission Planning &amp; Dev. Dept. Conservation Commission</p>
<p>Support the development of a regional farm and forest economy</p>		<p>Planning &amp; Dev. Dept. Conservation Commission</p>
<p>Ensure that animals and gardens are allowed in residential areas</p>		<p>Planning Commission Planning &amp; Dev. Dept. Conservation Commission</p>
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• New Economy (Economic Development chapter)</li> <li>• Renewable energy (Energy chapter)</li> <li>• Land Use chapter</li> </ul>		

## CHAPTER III: Population (Not subject of community forums)

## CHAPTER IV: Housing

<b>Housing Goals</b>		
<b>Develop diverse, quality, affordable housing for all</b> Ensure sustainable, adequate housing types that meet the needs of current and future Hartford residents.		
<b>Develop complete neighborhoods with traditional development patterns</b> Encourage clustered housing and dense neighborhoods near employment, transportation, parks and amenities.		
<b>Strategy 1: Increase variety of housing types for diverse residents and changing demographics</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Ensure that zoning and policies allow for diverse and emerging housing models	Examples: workforce housing, accessory apartments, “granny pods,” tiny houses and smaller units, senior housing, co-housing, and multi-family units	Planning & Dev. Dept. Planning Commission
Partner with private housing developments to allow diverse, desired housing	Examples: bylaw changes or incentives to allow for housing such as apartments or multi-family units	Planning & Dev. Dept.
Develop incentives that encourage new workforce and affordable housing	Examples: incentive zones, fast-tracking permits, tax abatement, or density bonuses employer partnerships	Planning & Dev. Dept. Planning Commission
<b>Also Supported By:</b>		
<ul style="list-style-type: none"> <li>• Land Use chapter</li> </ul>		

<b>Strategy 2: Ensure that new housing supports Hartford’s rural and historic character and development patterns</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Ensure that zoning and policies allow and incentivize infill and mixed use housing	Examples: village infill, mixed use development, workforce housing, conversion of homes and other units	Planning & Dev. Dept. Planning Commission
Update zoning and land use plan to encourage compact development and preservation of open space	Examples: cluster development, transfer of development rights, conservation development	Planning & Dev. Dept. Planning Commission
Ensure that infrastructure investments support desired development patterns	Examples: road paving and classification/downgrading decisions, water & sewer service extensions, sidewalk and transit investments	Planning & Dev. Dept. Public Works Dept.
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Transportation networks and road maintenance (Transportation chapter)</li> <li>• Parks and recreation (Facilities &amp; Services chapter)</li> <li>• Historic and rural character (Historic Resources chapter)</li> </ul>		
<b>Strategy 3: Develop sustainable, safe, energy efficient housing</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Develop environmental building and low-impact development standards	Consider: air quality, materials, energy, siting, green infrastructure, and environmental design	Planning & Dev. Dept. Planning Commission
Provide information to the public about resources, funding and techniques for sustainable housing development	Examples: Guides, case studies, state resources and guidebooks	Planning & Dev. Dept. Energy Commission CROH
<b>Also Supported By:</b>		

- Building integrity and RBES (Energy chapter)
- Crime prevention through design (Community Facilities & Services chapter)

## CHAPTER V: Economic Development

<b>Economic Development Goals</b>		
<p><b>Develop a resilient, diversified “new economy”</b> Build an economy driven by local businesses and entrepreneurs, that strengthens Hartford’s character and quality of life</p>		
<p><b>Foster the growth of attractive, high quality jobs</b> Attract diverse jobs that offer living wages and meet the employment needs of local businesses</p>		
<p><b>Make village centers hubs of a local economy</b> Create thriving and connected villages that serve as places to live, work, shop, meet and play.</p>		
<b>Strategy 1: Support growth sectors and desired “new economy” businesses</b>		
Actions	More Details	Who.
Identify growth sectors and desired business types and their needs	Examples: tech, food and farm, forest businesses, tourism and recreation, co-working, creative economy, cottage industries	Planning & Dev. Dept
Update zoning and development policies to ensure they allow for new economy land uses and development forms	Examples: on-farm businesses, shared spaces, and mixed use development	Planning & Dev. Dept. Planning Commission
Create financial and/or policy incentives to attract desired businesses	Examples: tax credits, green development zones, industry-specific zones	Planning & Dev. Dept.

Develop an “economic gardening” strategy to cultivate local entrepreneurs		Planning & Dev. Dept.
Support the development of the Vermont Creative Network and the 3CVT district		Planning & Dev. Dept. Partner: TRORC
Support the growth of state and local food and farm networks and food hubs		Partner: Vital Communities
Develop partnerships to support and market regional growth sectors	Examples: health, technology, recreation, arts	Planning & Dev. Dept. Partners: GMEDC, TRORC, State of Vermont, universities, major employers
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Land Use chapter</li> <li>• Workforce training (Education chapter)</li> <li>• Working lands economy (Natural Resources chapter)</li> </ul>		
<p><b>Strategy 2: Support workforce development and recruitment</b></p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Create apprenticeships and school-to-workforce pipelines through school and employer partnerships		School District Partners: GMEDC, VTC, HACTC, Dartmouth College
Develop high quality amenities and services to attract and retain workers	Examples: childcare, workforce housing, recreation and cultural offerings, quality schools	Planning & Dev. Dept.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Continuing education and service learning (Education chapter)</li> <li>• Workforce housing (Housing chapter)</li> </ul>		



<b>Strategy 3: Develop village centers as economic hubs</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Improve and add amenities and attractions in each village center	Examples: gathering places, events and parks, benches and seating	Parks & Recreation Dept. Planning & Dev. Dept. Public Works Dept.
Improve aesthetics and beautification in each village center	Examples: landscaping and gardens, public art, banners and signage, historic character and interpretation	Parks & Recreation Dept. Planning & Dev. Dept. Public Works Dept.
Develop partnerships to revitalize villages and provide amenities		Planning & Dev. Dept. Village businesses Non-profit and community groups
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Connectivity and active transportation (Transportation chapter)</li> <li>• Mixed use development (Land Use chapter)</li> <li>• Parks and recreation (Community Facilities &amp; Services chapter)</li> </ul>		
<b>Strategy 4: Expand commercial facilities and business infrastructure</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Inventory and publicize incubators and other spaces for entrepreneurs	Examples: incubator spaces, maker spaces, co-working and shared office spaces	Planning & Dev. Dept. TRORC and GMEDC
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Internet and fiber optics (Facilities &amp; Services chapter)</li> <li>• Transportation systems and connectivity (Transportation chapter)</li> </ul>		
<b>Strategy 5: Promote Hartford and its assets to attract visitors, workers and residents</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>

Conduct a community branding and identity process that showcases Hartford's character and assets		Planning & Dev. Dept. Partners Hartford Area Chamber Hartford Dev. Corp.
Create a marketing campaign promoting Hartford as a destination for visitors, employers, workers and new residents		Planning & Dev. Dept. Hartford Area Chamber Hartford Dev. Corp.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Parks &amp; recreation (Community Facilities &amp; Services chapter)</li> <li>• School quality (Education section Community Facilities &amp; Services chapter)</li> <li>• Historic and rural character (Historic Resources chapter)</li> </ul>		

GMEDC - Green Mountain Economic Development Corporation'  
 TRORC – Two Rivers Ottauquechee Regional Commission  
 HACTC –Hartford Area Career and Technology Center  
 VTC - Vermont Technical College

## CHAPTER VI: Community Facilities and Services

<p><b>Education Goals</b> NOTE: Strategies and actions represent community ideas from forums, but may not be in line with school district plans or policies</p>
<p><b>Improve the quality and availability of education for all residents</b>                  Provide diverse and high quality education options, from public PK-12 schools to continuing education and workforce training</p>
<p><b>Increase connections between the school system and community</b>                  Encourage collaboration, joint programming, volunteer opportunities, and shared use of resources and facilities</p>
<p><b>Strategy 1: Expand job training and workforce education programs</b></p>

Actions	More Details	Who
Work with school district to expand curriculum and meet educational needs of high-demand employment sectors	Examples: tech industry, advanced manufacturing, farming & sustainability work	School Board
Develop school-community partnership to expand job training, apprenticeship and internship programs		School Board, HACTC Educational institutions Major employers Regional RDC and RPC
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Libraries (Facilities &amp; Services chapter)</li> <li>• New Economy (Economic Development chapter)</li> </ul>		
<b>Strategy 2: Share resources, programs and facilities between the community and schools</b>		
Actions	More Details	Who
Develop policies to expand community use of school facilities during off hours		School Board
Expand community service and service learning opportunities to meet community needs		School Board Town departments Local non-profits
Explore opportunities to open school electives and educational programming to the public		School Board
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Bus sharing (Transportation chapter)</li> </ul>		

<b>Strategy 3: Address community health and social needs through schools</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Improve quality and diversity of school offerings to attract families and workers		School Board
Increase physical activity in school curriculum and school day		School Board
Ensure that all students have access to social workers in schools		School Board Social Service Agencies
Explore ways to make schools more welcoming and culturally inclusive		Committee on Racial Equity & Inclusion School Board
Explore ways to align school calendar with the needs of working parents and families	Examples: consider start and end times, breaks, and before- or after-school care	School Board
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Law enforcement and human services partnerships (Community Facilities &amp; Services chapter)</li> </ul>		

<b>Parks &amp; Recreation Goals</b>		
<b>Expand and improve trails, river access, and outdoor recreation</b> Increase quality and maintenance, information, access points and connectivity for a variety of outdoor recreation types		
<b>Maintain quality, accessible municipal parks, recreation facilities and programs</b> Ensure long-term sustainability and maintenance of diverse, convenient and affordable recreation options		
<b>Expand the variety of available recreation, cultural and artistic offerings</b> Increase offerings for people of diverse cultures, ages, abilities, income levels, and interests		
<b>Strategy 1: Plan for long-term sustainability and affordability of recreation facilities</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Create a capital budget for maintenance and improvements of major recreation facilities		Parks & Rec Dept. Town Manager
Identify cost-saving maintenance practices and landscaping options for parks and public spaces	Examples: drought-tolerant grasses, green infrastructure installations	Parks & Rec Dept.
<b>Strategy 2: Increase access and availability of recreation sites and programs</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Partner with local trail and outdoor recreation groups to improve trails and access	Partnership focus: trail building and maintenance, connectivity and networks, publicity and mapping, improving parking and signage, securing permissions	Parks & Rec Dept. Conservation Commission Partners: VAST, UVTA & UVLT
Develop new trails and access points serving neighborhoods and village centers		Parks & Rec Dept. Parks & Rec. Commission Area trail groups

Increase public access to private recreation facilities and cultural programming	Examples: Shared use agreements for school gyms or private recreation facilities, UVAC partnership, cross-promotion agreements, discounted passes for residents	Park & Rec Dept. Partners: Schools, employers, housing developments, rec businesses, arts centers
Develop and publicize maps and guides to area trails and recreation facilities		Parks & Rec Dept. Area trail groups
Identify sites and develop small parks and rec facilities in neighborhoods and village centers	Examples: pocket parks, activity trails, playgrounds or structures, chess boards	Parks & Rec Dept. Planning & Dev. Dept.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Transportation networks and Complete Streets (Transportation chapter)</li> <li>• Workforce training (Education section Community Facilities &amp; Services chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Community-school connections (Education section Community Facilities &amp; Services chapter)</li> </ul>		
<p><b>Strategy 3: Offer diverse recreation opportunities for changing demographics</b></p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Develop partnerships to expand arts and cultural activities	Examples: Shakespeare in the Park, free and reduced tickets to area arts programming, performances in unusual venues	Parks & Rec Dept.
Increase low-impact and universally-accessible recreation offerings in parks and town programs	Examples: chess and checkerboards, universally accessible (UA) playgrounds, bocce courts, grills	Parks & Rec Dept.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Communication systems (See Police and Emergency Services Section below)</li> </ul> <p>UVTA – Upper Valley Trails Alliance                  UVLT - Upper Valley Land Trust                  VAST – Vermont Association of Snow Travelers</p>		



<b>Police and Emergency Services Goals</b>		
<b>Provide strong police and emergency services to all five villages</b> Maintain full staffing, equipped stations, and meet response standards throughout Hartford		
<b>Build a human-centered approach to law enforcement, emergency and social services</b> Strengthen coordination between departments and holistic policies focused on wellbeing and positive relationships		
<b>Improve police presence and enforcement</b> Align police response and patrols with community needs and underserved locations		
<b>Strategy 1: Build, maintain and staff fire &amp; rescue stations serving all Hartford villages and locations</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Secure funding and build a fire station in Wilder		Fire Dept. Town Manager
Explore staffing options for Quechee fire station		Fire Dept. Town Manager
<b>Strategy 2: Fully staff Police and Fire departments</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Expand recruitment and job training programs to hire more police, fire & rescue staff		Police Dept. Fire Dept. Town Manager
Identify and address barriers to recruitment of staff and personnel	Examples: workforce housing, childcare, quality schools, salaries and benefits	Police Dept. Fire Dept. Town Manager

Recruit and train volunteers to supplement police, fire & rescue personnel	Examples: assisting with fingerprinting, neighborhood wellness checks, or CERT teams	Fire Dept. Police Dept.
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Diverse housing (Housing chapter)</li> <li>• Workforce training (Education section Community Facilities &amp; Services chapter)</li> </ul>		
<b>Strategy 3: Develop a strong community policing program and social service coordination</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Identify social needs and drivers of crime and rescue calls	Resource: National Guard data analyst	Police Dept.
Adopt a “good Samaritan” policy for overdose cases		Police Dept.
Expand police patrols and presence on rural roads and underserved areas		Police Dept.
Conduct follow up visits after all acute police, fire & rescue calls		Fire Dept. Police Dept. Social Service Org.
Establish formal partnerships and coordinated systems between police, fire, rescue and social service organizations		Police Dept. Fire Dept. Partners: hospitals, VA Hospital, Faith Organizations, Schools, Housing Providers

Appoint and train “neighborhood captains” to check on people and communicate needs to service providers	Examples: door-to-door visits during heat waves and high-risk times, disaster coordination	Fire Dept. Emergency Management Director
<b>Strategy 4: Expand crime prevention through design</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Prioritize and invest in public infrastructure that reduces crime	Examples: sidewalks, streetlights	Planning & Dev. Dept. Police Dept. Public Works Dept.
Update design guidelines to allow and incentivize elements that reduce crime	Examples: front porches, minimal setbacks	Planning & Dev. Dept. Police Dept.
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>Complete streets and active transportation (Transportation chapter)</li> </ul>		
<b>Library Goals</b>		
<b>Support and grow libraries as community centers</b> Maintain existing library branches and expand offerings to meet changing community needs		
<b>Strategy 1: Maintain and staff four accessible Hartford library branches</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Continue to maintain, fund and provide staff at all four library branches		Libraries Town Manager
<b>Strategy 2: Support new library offerings that meet changing needs</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>

Expand multi-cultural offerings, programs and resources	Examples: design and services welcoming to people of color, Spanish and other language services, multicultural programming	Libraries
Increase affordable and free family activities and programming	Examples: movies, book groups, play groups, classes and workshops, mentorship programs	Libraries
Invest in technology, collections and resources that meet evolving needs	Examples: Computers and pads, audio/downloadable books, maker or tinker spaces, bike sharing	Libraries
Explore changes to library hours and policies to meet needs of children and families	Examples: after school care or study groups	Libraries
Develop formal partnerships to publicize libraries and help libraries address other needs	Examples: partnerships with Conservation Commission, Parks & Rec, schools, or cultural groups	Libraries
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Transportation networks and Complete Streets (Transportation chapter)</li> <li>• Community-school connections (Education section of the Community Facilities &amp; Services chapter)</li> </ul>		
<b>Solid Waste Goal</b>		
<p><b>Improve composting, recycling and solid waste programs</b> Compost and recycle more materials by expanding services and participation</p>		
<b>Strategy 1: Expand town wide composting and recycling services</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Research recycling and trash handling practices and options	Examples: Information on what happens to recycling, options for expanding the solid waste program, info on regional composting needs and facilities	Public Works Dept.

Explore options for implementing state composting laws and expanding composting operations	Examples: curbside pickup or neighborhood drop-offs, composting facilities in each village, town facilities for leaf mulch, energy generation from compost or trash, expanding services to nearby towns, and partnerships with private facilities like Upper Valley Composting	Public Works Dept.
Create a public education campaign to increase rates and compliance for recycling and compost	Include: what can be recycled or composted, prep and methods for sorting and recycling, and benefits of participating	Public Works Dept.

## CHAPTER VII: Utilities

<b>Telecommunications Goal</b>		
<b>Develop universal high-speed internet and cellular phone coverage</b>		
Expand fiber optic and cellular networks to ensure affordable and reliable communications technology		
<b>Strategy 1: Support the development of fiber-optic and cellular communications systems</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Support providers in expanding broadband and high-speed Internet service		Two Rivers Ottauquechee Regional Commission & Green Mountain Economic Development Corporation
Support providers in developing cell towers and systems that fill service gaps		Two Rivers Ottauquechee Regional Commission & Green Mountain Economic Development Corporation

- Also Supported By:**
- New Economy and village center hubs (Economic Development chapter)
  - Density and land use patterns (Housing chapter)
  - Mixed Use development (Land Use chapter)

## CHAPTER VIII: Transportation

**NOTE: Goals/strategies/actions need attention**  
 This strategies & actions in this section are pieced together from several forum discussions: the energy/transportation discussion, roads/public works, and active transportation. Transportation as a whole did not have much discussion, so there were not many goals articulated, and section doesn't stand together as a whole.

<b>Public Transportation Goals</b>		
<b>Expand public transportation options and access</b> Increase the number and convenience of routes, access to transit, and public awareness		
<b>Strategy 1: Increase the number of transit routes and options</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Support the expansion of bus routes, including evening and weekend routes and a Quechee regional bus route, and more village stops		Regional Transit Providers TRORC Planning & Dev. Dept.
Explore the potential of commuter and community rail service		TRORC Planning & Dev. Dept.
Develop special bus services to events and critical destinations like libraries, trails and rec		Town Depts Regional Transit Providers



facilities		
Explore the potential of using school buses for public transportation during off hours		School Dept.
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Transportation sustainability (Energy chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Traditional development patterns (Housing chapter)</li> </ul>		
<b>Strategy 2: Improve connectivity between transportation systems and destinations</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Prioritize and invest in transportation infrastructure that connects Hartford’s village centers	Examples: bus routes and stops, bike paths	Town Manager Regional Transit Providers
Develop transportation networks that connect to key destinations including regional transit, major employers, schools, employers, and neighborhoods		Regional Transit Providers
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Traditional development patterns (Housing chapter)</li> </ul>		
<b>Active Transportation Goals</b>		
<b>Expand and improve active transportation options</b> Improve safety and availability of bike and pedestrian routes, including paths and protected lanes and safe sidewalks and crossings		

<b>Strategy 1: Expand safe bike and pedestrian infrastructure</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Complete a bike & pedestrian audit to identify assets, needs and priorities	Include: connectivity gaps (“First and Final Mile”), unsafe or deteriorating infrastructure, high-traffic areas	Planning & Dev. Dept. Public Works Dept. Police Dept.
Develop a plan for building and maintaining sidewalks in a cost-efficient way		Planning & Dev. Dept. Public Works Dept.
Improve safety of high priority crosswalks and sidewalks		Planning & Dev. Dept. Public Works Dept. Police Dept.
Invest in new sidewalks and crosswalks serving high-traffic areas or destinations		Planning & Dev. Dept. Public Works Dept. Police Dept.
Install bike infrastructure such as bike racks and covered storage in village centers and at key destinations		Public Works Dept.
Identify priority routes and install dedicated bike/pedestrian lanes or paths connecting key destinations		Planning & Dev. Dept. Public Works Dept.
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Transportation sustainability (Energy chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Trails and recreation (Community Facilities &amp; Services chapter)</li> </ul>		
<b>Strategy 2: Build “Complete Streets”</b>		
Ensure that new and rebuilt roads are designed for bikes and pedestrians as well as cars		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>

Adopt a Complete Streets policy to guide future road improvements and building projects		Planning & Dev. Dept. Public Works Dept.
Increase collaboration between Public Works and Planning Departments		Planning & Dev. Dept. Public Works Dept.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Trails and recreation (Community Facilities &amp; Services chapter)</li> <li>• Transportation sustainability (Energy chapter)</li> </ul>		
<p><b>Public Roads Goals</b>  <b>NOTE: Forums did not explore strategies and actions in depth</b></p>		
<p><b>Improve maintenance and reduce costs of town roads</b>          Ensure that roads are well maintained and in good condition while reducing the cost of long-term maintenance</p>		
<p><b>Reduce stormwater runoff and erosion from town roads</b>          Use green infrastructure and best practices for road building and maintenance to reduce runoff</p>		
<p><b>Strategy 1: Reduce amount of public roads</b>          Explore policies and options that would reduce the total road mileage that the Town of Hartford must maintain</p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Audit town roads to identify opportunities for downgrading or eliminating town road sections		Public Works Dept.
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Compact development patterns (Housing chapter)</li> </ul>		

## CHAPTER X: Energy

**NOTE: Goals/strategies/actions should change based on HEC work and conclusions**  
 Items included here are from the forum only.

<b>Renewable Energy Goal</b>		
<b>Meet or exceed state goals for renewable energy generation</b> Generate between 55,873 and 68,289 MWh/year of renewable electricity by 2050.		
<b>Strategy 1: Increase solar generation in Hartford</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Support community solar projects and group net metering		Energy Commission Energy Coordinator
Support and incentivize solar on commercial buildings, flat roofs and other ideal sites	Examples: partnerships, outreach, financial incentives	Energy Commission Energy Coordinator
Promote solar through an educational campaign for municipal leaders and the public		Energy Commission Energy Coordinator
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>• Land Use chapter</li> <li>• Working lands economy (Natural Resources chapter)</li> <li>• New Economy (Economic Development chapter)</li> </ul>		
<b>Strategy 2: Decrease fossil fuel infrastructure</b>		

Actions	More Details	Who
Engage town commissions & boards in exploring ways to reduce new fossil fuel infrastructure		Energy Commission Energy Coordinator
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Mixed use development (Land Use chapter)</li> <li>• Sustainable housing and housing development patterns (Housing chapter)</li> <li>• Transportation networks and road maintenance (Transportation chapter)</li> </ul>		
<p><b>Strategy 3: Explore alternative renewable energy sources</b></p>		
Actions	More Details	Who
Research and explore options for other renewable energy sources	Examples: local biomass (wood), food anaerobic digesters, micro hydro	Energy Commission Energy Coordinator
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Composting and recycling (Community Facilities &amp; Services chapter)</li> <li>• Working lands businesses (Natural Resources chapter)</li> </ul>		
<p><b>Building Integrity Goals</b></p>		
<p><b>Weatherize Hartford homes to improve energy efficiency</b> Weatherize 25% off Hartford’s housing stock by 2020</p>		
<p><b>Heat Hartford’s homes with renewable energy</b> Use renewable energy to heat 50% or more of Hartford’s housing stock by 2025</p>		
<p><b>Strategy 1: Promote energy efficient development</b></p>		
Actions	More Details	Who
Adopt Residential Building Energy Standards (RBES)		Planning Commission Energy Commission

		Energy Coordinator
Adopt a policy that incentivizes energy efficiency in rental units	Example: requiring landlords to incorporate energy costs	Planning Commission Energy Coordinator Energy Commission
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>Mixed use development (Land Use chapter)</li> <li>Traditional development patterns and housing variety (Housing chapter)</li> </ul>		
<b>Strategy 2: Inventory and track residential energy efficiency</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Collect data on residential energy efficiency projects and status	Examples: tax records, energy efficiency programs and rebates, and voluntary surveys	Energy Commission Energy Coordinator
<b>Also Supported By:</b> <ul style="list-style-type: none"> <li>Mixed use development (Land Use chapter)</li> <li>Sustainable housing and housing development patterns (Housing chapter)</li> <li>Transportation networks (Transportation chapter)</li> </ul>		
<b>Strategy 3: Support and promote weatherization projects</b>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Provide public education and assistance on weatherization	Examples: case studies and how-tos, info on financial incentives and technical assistance, free home visits	Energy Commission Energy Coordinator
Explore options to create a weatherization fund for homeowners	Examples: small tax increase, option tax, fuel tax, private funding	Energy Commission Energy Coordinator
Recruit and train volunteers or students to complete weatherization projects	Example: Sustain-A-Raisers program in NH	Energy Commission Energy Coordinator



**Also Supported By:**

- Housing quality (Housing chapter)
- Community-school connections and job training (Education section Community Facilities & Services chapter)
- Workforce development (Economic Development chapter)

**Transportation Sustainability Goals**

**Note: Most actions in this category moved to Transportation chapter, but many could go either place**

**Reduce vehicle miles driven**

Reduce and hold per capita vehicle miles traveled to 2011 levels (11,402)

**Reduce trips by car**

Reduce single occupancy vehicle trips by 20% by 2030

**Increase active and sustainable transportation**

Decrease fossil fuel-based transportation by 10% by 2025

**Strategy 1: Promote public & active transportation options**

Actions	More Details	Who
Promote and support transportation options that reduce single occupancy vehicle (SOV) trips	Options: public transportation options, car sharing, and ride sharing, and active transportation Examples: public education/info campaigns, car or van pooling, Zip car stations, demo days	Energy Commission Energy Coordinator
Improve the safety and convenience of Park & Ride locations		Planning & Dev. Dept. Public Works Dept.
Explore the development of a municipal bike share program		Energy Commission Parks & Rec Dept.
Support employers in developing incentives for ride sharing and active transportation	Examples: free bus passes, free downtown parking	Energy Commission Energy Coordinator

<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Transportation networks (Transportation chapter)</li> <li>• Active transportation (Transportation chapter)</li> <li>• Village centers (Economic Development chapter)</li> <li>• Trails and paths (Community Facilities &amp; Services chapter)</li> </ul>		
<p><b>Strategy 2: Promote and support electric vehicles</b></p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Map existing and potential electric vehicle charging stations		Energy Commission Energy Coordinator
Install new electric vehicle charging stations in village centers and high-traffic areas		Energy Commission Energy Coordinator
<p><b>Strategy 3: Explore the potential of hydrogen fuel cells</b></p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Support start-ups and entrepreneurs advancing hydrogen fuel cells for transportation		Energy Commission Energy Coordinator
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• New Economy (Economic Development chapter)</li> </ul>		

**OTHER**

<p><b>Civic Engagement Goals</b></p> <p><b>NOTE: Unclear where this section would go; forums did not explore civic engagement and volunteerism in depth</b></p>		
<p><b>Improve town-wide communication systems</b>                  Ensure that community members and groups have access to a variety of public information channels to share and receive news</p>		
<p><b>Increase civic engagement and volunteerism</b>                  Develop a culture of participation and increase the number of engaged community members and volunteers</p>		
<p><b>Strategy 1: Develop and publicize communication channels</b></p>		
<b>Actions</b>	<b>More Details</b>	<b>Who</b>
Develop partnerships with libraries, schools and area organizations to distribute information		All Town Departments
Publicize free communication channels such as the Valley News calendar		All Town Departments
Expand and publicize town-wide communication channels such as a Hartford Listserve and Facebook		All Town Departments
<p><b>Also Supported By:</b></p> <ul style="list-style-type: none"> <li>• Libraries (Community Facilities &amp; Services chapter)</li> <li>• Community-school integration (Education section Community Facilities &amp; Services chapter)</li> </ul>		

This page intentionally left blank.

## Municipal Template - Energy Data

The following is an explanation of the information displayed in the Municipal Template for Hartford.

The intent of the Municipal Template is to provide the municipality with data that can be used to ensure compliance with the requirements of Act 174 and “Enhanced Energy Planning” (24 V.S.A. 4352). The spreadsheet contains data that estimates current energy use and provides targets for future energy use across all sectors (transportation, heating, and electricity). It also sets a target for renewable energy generation within the municipality.

This data is meant to be a starting point for the municipality to begin planning its energy future and to talk about the changes that may need to occur within the municipality to ensure that local, regional and state energy goals are met. This includes the goal that 90% of all energy demand be met by renewable sources by 2050.

Estimates of current energy use consist primarily of data available from the American Community Survey (ACS), the Vermont Agency of Transportation (VTrans), the Vermont Department of Labor (DOL), and the Vermont Department of Public Service (DPS). Targets for future energy use are reliant upon the Long-range Energy Alternatives Planning (LEAP) analysis for the region completed the Vermont Energy Investment Corporation (VEIC). Targets for future energy generation have come from the regional planning commission and DPS. Targets for both future energy use and energy generation have been generally developed using a “top down” method of disaggregating regional data to the municipal level. This should be kept in mind when reviewing the template. It is certainly possible to develop “bottom up” data. For those municipalities interested in that approach, please see the Department of Public Service’s Analysis and Targets Guidance.

There are some shortcomings and limitations associated the data used in the Municipal Template. For instance, assumptions used to create the LEAP analysis are slightly different than assumptions used to calculate current municipal energy use. Regardless, the targets established here show the direction in which change needs to occur to meet local, regional and state energy goals. It is important to remember that the targets established by LEAP represents only one way to achieve energy goals. There may several other similar pathways that a municipality may choose to take in order to meet the 90x50 goal.

### Figure 1 - Data Sources

American Community Survey (ACS)  
Vermont Department of Labor (DOL)  
Vermont Department of Public Service (DPS)  
Energy Information Administration (EIA)  
Efficiency Vermont (EVT)  
Long-range Energy Alternatives Planning (LEAP)  
Vermont Energy Investment Corporation (VEIC)  
Vermont Agency of Transportation (VTRANS)

Below is a worksheet by worksheet explanation of the Municipal Template spreadsheet:

## 1. Municipal Summary

The Municipal Summary worksheet summarizes all data that is required to be in the Municipal Plan if the plan is to meet the “determination” standards established by the Vermont Department of Public Service.

### 1A. Current Municipal Transportation Energy Use

Transportation Data	Municipal Data
Total # of Vehicles (ACS 2013-2017)	6,944
Average Miles per Vehicle (fhwa.dot.gov)	13,228
Total Miles Traveled	91,855,232
Realized MPG (VTrans Transportation Energy Profile 2017)	18.9
Total Gallons Use per Year	4,860,065
Transportation BTUs (Billion)	585
Average Cost per Gallon of Gasoline (eia.gov, Feb. 2019)	2.31
Gasoline Cost per Year	11,226,751

This table uses data from the American Community Survey (ACS) and Vermont Agency of Transportation (VTrans) to calculate current transportation energy use and energy costs.

### 1B. Current Municipal Residential Heating Energy Use

Fuel Source	Municipal Households (ACS 2013-2017)	Municipal % of Households	Total annual heating BTUs	Municipal BTU (in Billions)
Natural Gas	273	6.1%	22,256,340,000	22.3
Propane	1243	28.0%	107,309,640,000	107.3
Electricity	487	11.0%	35,152,620,000	35.2
Fuel Oil	1955	44.0%	172,316,880,000	172.3
Coal	0	0.0%	0	0
Wood	286	6.4%	28,995,360,000	29.0
Solar	62	1.4%	6,368,640,000	6.4
Other	114	2.6%	10,084,200,000	10.1
No Fuel	27	0.6%	1,482,300,000	1.5
<b>Total</b>	<b>4461</b>	<b>100.0%</b>	<b>383,965,980,000</b>	<b>384.0</b>

This table displays data from the ACS that estimates 2017 municipal residential heating energy use.



## 1C. Current Municipal Commercial Energy Use

	Commercial Establishments in Municipality (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment (in Billions) (VDPS)	Estimated Thermal Energy BTUs by Commercial Establishments in Municipality (in Billions)
Municipal Commercial Energy Use	403	0.725	292

The table uses data available from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (DPS) to estimate current municipal commercial establishment energy use in the municipality.

## 1D. Current Electricity Use

Use Sector	Current Electricity Use
Residential (kWh)	39,372,325
Commercial and Industrial (kWh)	57,548,846
Total (kWh)	96,921,171

Average Annual Residential kWh  
Data from Efficiency Vermont (EVT), 2017

## 1E. Residential Thermal Efficiency Targets

	2025	2035	2050
Residential - Increased Efficiency and Conservation (% of municipal households to be weatherized)	33%	67%	100%

This table displays targets for thermal efficiency for residential structures based on a methodology developed by DPS using data available from the regional Long-range Energy Alternatives Planning (LEAP) analysis and ACS. The data in this table represents the percentage of municipal households that will need to be weatherized in the target years.

## 1F. Commercial Thermal Efficiency Targets

	2025	2035	2050
Commercial - Increased Efficiency and Conservation (% of commercial establishments to be weatherized)	6%	9%	18%

This table shows the same information as Table 1E, but sets a target for commercial thermal efficiency. Information from the VT DOL is required to complete this target.

### 1G. Thermal Fuel Switching Targets (Residential and Commercial) - Wood Systems

	2025	2035	2050
New Efficient Wood Heat Systems (in units)	0	0	0

This target was calculated using data from LEAP and ACS. This table provides a target for new wood heating systems for residential and commercial structures in the municipality for each target year. Due to the LEAP model forecasting a large decrease in wood use resulting in a negative number of targets we have put zero in for this section. Towns are encouraged to use efficient wood heat.

### 1H. Thermal Fuel Switching Targets (Residential and Commercial) - Heat Pumps

	2025	2035	2050
New Heat Pumps (in units)	455	1202	2518

This table provides a target for new heat pump systems for residential and commercial structures in the municipality for each target year. This target was calculated using data from LEAP and ACS.

### 1I. Electricity Efficiency Targets

	2025	2035	2050
Increase Efficiency and Conservation	-0.6%	5.7%	9.9%

Data in this table displays a target for increased electricity efficiency and conservation during the target years. These targets were developed using regional LEAP analysis. Towns are encouraged to consider increased efficiency targets.

### 1J. Use of Renewables - Transportation

	2025	2035	2050
Renewable Energy Use - Transportation	9.6%	23.1%	90.3%

This data displays targets for the percentage of transportation energy use coming from renewable sources during each target year. This data was developed using the LEAP analysis.

### 1K. Use of Renewables - Heating

	2025	2035	2050
Renewable Energy Use - Heating	51.5%	63.6%	92.1%

This data displays targets for the percentage of heating energy use coming from renewable sources during each target year. This data was developed using information from the LEAP analysis.

### 1L. Use of Renewables - Electricity

	2050
Renewable Energy Use - Electricity (MWh)	55,873- 68,289

This data displays the target for electricity generation coming from renewable sources within the municipality for 2050. This data was developed using information from the regional planning commission and DPS. This data is the same as the data in Table 1Q.

### 1M. Transportation Fuel Switching Target - Electric Vehicles

	2025	2035	2050
Electric Vehicles	485	3,435	7,144

This tables displays a target for switching from fossil fuel based vehicles (gasoline and diesel) to electric vehicles. This target is calculated on Worksheet 2 by using LEAP and ACS data.

### 1N. Transportation Fuel Switching Target - Biodiesel Vehicles

	2025	2035	2050
Biodiesel Vehicles	852	1,604	2,707

This tables displays a target for switching from fossil fuel based vehicles to biodiesel-powered vehicles. This target is calculated on Worksheet 2. by using LEAP and ACS data.

## 1O. Existing Renewable Generation

Renewable Type	MW	MWh
Solar	6.43	7,340
Wind	0.00	6
Hydro	39.04	158,534
Biomass	0.00	-
Other	0.00	-
<b>Total Existing Generation</b>	<b>45.47</b>	<b>165,874</b>

Table 1O shows existing renewable generation in the municipality as of December, 2018, from vtenergydashboard.org

## 1P. Renewable Generation Potential

Renewable Type	MW	MWh
Rooftop Solar	6	7,942
Ground-mounted Solar	1,089	1,335,856
Wind	0	0
Hydro	0	7
Biomass and Methane	0	0
Other	0	0
<b>Total Renewable Generation Potential</b>	<b>1,096</b>	<b>1,343,805</b>

Renewable generation potential is based on mapping completed by the regional planning commission that is based on the Municipal Determination Standards and associated guidance documents developed by DPS. The renewable generation potential is expressed in MW and MWh by the type of renewable resource (solar, commercial wind, hydro, etc.).

## 1Q. Renewable Generation Target

	2050
Total Renewable Generation Target (in MWh)	55,873- 68,289

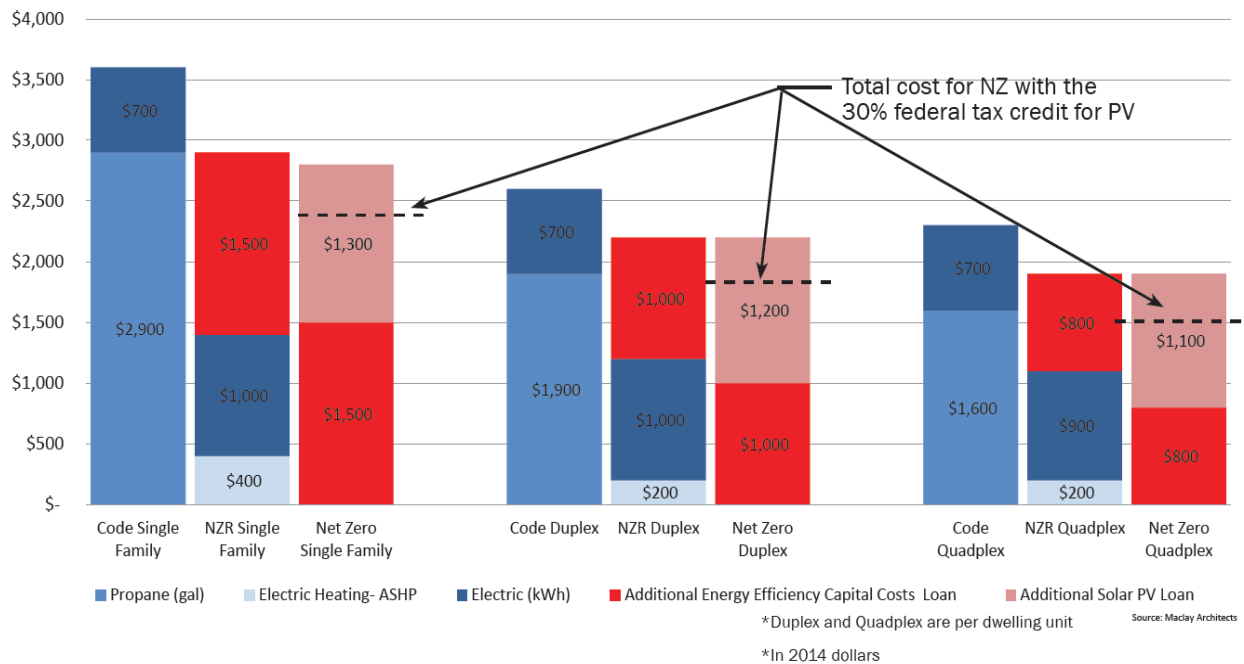
Renewable generation target for municipalities was developed by the town's population percentage within the region.

## 1R. Sufficient Land

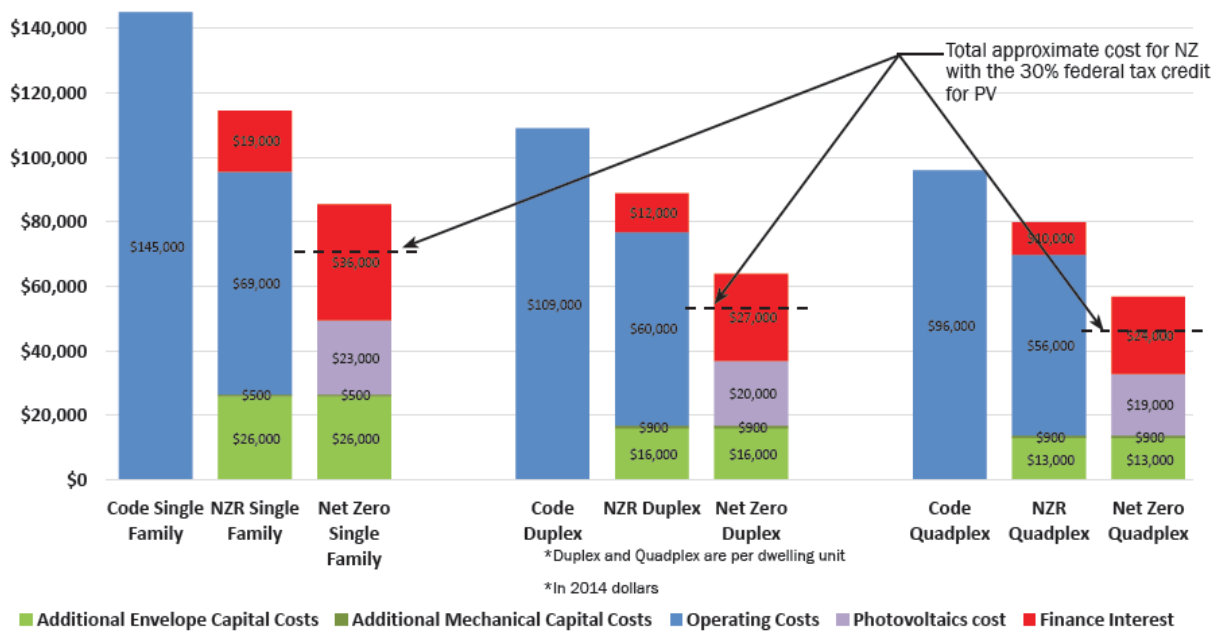
	Y/N
Renewable Sources	Y
Surplus of Generation	2065%

This table shows whether or not there is sufficient land in the municipality to meet the renewable generation targets based on the renewable generation potential in the municipality.

## APPENDIX C – INVESTMENT ANALYSIS OF NET ZERO BUILDING



**Figure 7.1: Residential first year energy and finance costs**



**Figure 7.2: Residential 30 year capital, operating, and finance costs graph**

Source: Efficiency Vermont. Net Zero Energy Feasibility Study, Full Report; Jan 30, 2015.

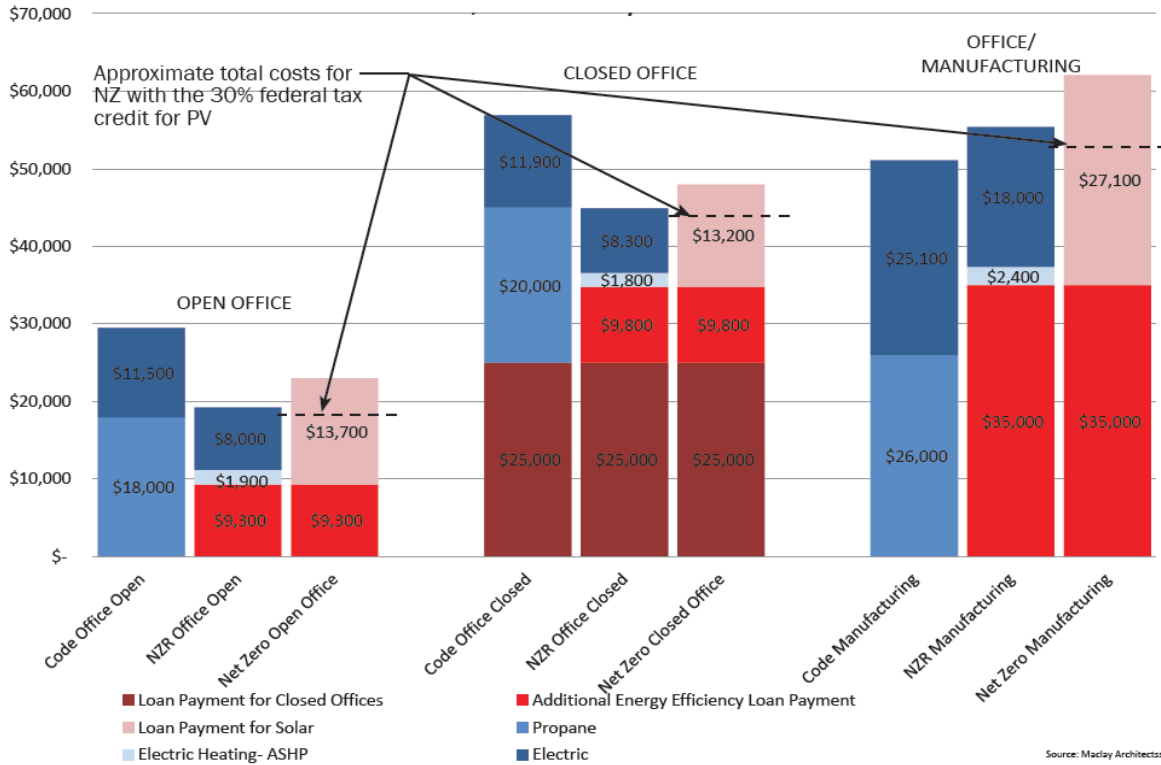


Figure 7.7: Commercial first year energy cost graph

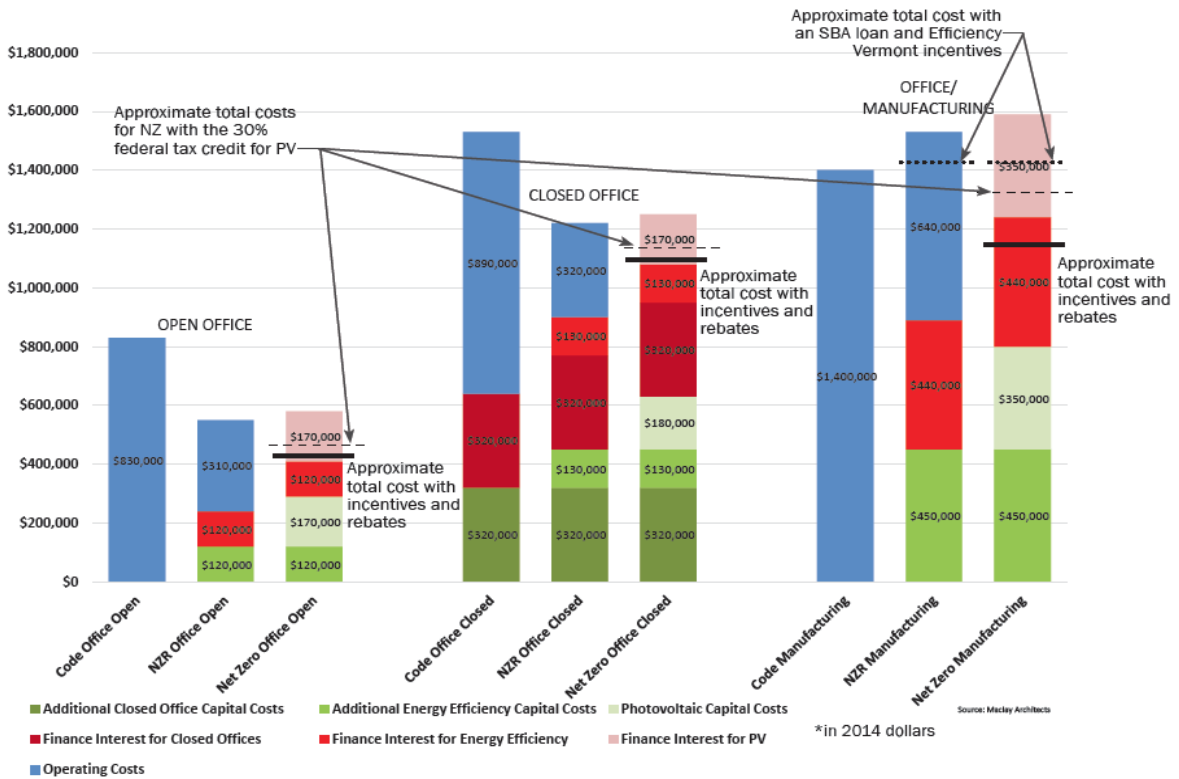


Figure 7.8: Commercial 20-year capital, operating, and finance costs

Source: Efficiency Vermont. Net Zero Energy Feasibility Study, Full Report; Jan 30, 2015.



## APPENDIX D – LAND USE ESTIMATES FOR SOLAR (PV) GENERATION

Hartford has 2004 acres of “Prime Solar” within 1 mile of 3 phase power lines.<sup>1</sup> Assuming 30% of solar PV capacity is installed on rooftops, Hartford would need roughly 300 acres of fixed array commercial-scale solar parks to meet the new generation target.

To estimate total land use for renewable energy generation from solar PV, we need an estimate for Hartford's annual energy needs (the target) and we need an estimate for how productive an area of land in our region is for generating energy from solar PV (i.e. the power density).

1. The target for "new" generation is estimated for Hartford by TRORC, expressed as a range (55,873-68,289 MWh/yr). To keep things simple for illustration purposes, we will use the mid-point of the range which is 62,081 MWh/yr. That's how much new renewable generation Hartford residents and businesses will need to keep the lights on, the fridges cold, the electric vehicles moving, etc. each year, beginning in 2050.
2. Now, find the rate of power generation required to produce this much energy in a year from solar PV. To do that, first translate energy to power (capacity); divide by days/year, then divide by hours per day:  $62,081/365=170.09$  and  $170.09/24=7.09$  MW. So if Hartford's solar arrays, cumulatively produce power at a rate of 7.09 MW throughout the year, we'll accumulate the required new energy. But the sun does not always shine, which brings us to the utilization factor.
3. The commonly accepted utilization factor for solar PV is 15%, so we need a rate of production greater than 7.09 since we are only producing energy 15% of the time. Dividing  $7.09 \text{ MW}/.15$  gives us 47.27 MW. Now, with power density, we can calculate the required land area.
4. The analysis of regional solar PV installation by TRORC provides the basis for the power density estimate we will use. TRORC finds that 9 acres are required for each MW of power (total land required for installation sizes typical in our region). So each MW requires 9 acres and we need to produce power at a rate of 47.27 MW, then the total acreage required is  $9 * 47.27=425.43$  acres. But this does not mean 425.43 contiguous acres, nor does it mean we cannot install solar on rooftops. For the purposes of these rough estimates, we will assume equivalent rates of solar PV production on the ground and on rooftops. So how many MW can we put on roofs?
5. Using an initial estimate of 30% of new solar PV generation capacity on rooftops (this is double the TRORC estimate for Hartford, but reflects Hartford's emphasis on maximizing rooftops and accounts for structural and rooftop renovations between now and 2050), we need 70% on the ground or  $425.43 * .7 = 297.80$  acres, or roughly 300 acres.

---

<sup>1</sup> [https://www.trorc.org/wp-content/uploads/2015/09/Appendix\\_C\\_Energy\\_Targets\\_07\\_26\\_17.pdf](https://www.trorc.org/wp-content/uploads/2015/09/Appendix_C_Energy_Targets_07_26_17.pdf)