Tunbridge Town Plan

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Prepared by the Tunbridge Planning Commission

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Fellow residents of Tunbridge:

What follows is the most recent update of the Tunbridge Town Plan, a planning effort that dates back to 1988 when the first Tunbridge Town Plan was written, the year the Tunbridge Planning Commission was formed. That plan served as the template for the following three plans written in 1993, 1998, and 2003. In 2003, the Planning Commission realized the need for a more comprehensive plan based on a changing landscape, both physically and figuratively. Population increases in the Upper Valley, as well as changes in agriculture, real estate values, and work and community patterns, have all played their part in redefining the Tunbridge community. Additionally, the population of Tunbridge, like that of the rest of Vermont, is changing, with fewer young people settling or staying in town and people later along in life moving here for a certain quality of life. As development pressures began knocking at Tunbridge's door, it became clear that as a town, we needed to discuss what we want Tunbridge to look like, how we want it to grow, and what our children will inherit.

In January of 2017, the Town was awarded a $12,000 Municipal Planning Grant from the Vermont Department of Housing and Community Affairs to help fund a Town Plan rewrite. The Town secured this grant with assistance of the Two Rivers-Ottauquechee Regional Commission (TRORC). Most of the award was to pay for technical assistance from TRORC, who partnered with the Planning Commission to write this document and helped meet the criteria specified by the State. Another portion of the grant went to facilitating a series of public meetings held in late Summer 2017.

We on the Planning Commission were overwhelmed by the attendance and participation of so many people at the meetings. The high quality of the input, as well as the level of concern you showed, inspired us in our work on the Plan. We are very grateful to all who participated, and we hope this document reflects the fruit of those meetings. This kind of community involvement in the town plan process is part of what makes Tunbridge the place we choose to live.

The document that has resulted is considerably longer and more detailed than previous plans. This is for a number of reasons. At this time, Tunbridge neither has zoning nor is proposing zoning, although we do have flood regulations which regulate development in the floodprone part of town and are considering whether we should regulate some subdivisions. Since we have no zoning, most development outside of the flood zone does not require a permit, but commercial development on a lot over one acre or creation of 6 lots or housing units does trigger the e Act 250 process. For those developments, town plans play a role if they provide sufficient and specific guidance. We also added sections to address new challenges faced by towns as competition for natural resources, energy resources, and housing has increased. Finally, in response to the overwhelming participation of townspeople, we have tried to address all the concerns shared at the town-wide meetings.

In sum, this revision could not have happened without the hard work of Tunbridge residents. Again, we are grateful for that. If we do not plan as a community, we can be sure that others will make plans for us. This Plan is just one tool, one step in the Town's work to plan as a community and to shape its future.

Respectfully,
The Tunbridge Planning Commission

Planning is a process of choosing among those many options. If we do not choose to plan, then we choose to have others plan for us.~ Richard J. Winwood

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I. Introduction

A. The Process of Planning for Our Future – Citizen Participation

The Town's planning process has been firmly rooted in citizen participation. The 2005 Town Plan revision featured a significant expansion of the Plan to incorporate the community's vision for the Tunbridge future. The development of the 2005 Plan featured a series of meetings were held in which citizens were asked what they wanted Tunbridge to be like in the next 5, 15 and 50 years. The response to these meetings and workshops was exceptional. The first of these meetings, a two-day event held in early April of 2005, was attended by over 200 people (15% of Tunbridge's population). The input, comments, and suggestions that the Planning Commission received from the public were invaluable in determining what Tunbridge's vision for the future is and what that document said.

In Spring 2017, the Tunbridge Planning Commission was awarded a Municipal Planning Grant from the Agency of Commerce and Community Development for the purpose of rewriting the Tunbridge Town Plan. The Planning Commission contracted with the Two Rivers-Ottauquechee Regional Commission for technical assistance services and began the process of collecting public input for the updated town plan. Additional revisions were completed in 2018 and the plan was adopted.

This latest plan has had additional changes made after the 2018 revisions in order to better incorporate data and statute on forest blocks and other issues

B. Why have a Plan?

At first glance, Tunbridge is a small, rural town that has remained relatively untouched by the changes that have occurred in surrounding towns. Tunbridge has not yet suffered from the stresses that a growing population can put on public utilities and services.

Nevertheless, work patterns are changing. It has become far more common for individuals to work outside of Tunbridge, some commuting as much as an hour to their jobs. Tunbridge resides in the Upper Connecticut River Valley, a main center of employment and services for eastern Vermont centered around Hartford/Lebanon/Hanover. The ease of access to employment, the rural character, community comradery, and the attractive cultural and aesthetic environment makes the Town of Tunbridge a prime candidate for growth. As a result, the population increased in the decades between 1980-1990 and 1990-2000, two decades where Tunbridge experienced a 41% overall increase in population. And while the decade between 2000-2010 saw a slight decrease in population, it is difficult to argue that an increased population has changed the character of our community over the past forty years. In a community like Tunbridge, a rapid change of population will impact schools, alter road maintenance concerns, and most certainly will put a higher burden on our other town services.

Planning is the process of projection. A community imagines what the future should be, and then starts putting these ideas into action. Communities with little or no planning are more likely to experience problems of over-development, such as high property taxes and increased demands for community services. Tunbridge, like every town, has choices in the way we provide for orderly growth and in the way we balance our natural and built environments. Planning is done to meet the needs of the people who are here now in the face of change.

Here are some specific reasons to have a Town Plan:

1. *A guide for future development* –The District Environmental Commission requires development proposals to conform with Town Plans during Act 250 hearings, which is why the Plan should clearly explain to developers and others what types of development are preferred in our town and where they should be built.

2. *A guide for our community* – Information in the plan can be used for developing the recommendations contained in a capital budget and program, for establishing a community development program, and for providing direction to the Selectboard for such things as community services, emergency services, recreation, and municipal facility development to name a few.

3. *Support for grant applications and planning studies* – Many of the state-run grant programs available to Tunbridge look to see if the town has stated a need for its grant request. Studies are often called for within a plan, and the funding for such projects can come from state sources as well.

C. Use of This Plan

The above section describes why to have a plan. This plan has been carefully worded so as to try to avoid unintended consequences, especially when used in decision making. This plan can have effect in Act 250 permits as noted, and it can also have effect in Section 248 proceedings (cell towers and electric generation), as well as 1111 permits (access permits onto highways). The plan, as required by law, covers many areas, and no specific goal in the plan shall be construed or applied in isolation from the other goals of the plan. Plans always have competing interests and so they have to be seen as a whole and a product of compromise.

This plan follows a standard format and has goals, policies and recommendations. A goal represents the state of affairs that this plan is intended to achieve. A policy is an expression of how to meet a goal. A recommendation is suggested means by which to implement a policy. Policies of the plan are generally *permissive*, in that if the plan says that farms are desired, one can, but does not have to, have a farm. Most policies simply encourage, but do not mandate, activities by using the word “should.” Where this plan intends to be used in a mandatory way, that is only applicable under the above permit processes, and only by using words such as “shall” or “must.” All goals, policies, and recommendations of the Plan are clearly titled as such, while background materials lay the foundation for these but are not meant to be construed as policies.

We want to note that the revisions that occurred during 2020 started just as the coronavirus pandemic emerged and continued through the state "Stay Home, Stay Safe" order and high levels of disruption to the daily lives of every Vermont resident. The COVID-19 illness and the uncertainties it has brought meant that all meetings for this plan were conducted virtually. We recognize that this, in some ways, may have increased access and opportunity for feedback for some while decreasing it for those not connected, with slow internet speeds, or balancing working from home with family needs. We are also uncertain about the long-term impacts of the pandemic on our town businesses and residents. We have included the developments that occurred during 2020, like the formalization of a unified command for emergency management, which only makes our town stronger.

D. Defining Our Rural Character

Why define it?

Throughout the process of revising this document, it continues to be clear that the "rural character" is the cornerstone of what makes Tunbridge special to its residents. It is a concept that is very important to our citizens and shall be protected.

Tunbridge in the present

The citizens of Tunbridge enjoy the way their town looks and feels right now. It is the small, dense villages along the Route 110 Corridor and the working landscapes that define Tunbridge. The continued balance between the dense concentration in Tunbridge's villages, and the diffuse residential and agricultural areas surrounding the villages is important.

Tunbridge is a quiet bedroom community. Most residents work out of town although there is active support for adding more small businesses to the villages and small cottage industries in homes.

Tunbridge residents have a strong "land ethic," a need to protect and work the land. This is embodied in the deep agricultural history, tying rural character to agriculture. Therefore, agriculture, and the flavors, smells and images that go with it, is important to the residents of Tunbridge. Working farms are part of Tunbridge's cultural and physical landscape, and citizens feel that these farms are our future and need to be supported and given opportunities to thrive.

The density of development in Tunbridge is very common in rural Vermont. The Current Land Use Map (Map 2) included with the full version of this document (a large scale-version of this map is on file at the Town Clerk's office) demonstrates that most development exists along Tunbridge's roads. Few structures are located far from these roads, which helps create the open agrarian feel that generates our sense of rural character. Most roads remain unpaved and meet local needs.

While development is generally clustered along roads, the Route 110 corridor is not overburdened with an abundance of development. It remains a very scenic valley floor, with the First Branch of the White River and several active farms predominating. Citizens have made it clear that the way this area of town looks right now is important to them and has inherent aesthetic value. They would like it to remain a relatively undeveloped, scenic agricultural and recreational resource.

Because of the natural resources that exist in Tunbridge, there are abundant formal and informal opportunities for outdoor recreation such as hunting, fishing, hiking, cross-country skiing, snowmobiling, horseback riding, swimming and others. The availability of these opportunities is tied to the rural character of the Town.

Summary of Rural Character

Tunbridge is a quiet Vermont town, surrounded by a mixture of large open fields and tracts of woodlands. Development within Tunbridge Village and North Tunbridge Village is typical of small New England villages. Buildings are built close together, with minimal setbacks from the road. In areas outside Tunbridge's villages, development is diffuse, and occurred organically along Tunbridge's dirt roads. Citizens enjoy the opportunities for individual expression and social and community

interactions that the Town offers. They believe that people should have the opportunity to utilize their property consistently with uses typical in Tunbridge.

E. General Goals

The following overall goals are important to our town:

- To remain a rural, agricultural town by supporting and encouraging agricultural activities in Tunbridge – the primary and fundamental intention of Tunbridge.
- To plan for the controlled and orderly growth of the town, utilizing a pattern that maintains Tunbridge's rural character.
- To promote a healthful environment for our citizens, and insure adequate and clean waters and air.
- To encourage the development of small-scale enterprises in the Villages of Tunbridge and North Tunbridge that provide basic skills and services for all of the citizens of Tunbridge, which will enhance and improve the rural way of life.
- To ensure necessary public facilities and services within an expressed plan at a reasonable cost.
- To provide recreational opportunities for townspeople.
- To help provide employment and housing opportunities that allow for affordable living in Tunbridge for people of all ages.
- To ensure natural resource conservation.

"People respect each other as human beings."
"Rich people live beside poor people very well."
"We're willing to help one another when help is needed."
"People are able to lead private lives as they see fit."

II. History and Community

A. Tunbridge History

The Town of Tunbridge was chartered under the authority of Governor Benning Wentworth in 1761. Due to the relative remoteness of the township from major New Hampshire towns, the white settlers did not arrive until more than a decade later. Settlement by American colonists came from the east (via Strafford) and from the south (along the First Branch of the White River). The first generally recognized year-round settlement was by the Moses and Susannah Ordway family in about 1775 just across the Strafford border on present-day Gilley Road. The first village at the southern border was substantially destroyed by the Raid of 1780, an attack by about 300 Native American fighters organized and led by British officers. It was a handful of years before the claims of new settlers were stable enough to allow the construction of the first frame houses in town for more permanent homesteads.

The land that the settlers encountered must have seemed an unspoiled paradise—as it might to us today. The First Branch flowed wide and steady, varying little through the years. Many varieties of fish, including Atlantic salmon, thrived in the waters in their season. A wide forested floodplain was filled with hemlocks, tamaracks, spruce, and other vegetation that could thrive in the saturated environment. The hills were nearly entirely forested—beech, maple, and chestnut dominating, and the hilltops decorated with deep-rooted red oaks. Some form of this environment had persisted with variation for thousands of years as the Native American populations developed a subtle and attentive stability with the wildlife. The seemingly pristine forest of Tunbridge had therefore been affected by the work of the human cultures, but this environment saw rampant change in the late 1700's as the settlers turned the land to meet their immediate needs.

The land of Tunbridge offered a chance to pitch a claim and make a new start since there were several appealing incentives the environment offered here. The heavily wooded landscape provided a cool, but moderate climate where wildlife flourished, and many provided good food, such as moose, deer, and rabbit. The water table was high, and many dug wells offered homesteads an accessible water supply without digging more than 20 feet, even with sites high on some hills. Virgin hardwood and softwood timber were plentiful to build structures and provide fuel. Best of all, thousands of years of forest had generated topsoil that was relatively deep and very rich. Compared to the worn-out, granitic soils east of the Connecticut River, the earth of Vermont offered a haven for struggling farms where they could readily grow grain, including wheat, shortly after clearing the land.

To say that the economy rested on an agricultural foundation is certainly an understatement, as most every family would be considered farmers by today's standards, often with specialization or supplementary enterprise to help them trade for what they could not produce themselves. Gardens were commonplace, and many homesteads could grow corn, oats, and barley to feed themselves and their livestock. All would have been used for meat, with poultry contributing eggs and feather, some sheep being sheared for wool, and a few cattle providing dairy, leather, and much needed labor. It would be the hope of every family to have at least one horse for the greatest power in farm work, and for transportation, though human feet certainly were the primary mode of human travel. In the late winter, most households would have taken advantage of the good sugaring climate to put away maple sugar—the only affordable sweetener for most residents. Lumber would have been so plentiful and cheap that

deforestation was the norm to "improve" the land according to the short-term agricultural values of the homesteaders.

The natural environment not only supplied the settlers with raw materials to survive, but it also gave them some compact exports that could be used to purchase goods from elsewhere. Wood that was not used for building materials or firewood was often burned outright for the production of potash for export—one of the few resources compact and valuable enough to be exported in this era, supplying the settlers with some of the only cash they handled. Animal furs and skins were another durable commodity which was at first easy to come by, but was soon harder to accumulate in great numbers. These were used to bring back purchased goods like salt, spices, and some manufactured goods such as fine tools and delicate textiles.

The story of the European settlement of this frontier in Tunbridge had some common themes and trends. While some new Tunbridge residents came from immediately adjacent areas to the south and west, larger waves of new settlers came from communities in Massachusetts and Connecticut, downstream in the Connecticut River valley. These areas were seeing rising property values, and immigrants saw the lands of the "New Hampshire Grants" as promising new land for agriculture. On top of this attraction, many of this time period, and eras since, have seen this area as a place to make a new start in life. Many, like the family of Joseph Smith, the future founder of the Mormon Church, came to Tunbridge to live life freely according to their own unconventional religious and social beliefs. In many ways, Vermont overall served as the "Wild West" of New England at this time.

This is not to say there was not considerable unity and common ground through much of the town. Town meetings began as early as 1785, including only male adults who owned property in town. Early town planning recognized the common need throughout the new town for bridges, major mills, cemeteries, schools, and a meetinghouse. The meetinghouse was probably the first major project initiated, for the building was sited in the exact geographic center of town, on the west side of the river across from the present town garage. The town fathers made the reasonable assumption that this would be the middle of town settlement, but this outcome was undermined by two major shortcomings: it was one of the only structures sited on the west side of the First Branch, with no reliable way to cross to it, and there was no easy way to dam the river for a mill, thus offering no foundation for a village and marketplace. Schools were also an early priority in Tunbridge, and by 1791 the town was divided into eleven school districts, which was soon increased to twenty-one school districts.

Early homesteads relied on transportation only occasionally by modern standards, as the settlements were largely self-sufficient in the early Tunbridge economy. Nonetheless, connecting the residents of Tunbridge with each other and the outside world was an essential need that the town recognized. By the law upon which the charter of Tunbridge rests, the town had the right to lay aside land for public roads, when and where town officials found it necessary. Main roads were planned in the 1780's, branching off of the central valley's highway, with ten major bridges planned to span the First Branch. The best laid plans, however, often are humbled by the shortage of money, resources, and labor, so roads were rough and the first permanent bridge was built at the town's geographic center only in 1793. This occurred so that most residents who lived in the east could get to the new meetinghouse, but it also allowed for the more aggressive settlement of the western side of town. With roads unmaintained and traveling vehicles being something of a luxury, residents found it advantageous to develop dwellings in clusters, as residents have through the vast majority of Tunbridge history. Dwellings congregated in South Tunbridge, Clarksville, the upper Strafford Road, and even Brocklebank, as well as the dominant villages in central Tunbridge and in North Tunbridge. Far from seeking privacy, residents found seclusion largely a necessary evil of any homesteads which ended up

inaccessible or far flung from the areas that became favored for larger settlements. Most every house built over the first century in Tunbridge was close to a town "highway"—the closer the better. The postal service was an invaluable link to Tunbridge residents, but those outside of the villages had to wait until they made trips into town to see if they had mail.

This population boom ended with the numerous homesteads finding their land and its resources exhausted, and word of flatter and richer land across the Appalachian Mountains (in the Midwest) pulled many residents of Tunbridge away. Remarkably the following decades saw a tremendous building boom of sound permanent residences, many of which survive to the present day.

The 1850's saw the coming of the railroad (via South Royalton), and with the railroad came the rise of the export economy and a swell of industry in Tunbridge. Sheep were still abundant, and two entrepreneurial brothers by the name of Gay set up a sizeable woolen mill just north of Tunbridge Village. In North Tunbridge such enterprises as the Smith Foundry created numerous cast iron implements, including plows and two modest sizes of wood stoves. Other enterprises used the turning power of the river to drive a large cider mill and another mill that crafted wooden implements such as rakes and tool handles. Lumber and grist continued to be processed at the many dams up the First Branch, and small mills along the brooks helped provide for the milling needs of families. Stores, politics and A. N. King—the Gilded Age comes to Tunbridge

When the Civil War erupted in 1861, Vermont answered the call with more volunteers for its population than any other Union state. Tunbridge was no exception, and fervor to preserve the Union was so strong that no draft was ever forced upon the residents of the town. Thirty-eight boys from Tunbridge were killed or died of disease in the conflict—far more than in any other war in the history of the Republic. The end of the war also brought many other Tunbridge men to the faraway world they witnessed in the service, and opportunities by the expanding settlement in the West all contributed the continuing decline of the population. Veterans that returned were by some estimates the "greatest generation," volunteering in civic office, bringing leadership to the town, and investing in the town in other diverse ways.

The ensuing years saw the ingenuity of the remaining people of Tunbridge put to surprising good use. Tunbridge still relied heavily on its agricultural foundations, and the residents of the valley rallied to form the Union Agricultural Society, holding its first exposition in 1867. The harvest festival soon grew in magnitude to become what one lieutenant governor referred to as the "little World's Fair" which has endured ever since. The Grange was also formed as a supportive co-operative society where farmers could buy in bulk, as well as find fellowship with their neighbors.

As industries came and went in Tunbridge, the turn to the 20th century saw the residents relying more heavily on the agricultural base of their predecessors. A key difference was that large farms elsewhere, particularly in the Midwest and West, now competed directly and indirectly in the price of some general agricultural commodities, such as grain and wool. While self-sufficiency and bartering still figured in the Tunbridge economy, modernization also brought the expectation as well as the need for new goods that could not be produced locally. One way farmers responded to this strain was in the harvest and use of ice, which made it possible to export some perishable food farther away. Some farmers found work in other ways; some farmers immigrated to take their place, but the trend was a steady erosion of the agricultural working population in Tunbridge.

The turn to the 20th century saw the population continue to slowly decline, but life was accelerating. Electricity finds its way to town over the first four decades. This new power had been relied upon in

the form of heavy batteries, but these new lines carrying current to Tunbridge opened up new possibilities to residents, and the appetite for this new power grew.

In the 1930's pavement was introduced and covered bridges start to be dismantled. The self-sufficiency of Vermonters has led some to observe "the Depression may have come, but no one could be sure". The shortage of cash did indeed find many farming families borrowing from those with money, and, finding themselves unable to pay it back in a timely manner, lost their properties.

Even as modernization and its effects were arriving in Tunbridge, the population declined into the mid-1960's. In 1954 one result represented how modern technology and the greater affordability of construction was changing the operating principles of the town, as the decline in populations convinced the town to make the final consolidation of school districts into one Tunbridge Central School. The siting of the school showed that central location and structural conservation was no longer required; an opportunity to buy a vacant farm site was sufficient to convince the town to site the school considerably north of the northernmost village and build an entirely new structure. While the School was now adjacent to Route 110, the choice clearly assumed that automobiles rather than walking would be the major means of transportation.

The cheap nature of transportation in the 1960's brought some unwelcome changes in the agricultural nature of Tunbridge, and many farmers found themselves unable to sustain their livelihoods in this changing world. The influence of the railroad had become less significant, and large trucks replaced them as the primary vehicles for moving food. Consequently, some enterprises like the Tunbridge Cooperative Creamery and the canning operations in locales such as Randolph closed down in the shadow of larger processors. Farmers were told by agricultural analysts and new regulations that they needed to adopt new technology and grow, focusing on a single commodity—quite the contrary of what Tunbridge farmers had traditionally done over the past two centuries. Aside from growing their own gardens and having a few animals on the side, raw dairy milk became that single commodity that farmers worked to produce. Besides this limited market, and larger farms in the Midwest, the farmers who were struggling to make it in the dairy business found they were required to buy a bulk tank in order to sell to the bigger dairy processors, and many found themselves unable or unwilling to make this expensive and risky investment. A final factor that was affecting every part of the community was also the result of cheap transportation: the steady increase of the value of property here.

The boom that the nation felt after World War II found Americans with an increasing desire for homes away from urban areas, and the increase of prices for land in rural areas was the inevitable result. Tunbridge land and homesteads were affordable and appealing to many who sought vacation homes, which could be reached now in a day's drive from many cities and large towns throughout the Northeast. Property here was desirable for many new residents such as writers, artists and others with occupations that did not require daily time in a central office. The Town of Tunbridge's population reached its historical low in 1965. The Town also attempted to institute zoning regulations during the 1960's that ultimately ended in failure.

The era of industry got under way in earnest after the Civil War, largely supported by the new proximity of the railroad in South Royalton. A main focus of this industry was connected with the mills. Many of these mills each produced hundreds of thousands of board feet each year. The twist with big industry then as now was that the life blood of the local endeavor was kept alive only by the circulation of the transportation system. Many of the materials – wood and wool, for instance – came from local sources, but the consumption was more distant. Eventually, the forest and soils supporting the wool industry had declined, and the cheap sources were farther west. The nature of these new

endeavors forced businesses to move into greater proximity to the railways or lose the ability to compete. Some industries moved or closed, some lasting only to the turn of the century, while others (such as a few lumber mills) living in the memory of many current residents.

The 20th century saw a dramatic revolution in commerce at the local level. While the number of roads in town has diminished, the roads still in use have become far more heavily used in the last 50 years. As homesteads were largely self-sufficient units at the beginning of the 1900's, going out on a trip of any length was an occasion. With the current economic climate, it is now the exception rather than the rule that a resident with a car remains at home. And the length of the trips has changed enormously: a business trip to South Royalton in a horse and wagon took up a full day of work, while the driver of an automobile may complete the entire trip (with transactions) within an hour and consider themselves not really to have "gone anywhere" of note. Villages have gone from destination to a place to visit. Roads have required greater maintenance, accounting for what is now proportionally the fastest growing part of the town's expenditures.

In 1999 Hurricane Floyd caused noticeable damage in town, especially at the Fairgrounds. The Fairgrounds lost power for an extended period of time. The First Branch of the White River rose so rapidly that Sherlock's Field was evacuated and it eradicated the foot bridge to Sherlock's field. The rain & mud were so extensive that it closed The Tunbridge World's Fair for only the second time in its history since it began in 1867. In spring 1999, due to a significant ice jam event on the First Branch of the White River, the Mill Covered Bridge located on Spring Road was destroyed. It was rebuilt in an historical manner and reset with oxen.

In 2011 Tunbridge had two major events. 2011 marked the Town's 250th anniversary, or Sestercentennial (1761-2011). Tunbridge, with support of its Historical Society, Select Board and Planning Commission, hosted numerous events throughout the year. Every month offered multiple events, including t-shirt and memorabilia sales, a logo competition, a Town photo at the Fairgrounds, hikes to significant viewpoints and locations in Town, outdoor movie viewings, creation of commemorative quilts depicting Town sites that are displayed in the Town Hall.

The second major event of 2011 occurred on August 28, 2011 when Tropical Storm Irene struck Vermont. There was loss of power for days, major property damage, and extensive road damage, including Route 110. This event occurred exactly 7 days after a sudden storm that took out Belknap Brook road and the town had just finished reconstructing it when it was taken out again at the exact same location when Irene struck. Tunbridge experienced major damage, but was considered lucky compared to neighboring towns. When the Tunbridge road crew stabilized roads in Town, it assisted other communities with their extensive damage.

B. The Tunbridge Community

Community is one of Tunbridge's strongest assets. Residents have repeatedly commented about the sense of community that thrives in the Town and its importance. Citizens enjoy the programs offered in Tunbridge such as the recreational programs, and school-based, school club and library activities, as well as the cherished traditions of the months surrounding the Tunbridge World's Fair, ice cream and sugar-on-snow socials, pot lucks and Memorial Day events.

Tunbridge citizens seem to come together for business and pleasure with a regularity that is unique in this day and age. Community dinners, the Tunbridge World's Fair, school functions and town functions are well attended by residents.

In part, the topography of Tunbridge has helped shape the community. Tunbridge is bisected by Route 110. Unlike neighboring towns, Tunbridge has no villages that are separated by the topography. The very "central" nature of the Route 110 valley and the villages located in it draw the community to the heart of the town.

The rural, agricultural heritage coupled with Tunbridge's emerging status as a bedroom community creates a unique mix of individuals from all walks of life.

Of course, Tunbridge must always be aware that it takes *community effort* to maintain the feeling of community that is so cherished by its residents. Attendees of the Planning Commission's workshops in 2017 noted a decline in volunteerism. This is, in part, a result of cultural changes. Most families must work full time, often with both parents working outside of Tunbridge. Tight schedules and work commitments can make it difficult to give time to the community.

C. Goals, Policies and Recommendations

Goal

1. To increase volunteerism for public programs and services.

Policies

1. The Town will continue to use public facilities for public community events.
2. The Town will support efforts to encourage volunteerism.
3. The Town will continue to support community programs.

Recommendation

1. Add an historical section to the Tunbridge website to provide information about the Town to its residents and interested individuals.

"A viable neighborhood is a community: and a viable community is made up of neighbors who cherish and protect what they have in common." ~ Wendell Berry

III. Population

A. Population Patterns

Population, when considered in terms of past, present and future statistics, represents an important factor in the overall development patterns of our town. Rapid population increases can create a demand for new and expanded municipal services, and can strain the financial ability of a town to provide public services, which is important to our Citizens and taxpayers.

Shown below are population statistics for the Town of Tunbridge taken from the U.S. Census Bureau. According to the U.S. Census, the population of Tunbridge was 1,309 in the year 2000, compared to a population of 1,154 in 1990, resulting in a 1990s growth rate of 13.2%. Tunbridge's growth rate of 13.2% from 1990-2000 was higher than the 8% rate of growth achieved by the State of Vermont and the Two Rivers–Ottauquechee Region. 2020 Census figures are not available yet.

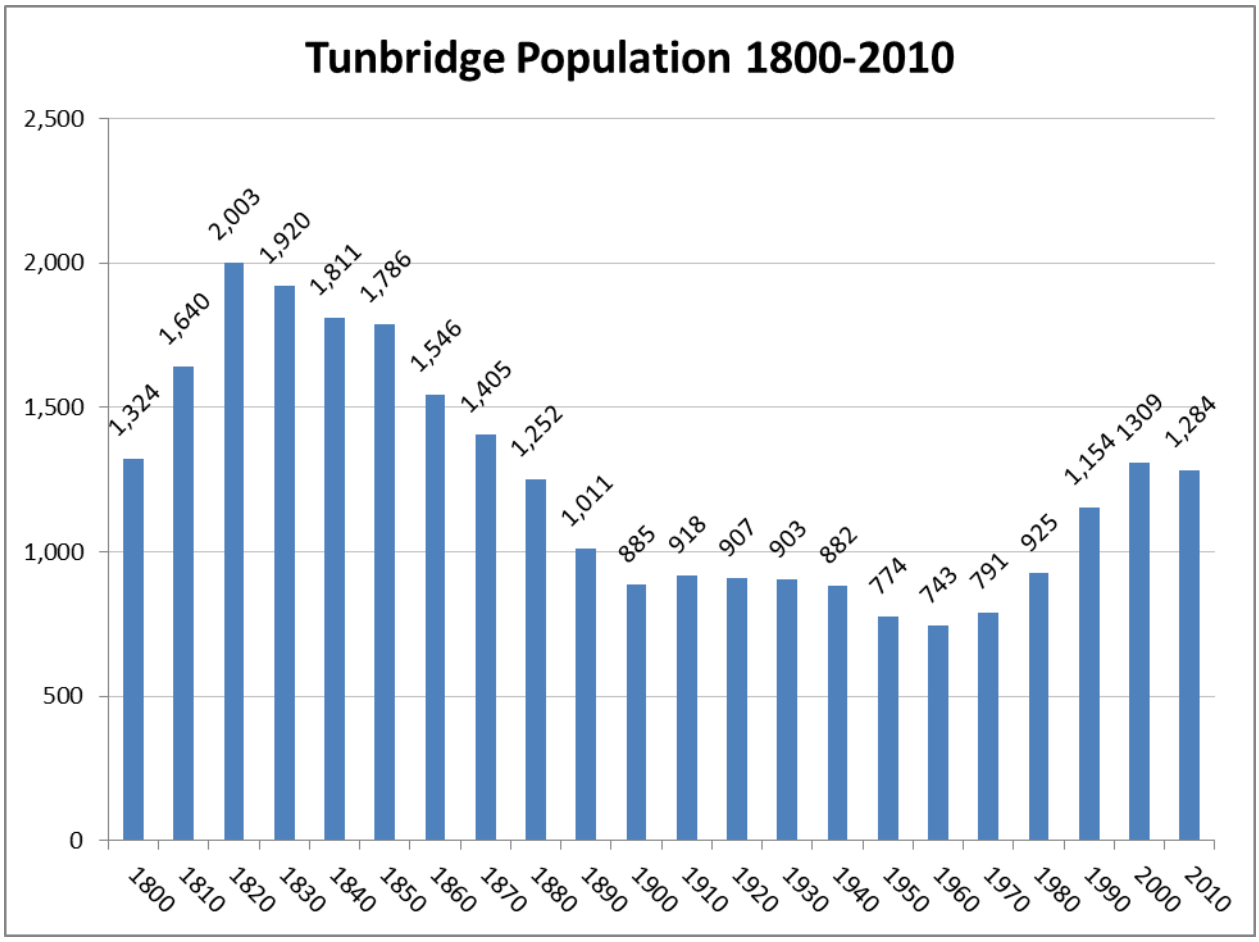

Figure 1- Tunbridge Population, 1800-2010 (*Source: U.S. Census*)

The two decades between 1980 and 2000 saw a 41% population increase in Tunbridge. But, between 2000 and 2010 Tunbridge lost nearly 2% of its population, a trend that was mirrored in surrounding communities and in the greater Upper Valley region. The noted exceptions were the towns of Royalton and Strafford which continued to grow, albeit at a slower pace.

Population Growth, Tunbridge and Surrounding Area				
	1980	1990	2000	2010
Tunbridge	**925**	**1154**	**1309**	**1284**
% Change		**24.70%**	**13.42%**	**-1.9%**
Chelsea	1091	1166	1240	1238
% Change		6.80%	7.20%	-0.2%
Randolph	4689	4764	4853	4778
% Change		1.50%	1.90%	-1.5%
Royalton	2100	2389	2603	2773
% Change		13.70%	8.90%	6.5%
Strafford	781	902	1045	1089
% Change		15.40%	15.80%	5.1%

Figure 2 – Population Growth, Tunbridge & Surrounding Area *(Source: U.S. Census)*

B. Age of Population

In general, the age of Tunbridge's population is similar to that of Vermont as a whole, with much of our population over the age of 45. Unlike many Vermont towns, Tunbridge did not experience a dramatic loss of young adults between 2000 and 2010. In the 20-24 age group, Tunbridge actually gained 6% of its population. In the 25-34 age cohort, however, the community lost 12%.

The loss of young adults (generally between the ages of 25-35) has been a concern throughout Vermont during the past decade. Often referred to as a "brain drain" the out-migration of young adults raises concerns on both economic and social levels. Without a talented and well-educated pool of young workers, there are worries that the state will find it increasingly difficult to attract and retain well-paid jobs, which in turn can have serious repercussions for the state's capacity to raise tax revenues and pay for essential services. Young adults who leave their rural communities often do so because communities lack the resources commonly sought after by people of their age group, such as reliable high-speed internet access, clear cell phone reception and opportunities for social interaction with others of their age group.

According to the Department of Economic Development's (DED) 2007 Report "Growing Vermont's Next Generation Workforce", Vermont ranked at the bottom nationally for the percentage of its citizens between the ages of 25 and 29, and at the top in the percentage aged 50-54. While it is common, and perhaps desirable, for young adults to venture beyond their home state after college, the biggest concern is that many are not returning. During interviews for the DED report in 2007, young adults explained that their primary reason for leaving Vermont was to find better paying jobs. Likewise, the biggest hurdle for young adults wanting to return to Vermont was the availability of well -paying jobs and affordable housing.

However, it should be noted that those young adults who choose to return to, or relocate to, Vermont have indicated that their primary motivation for moving to Vermont is the lifestyle associated with the working landscape. Outdoor recreation, agriculture, and the importance of community often encourage these citizens to return, but in Tunbridge this does not appear to be the case.

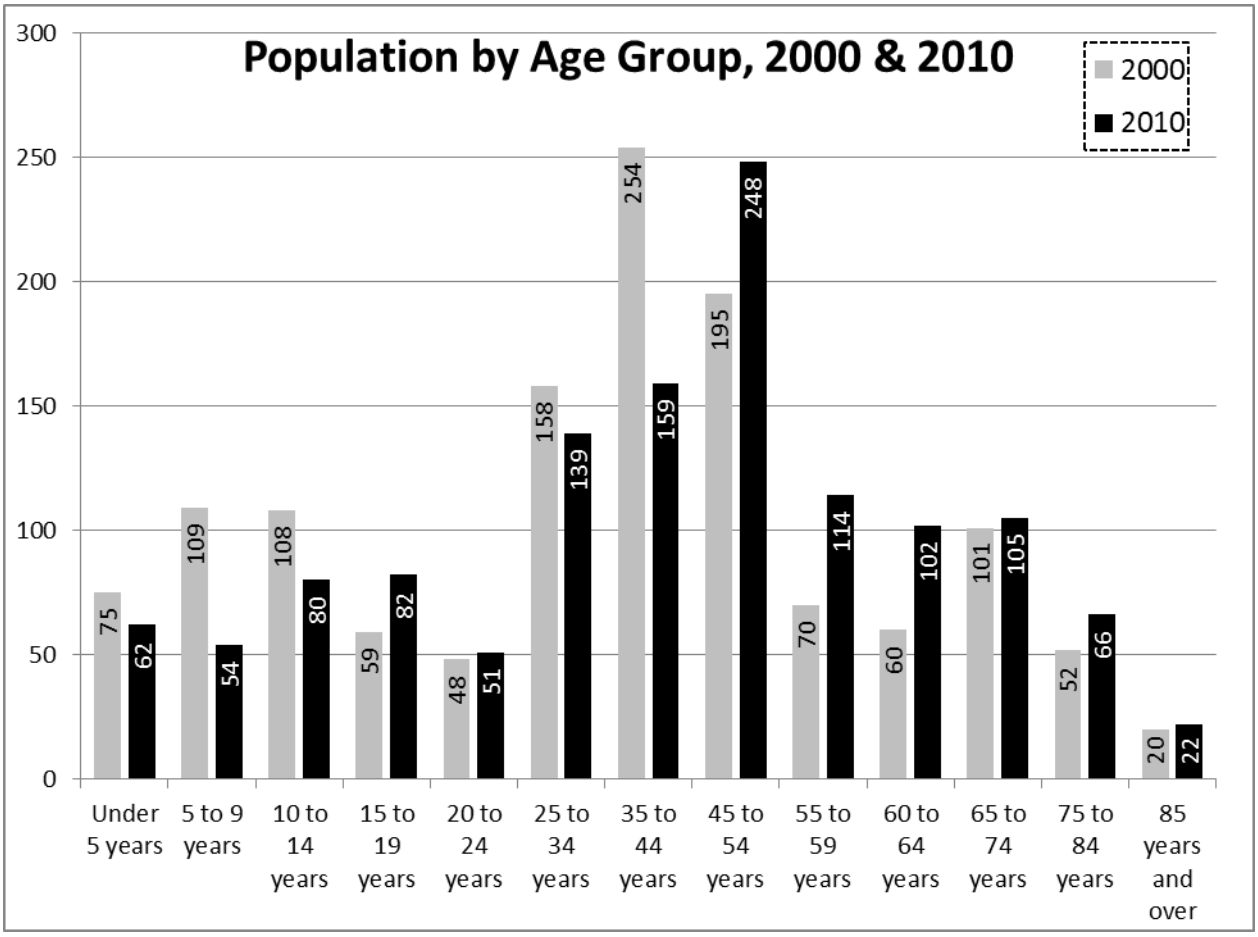

Figure 3 – Population by Age Group, 2000 & 2010 (Source: U.S. Census)

As indicated in figure 3, between 2000 and 2010 population increases have occurred primarily in the 45-64-year-old range, which reflects the ongoing effect of the baby boomer generation, but also implies that older people may have moved into the community while younger residents have left. The population of 25-44 year olds in Tunbridge dropped dramatically by 28%. Overall for Vermont, the number of residents in the same age group only dropped 16%.

The comparison between the 2000 and 2010 census information also indicates any new residents in Tunbridge's are older (ages 45-64). The increase of population at this age group may in part explain declining enrollment in the Tunbridge school system as families in their late 40s to mid-50s often have children who are in high school or college.

As is the case throughout Vermont, Tunbridge has an aging population. In 2010, 15% of residents were over 65 years of age, which is only slightly greater than the Vermont average of 14%. An aging population will need services that are not readily available in a town like Tunbridge. The need for elderly housing will increase. Additionally, Tunbridge may see an increase in home sales as elderly residents become uncomfortable with maintaining larger houses on their own.

One program that will benefit the elderly in Tunbridge is the "Neighbors Helping Neighbors" program. This program was started by local residents in order to improve the lives of all residents – young, old, rich or poor. Neighbors Helping Neighbors relies on the strong community to supply labor for

volunteer activities at no charge to the beneficiary. To date, the program has a list of nearly 40 individuals willing to volunteer.

Neighbors Helping Neighbors offers a broad range of services including transporting people to and from medical appointments, picking up prescriptions, loaning medical equipment on a short-term basis, cooking meals for people who are ill, making minor home improvements and assisting with automobile repairs. The program also sponsors or assists in events or programs such as community pot-luck suppers, speakers or musical programs of interest to the community, and healthy cooking workshops.

C. Relative Income of Population

2015 Median Adjusted Gross Income		
Town	**Returns Filed**	**Median Income**
Tunbridge	**664**	**37,972**
Chelsea	583	34,078
Royalton	1,291	33,948
Vershire	359	33,380
Strafford	560	47,378
Vermont	318,329	36,931

Figure 4: 2015 Median Adjusted Gross Income, Tunbridge & Surrounding Towns *(Source: VT Department of Taxes)*

The Vermont Department of Taxes annually publishes *Vermont Tax Statistics*, which includes a summary of personal income tax returns filed with the State. In 2015, 664 personal income tax returns were filed from residents in Tunbridge. 1,120 exemptions were claimed. Total adjusted gross personal income reported for Tunbridge residents was $36,702,775. Tunbridge's median income is $37,972 putting it just behind Strafford as the highest median income in the surrounding area.

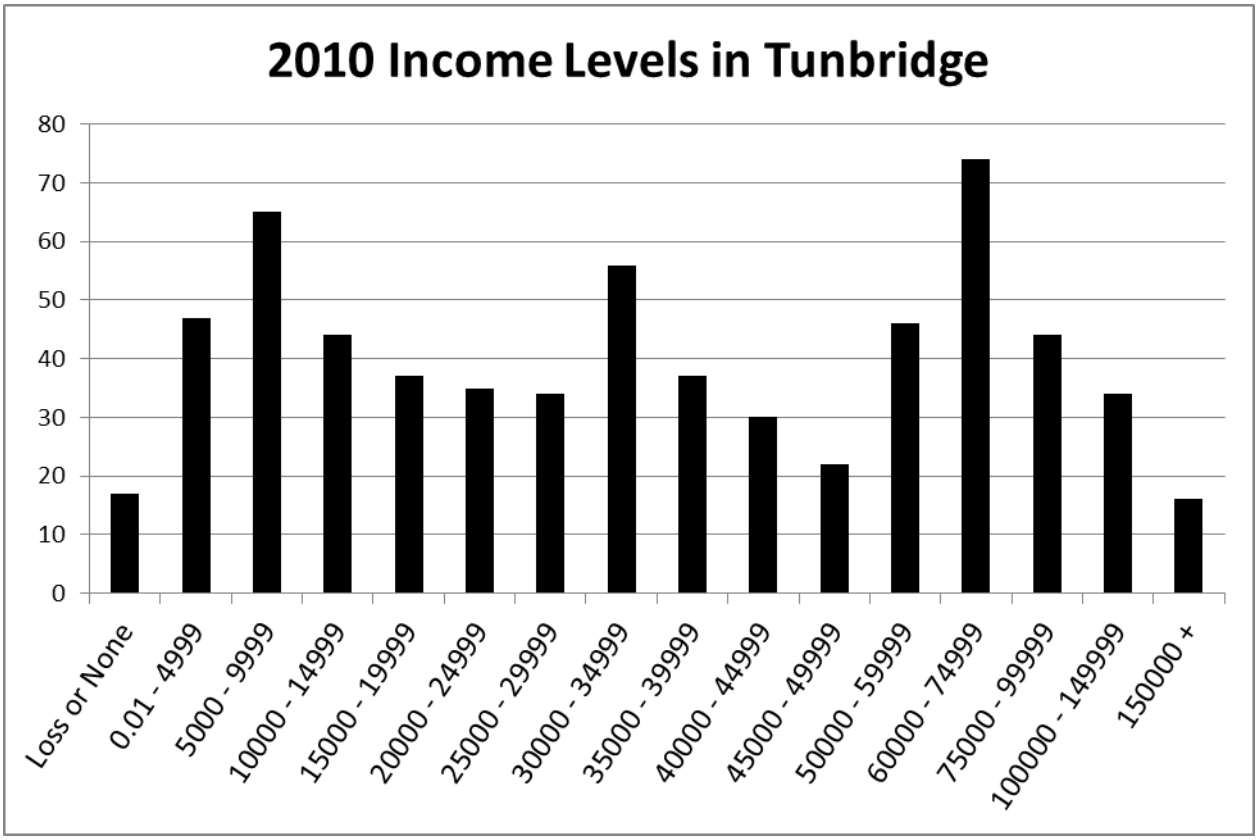

Figure 5 – 2010 Income Levels in Tunbridge *(Source: VT Department of Taxes)*

For 2010, 56% of the total personal income generated in Tunbridge was by filers earning $30,000 or more and 44% were earning less than $30,000.

IV. Economic Base

A. Employment and Jobs

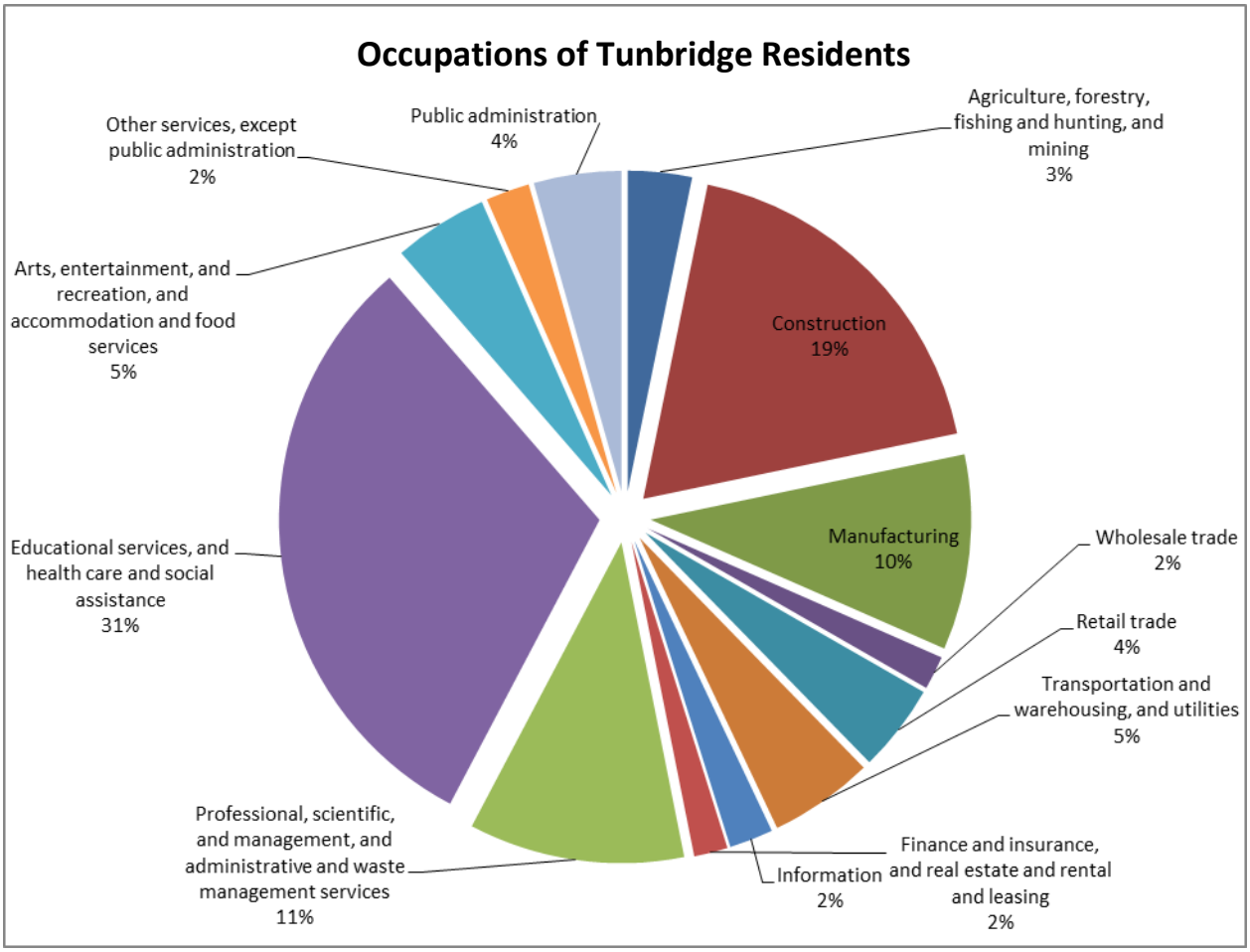

Figure 6 –Occupations of Tunbridge Residents *(Source: American Community Survey 2005-2010)*

Tunbridge does not serve as an economic hub for commercial and industrial activity. Residents go to the Towns of Chelsea, South Royalton, Montpelier, Barre, Randolph, Hanover and West Lebanon, NH, for banking, professional, and related services.

The pie chart above indicates that 42 % the population of Tunbridge is employed in some form of management, professional, educational or health care profession. This data supports the notion that Tunbridge is a bedroom community, sending a majority of its residents to jobs at Dartmouth College, Dartmouth Hitchcock Medical Center, Vermont Technical College, or Gifford Medical Center. Agriculture, construction, logging, and public occupations (teacher, road crew, etc.) have been the traditional occupations carried on in the Town, and construction still remains the second largest employment type in the community. However, many small businesses have been established in Tunbridge in recent years, including the following types:

- Artisan
- Farming
- Forestry
- Laborer

- Light Industry
- Professional
- Retail

Most of these businesses are viable and aggregate a small number of jobs. Many are operated out of homes. Where non-family members are employed, these seem to be a mix of newcomers and long-time residents.

Interestingly, the physical impact of this job creation seems to be almost undetectable; most new businesses are carried out in existing buildings or modestly scaled new buildings or additions. Several old buildings have been renovated and improved by these activities. Most businesses would not be considered "industrial." The apparent lack of discernable impact of these types of businesses makes them favorable to the citizens of Tunbridge. Small, home-based businesses tend to fit well within Tunbridge's idea of rural character.

One surprising piece of the U.S. Census employment information is that as much as agriculture is a part of Tunbridge's rural character and history, only 3% of the population is directly involved with farming, fishing or forestry, a 50% drop compared to 2000 (6%). The primary farming occupation seems to be in dairy, but there are a number of small diversified farming occupations developing in Tunbridge. For more detailed information on agriculture, see chapter XI.

B. Historic Wages of Population

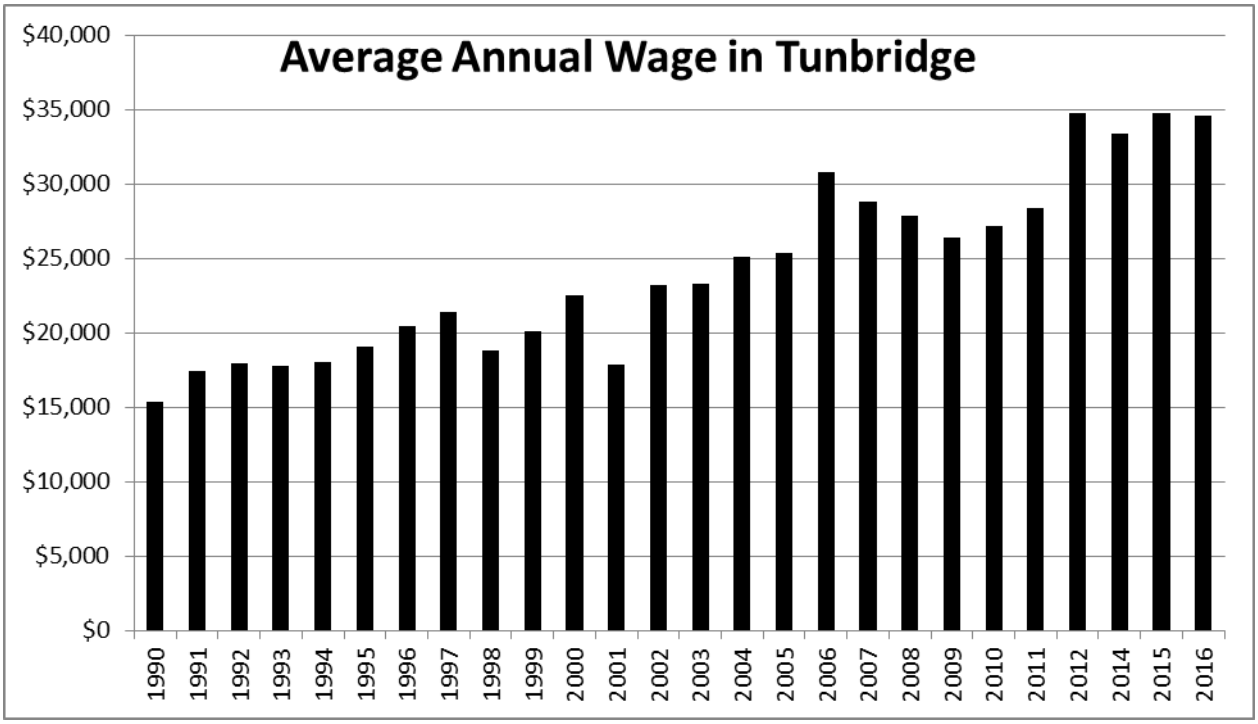

Figure 7 – Tunbridge Average Annual Wage *(Source: Vermont Department of Labor)*

The average yearly wage in 2016 of an individual in Tunbridge was $34,621 as compared to $45,059 for the State of Vermont on the whole. Of 2010 income tax filers in Tunbridge, roughly 50% made less than the state average yearly wage. In Orange County, 34% of filers reported making less than $20,000, while in Tunbridge that number was 32%. On the opposite side of the income spectrum, 2% of the Tunbridge population reported over $150,000 in income, comparable to all of Orange County.

One of the primary concerns voiced by Tunbridge residents is that younger people are attracted to better paying jobs than are generally available in or near Tunbridge. Land and housing costs also contribute to this trend. As a result, Tunbridge has seen many young people move out of town. Whether greater broadband availability and national issues such as climate change and the shift to remote work during the pandemic will reverse this remains to be seen.

C. Taxes

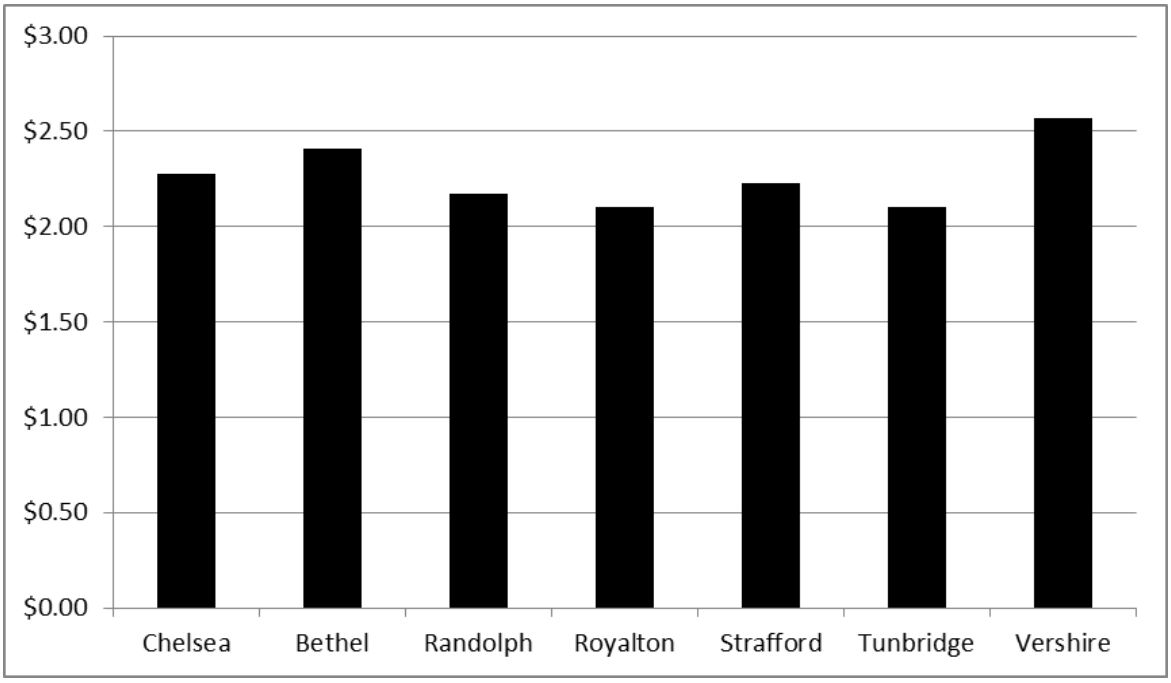

Figure 8 – 2016 Tax Rate – Homestead (per $100) – *(Source: Vermont Department of Taxes)*

Citizens in Tunbridge are concerned about the continued rise of property taxes and the burden they continue to put on individuals who make only the average wage. Tunbridge's property tax rate is comparable to the towns in the surrounding area. It is hard to deny, however, that rising property values are making it harder for middle-class citizens to buy homes in Tunbridge. These costs, coupled with increases in the overall cost of living, are making it more difficult for Tunbridge to attract young families.

Vermont's Agricultural and Managed Forest Land Use Value Program – better known as the Current Use Program – offers landowners use value property taxation based on the productive value of land rather than based on the traditional "highest and best" use of the land. According to the Vermont Department of Taxes, in 2000 the current use value of the land was about 20 percent of the full fair market value. In 2019, Tunbridge had the highest number of parcels in Current Use statewide, totaling 207. In general, the current use program has a limited impact on taxes, as the program reimburses towns on what they lose in municipal taxes.

D. Economic Development

The villages of Tunbridge, although acting as the center for community activities, are not the current center of economic activities in Tunbridge. There is no economic center, which implies that citizens go elsewhere to do business. The Tunbridge Fairgrounds is clearly an asset to the community, bringing people from near and far for such occasions as the Tunbridge World's Fair and the Vermont History Expo. However, these have a limited effect on the community's economic base.

The most important consideration for continuing economic development and related growth in Tunbridge is that such development be consistent with the rural character of the Town. The types of small businesses and home occupations that are listed in section "A" of this section of the Plan are appropriate for Tunbridge specifically because of the limited impact on or enhancement of the Town's rural character.

Because small businesses seem to be most appropriate for Tunbridge, a group of people has organized to investigate and promote high speed internet, specifically ECFiber.Net, throughout the town. Their work has led to the future development of fiber optic cable internet use in Tunbridge proposed for installation by 2019, but still not fully installed at the end of 2020. The availability of broadband and improved cell phone coverage would encourage the continued development of small, low-impact businesses in Tunbridge.

Village Designation Benefits

Because of its participation in the Vermont Village Designation Program, Tunbridge's Villages have the following benefits available:

- 10% Historic Tax Credits - Available as an add-on to approved Federal Historic Tax Credit projects. Eligible costs include interior and exterior improvements, code compliance, plumbing and electrical upgrades.
- 25% Facade Improvement Tax Credits - Eligible facade work up to $25,000.
- 50% Code Improvement Tax Credits - Available for up to $50,000 each for elevators and sprinkler systems and $12,000 for lifts. Eligible code work includes ADA modifications, electrical or plumbing up to $25,000.
- 50% Technology Tax Credits – Available for up to $30,000 for installation or improvements made to data and network installations, and HVAC reasonably related to data or network improvements.
- Priority Consideration for HUD, CDBG and Municipal Planning Grants
- Priority consideration for Municipal Planning Grants and funding from Vermont's Community Development Program.
- Priority Consideration by State Building and General Services (BGS)
- Priority site consideration by the State Building and General Services (BGS) when leasing or constructing buildings.

Residents have indicated that they would like to see such things as a coffee house, restaurant, general store, or active businesses in both village areas. Such businesses should be encouraged to utilize existing historic buildings rather than build new ones. Fortunately for commercial developers, the villages of both Tunbridge and North Tunbridge have been designated "Village Centers" as part of the Vermont Downtown Program. This program offers income tax credit rebates for things like rehabilitation of historic structures and code improvements. For more information on this program, contact the Tunbridge Planning Commission, the Two Rivers-Ottauquechee Regional Commission, or the Vermont Downtown Board.

The working landscape that makes up such an important part of Tunbridge's rural character should be an important part of future economic development in Town. This is a quality of life draw that offers safe area with a relatively benign climate in a potentially changing world. Promoting the creation of small, diversified farms and a year-round farmers' market might help add local jobs and increase the number of working farms in Tunbridge. More information on Agriculture in Tunbridge can be found in the Agriculture section of this plan.

E. Goals, Policies and Recommendations

Goals

1. To support community efforts to bring fiber and wireless internet access to the entire Town
2. To support efforts to improve cell service in Town.
3. To encourage home businesses and cottage industries.
4. To encourage the revitalization of historic buildings in the Villages.
5. To encourage low impact businesses to locate in the Villages.
6. To encourage businesses that use existing buildings in an appropriate manner.
7. To support economic projects that trigger Act 250 provided they are in accordance with the provisions of this Town Plan.
8. To encourage agriculture-related small businesses.
9. To maintain our engaged and active community.

Policies

1. Tunbridge encourages the formation of businesses in Tunbridge Village Area and the North Tunbridge Village Area.
2. Tunbridge supports the installation of fiber optic cable internet.
3. Cell towers must take reasonable steps to minimize their height and visual impact, and to avoid creating new roads and intruding into forest blocks.
4. Tunbridge supports the local exchange of agricultural products and the creation of value-added farm and forest products.

Recommendations

1. ECFiber.net should continue installation of fiber optic cable in Tunbridge (originally slated for 2019 still incomplete in 2020).
2. The Town should continue to maintain the Tunbridge bulletin board so that its information remains current and continue to update and maintain the Town's website.
3. The Planning Commission should further investigate policies which could assist the viability of family farms within Town.
4. The Town shall keep the Tunbridge and North Tunbridge village designations up-to-date and renew its village designations when they expire.
5. The Town should continue to encourage a Tunbridge farmers' market, and/or cooperate with existing markets in South Royalton and Chelsea, to support Tunbridge's strong agricultural character and community.
6. As agriculture is the backbone of the town, economic policies that are adopted should recognize its importance and priority to ensure there are no unintentional adverse impacts.

"I get up every morning determined to both change the world and to have one hell of a good time. Sometimes, this makes planning the day difficult." ~ E. B. White

V. Housing

A. Introduction

A major function of local housing planning is to meet two community objectives – first, safe and affordable housing for its present and future population, and second, suitable density and distribution of housing throughout the community. Growth in housing affects the Town's capacity to provide facilities and services to our townspeople and the character of the area. Housing built without adequate planning for schools, roads, and other public services can overburden the ability of the taxpayers to pay for these services, can lower adjacent property values. and can negatively affect the rural character of the Town.

This section discusses the amount, type, location, and affordability of existing housing and the needs for future housing. See also Appendix B for a list of housing resources.

B. Number of Housing Units

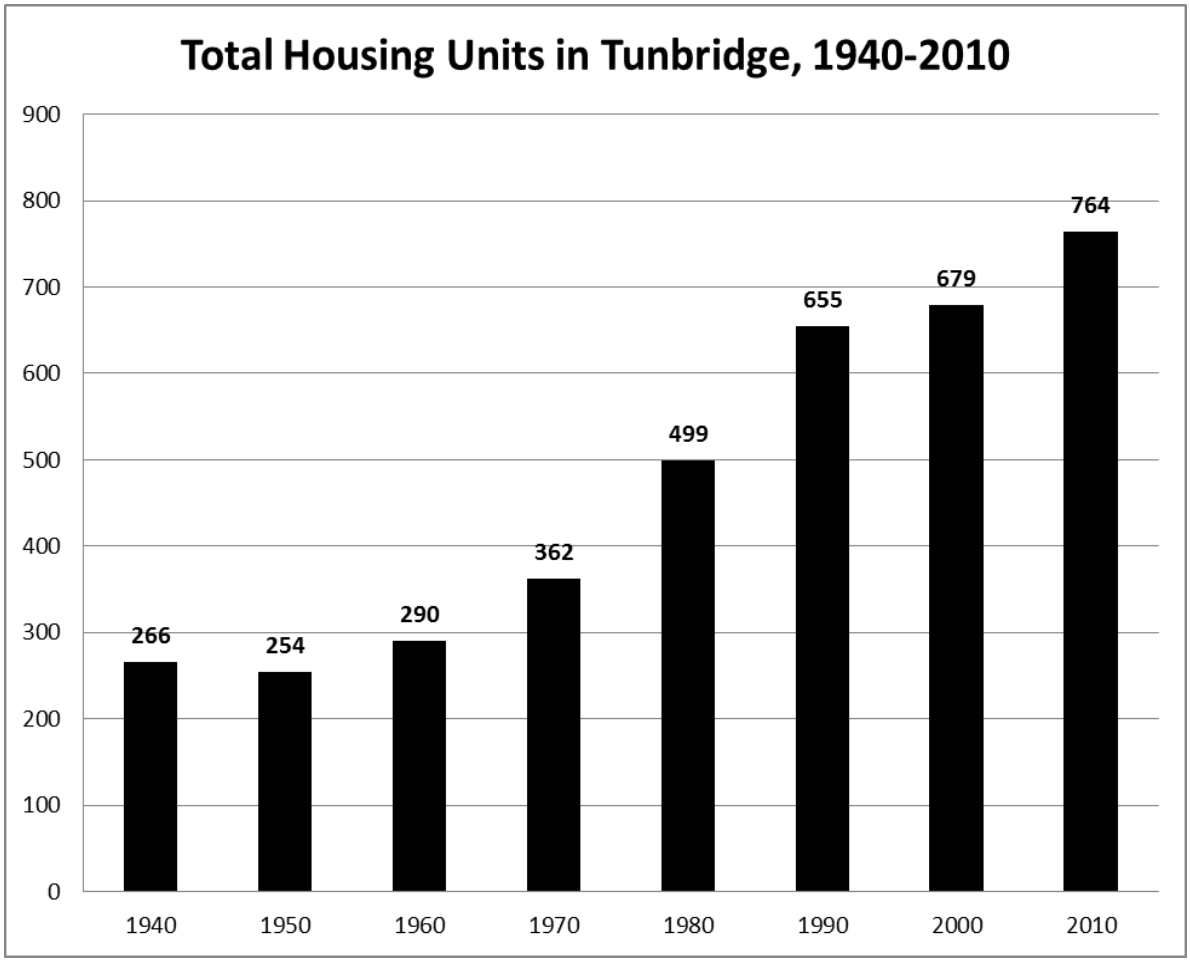

Figure 9 – Total Housing Units in Tunbridge, 1940-2010 *(Source: US Census)*

Tunbridge's total number of housing units has been increasing since the 1960s. The 1970s and 1980s saw a large increase in the number of homes being built throughout Vermont, and Tunbridge was no exception. Tunbridge experienced a 31% increase in new homes between 1980 and 1990, which kept

pace with the 30% increase reflected in Orange County Data. This was due in large part to an increase in the purchase of second homes, and to individuals from out of state moving from the city to the country. Between 1990 and 2000 growth slowed, increasing by only 4%. The pace of housing growth increased again between 2000 and 2010; the number of homes rose by 12.5%; a rate that was slightly faster than the county average of 11%. According to ACS data, housing units have decreased by 32 overall units since the last US Census data, and housing construction has slowed considerably since 2010, however ACS and Census data are not that compatible and this may just be due to that.

C. Types of Housing

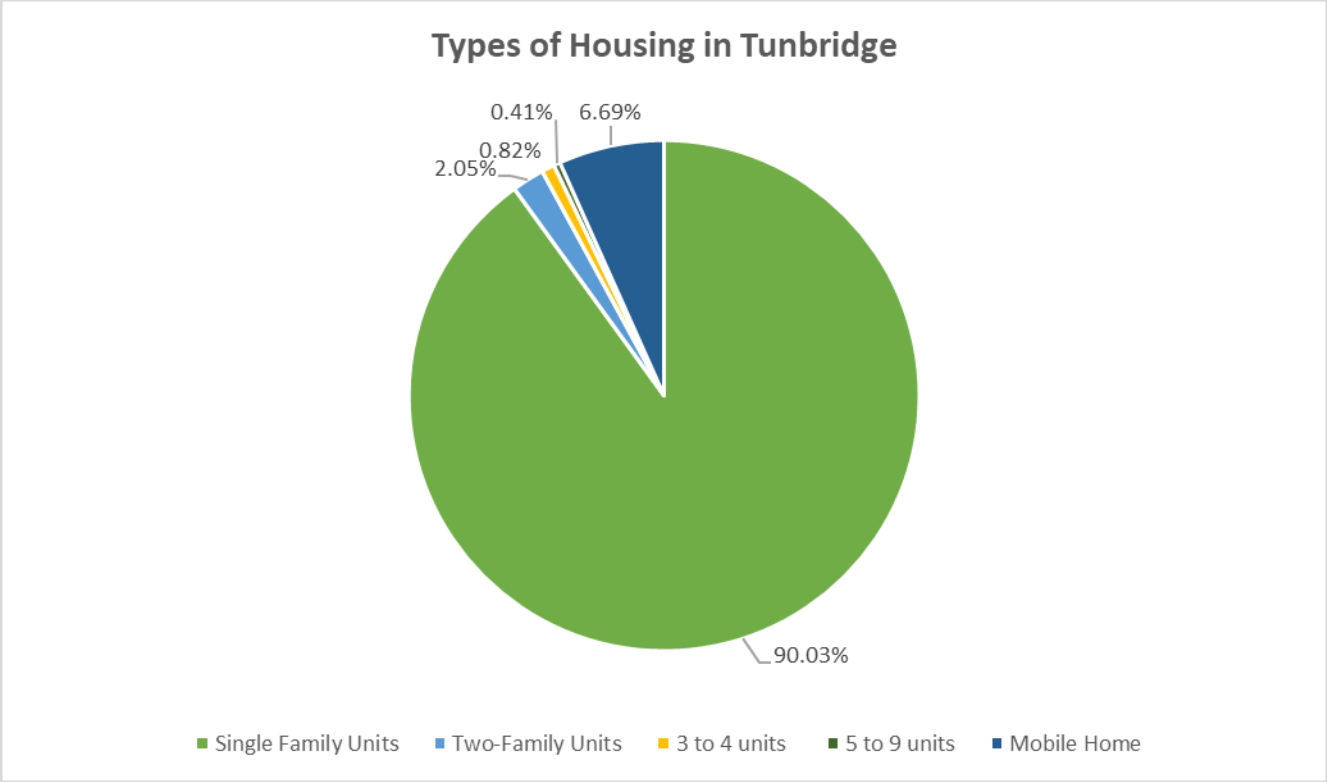

Figure 10 - Types of Housing in Tunbridge, 2016 (Source: American Community Survey, 2016)

The U.S. Census defines a "housing unit" to include conventional houses, apartments, mobile homes, and rooms for occupancy. According to the 2016 American Community Survey estimates that there are 732 total housing units in Tunbridge. Like most of the units in towns throughout Vermont, they are predominantly single-family homes, with mobile homes being a distant second.

As indicated by Figure 11, 64% of the housing stock in Tunbridge is owner occupied. An additional 22% of the housing is dedicated to seasonal, recreational or occasional use, making Tunbridge unique when compared to 14% in Orange County and 17% in Vermont as a whole. When a town has a large number of homes that are not occupied year-round, it can have unforeseen impacts on town services. For example, Tunbridge, like many other Vermont towns, has a volunteer fire department. This department depends on full-time residents to staff its fire department, and a lack of full-time residents can make acquiring staff difficult because the pool of candidates is reduced.

Vacation homes notwithstanding, Tunbridge had only 1% of its total housing stock vacant in 2010. Anything below 5% is functionally considered a zero, so in general, Tunbridge does not have much available housing stock to offer, which drives up housing costs in Town.

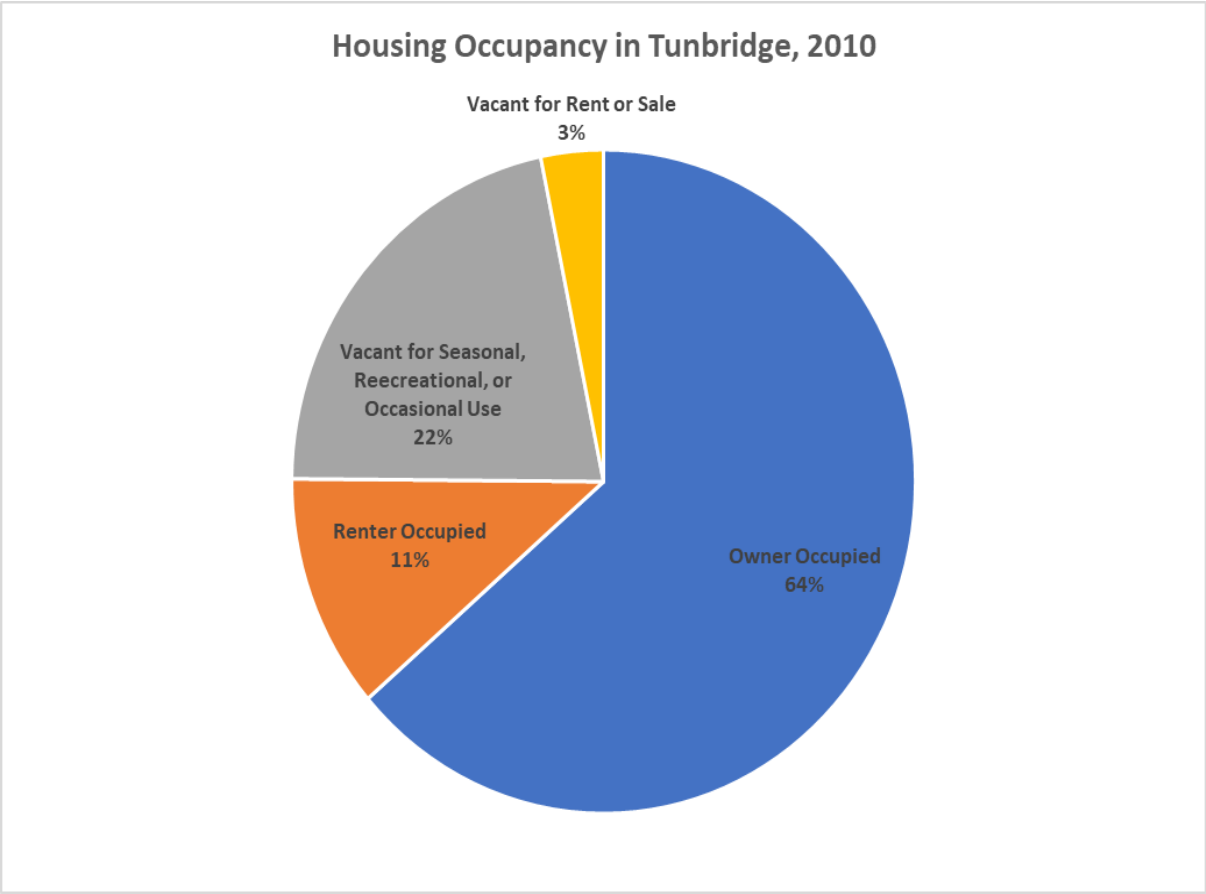

Figure 11 - Housing Occupancy in Tunbridge, 2010 *(Source: U.S. Census)*

D. Rental Housing

Only 12% of Tunbridge's housing stock in 2010 was renter occupied. The tight housing market and lack of unoccupied apartments continues to drive up rental costs. In 2016 the US Agency of Housing and Urban Development (HUD) calculated the fair market rent for a modest two-bedroom apartment in Tunbridge at $979 per month. This represents a 14% increase from the 2011 Fair Market rent of $979 for a two-bedroom apartment. In 2016 the median rental rate in Tunbridge was $1,008 per month, which indicates that renters in Town are paying higher than Fair Market rent. In order for a renter in Tunbridge to be able to afford rent at the Fair Market Value rate, he/she would have to make roughly $38,000 annually[1]. Given that 50% of Tunbridge's households make $35,000 or less, it is likely that it would be difficult to find affordable rental housing in Tunbridge. Rental rates in Tunbridge are higher than those in Orange County and across the State of Vermont. Many of the rental units in Tunbridge are inhabited with Vermont Law School students who commute to South Royalton, and their presence in the housing market plays a factor in raising rental housing rates.

Residents in Tunbridge making the median annual wage of $37,972 are paying 32% of their income for the average gross rental rate, which means rental properties in Tunbridge are not affordable. Coupled with the fact that rental properties represent only 12% of the total housing stock, and only 11 units were vacant in 2010, it is fair to say that Tunbridge needs additional rental housing. The

[1] Based on the HUD affordability estimates.

Tunbridge community is aware of this need and is concerned about it. In particular, they have acknowledged the impacts that a lack of affordable housing has on attracting young families to their town.

E. Affordable Housing

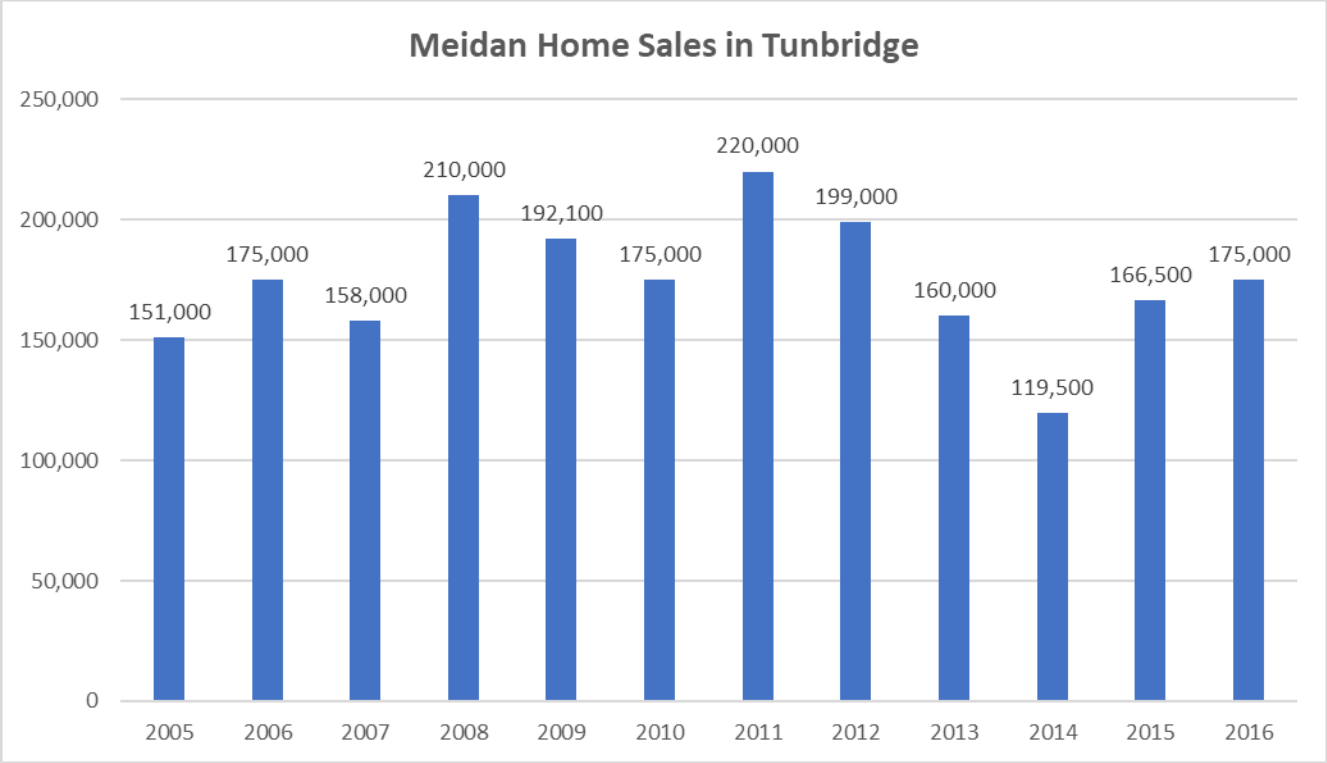

Figure 12 - Median Home Sales in Tunbridge (Source: American Community Survey)

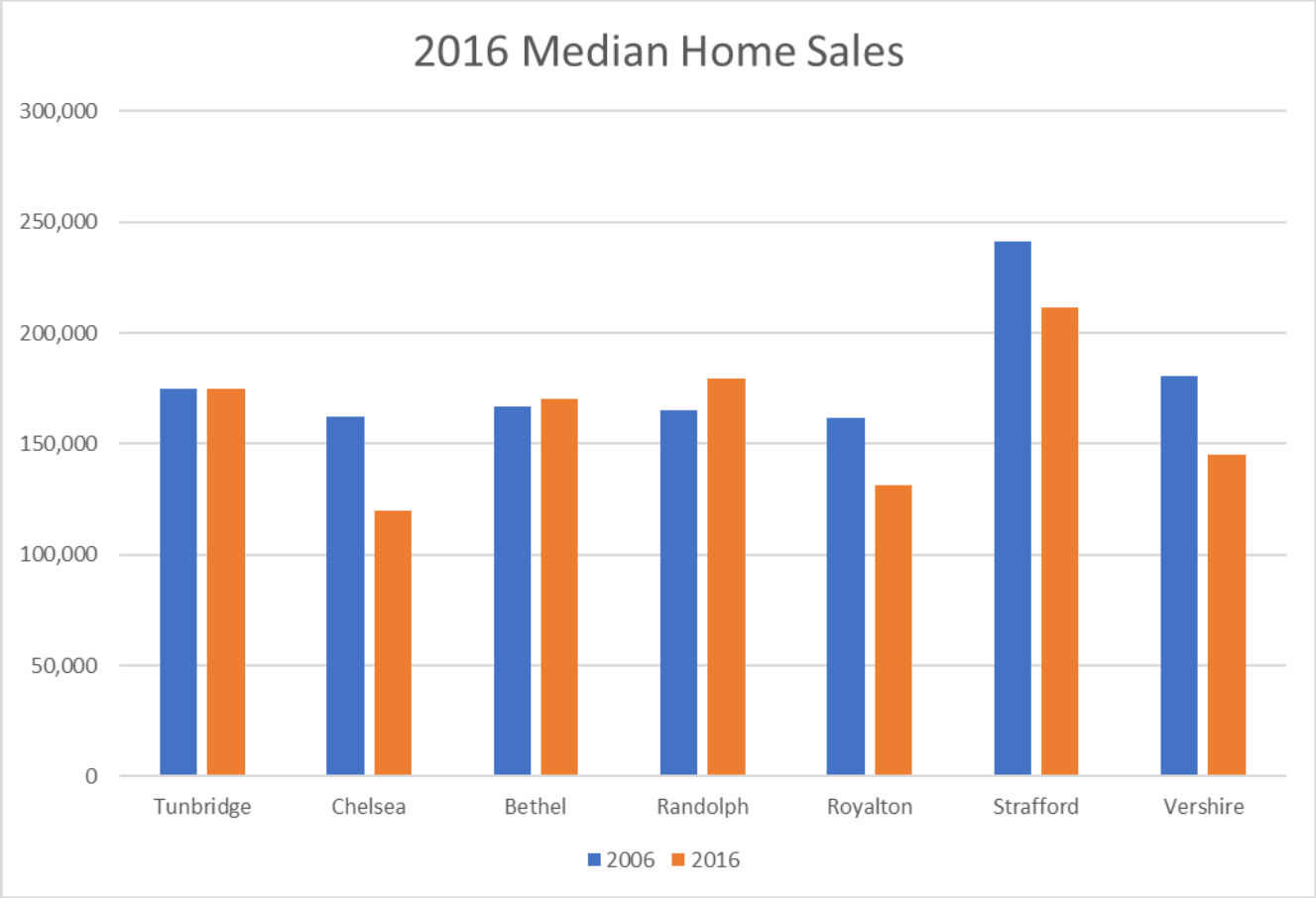

Figure 13 Median Home Sales of Single Family Residences 2016 (Source: Vermont Department of Taxes)

During the past decade housing prices have dramatically increased statewide. However, data from the Vermont Department of Taxes, as displayed in Figure 13, indicate that median home sales in Tunbridge have remained level from 2006 through 2016. The median sale price for a primary residence was $175,000 in 2016 in Tunbridge.

Affordable housing is defined as that which a household making the County median income could afford if no more than 30% of its income were spent on housing costs. For homeowners, housing costs include payments for principal and interest on mortgage, taxes, etc. For renters, housing costs include rent and utilities.

In its annual publication “Between a Rock and A Hard Place: Housing and wages in Vermont”, the Vermont Housing Council notes that the median purchase price of a primary home in Vermont in 2010 reached $195,000. A Vermont household would need an annual income of $58,000 as well as $16,000 in cash (for closing costs and a 5% down payment) to purchase a home at that price. The cost of housing has been driven up in great part due to the tight housing market. In 2000 Tunbridge’s vacancy rate was only 1% which is consistent with the rest of the State and, according to “Between a Rock and A Hard Place”, the lowest in the nation.

Tunbridge, like many communities, has experienced a trend toward fewer home occupants. This trend is unlikely to be reversed. The trend results in an increase demand for housing units, which could be smaller. The elderly, single households and other special populations are oftentimes in need of special types of housing including that which is affordable and readily accessible.

Another barrier to affordable housing is the age of homes in Tunbridge. "Between a Rock and A Hard Place" points out that on the whole, "Vermont's housing stock is among the oldest in the United States. 63% of owned homes and 74% of rentals in Vermont were built in 1979 or earlier, before newer energy efficiency technology was available, housing codes were less stringent and the use of lead-based paint was wide-spread. These factors make an important impact on the cost of operating housing, assuring the health and safety of all residents, and providing access to Vermonters with different abilities."

State statute requires communities to have a program that encourages the creation of affordable housing. Because Tunbridge has no land use regulations beyond the scope of this plan and its relationship to Act 250, there are no formal regulations to encourage the development of affordable housing.

F. Elderly Housing

Nursing and Residential Care Facilities: Total Beds			
	Nursing Care Level II	**Residential Care Level III**	**Residential Care Level IV**
Chelsea	0	22	0
Bethel	0	0	0
Randolph	30	18	0
Royalton	0	0	0
Strafford	0	0	0
Tunbridge	**0**	**0**	**0**
Vershire	0	8	0

Figure 14 Nursing and Residential Care Facilities: Total Beds (Source: Vermont Dept. of Aging and Independent Living, 2018)

According to the 2010 U.S. Census, there are 193 individuals in Tunbridge who are 65 or older. 26% of the households in Tunbridge include people 65 years or older. Residents believe that rising taxes are making it harder for the elderly to afford to own a home in Tunbridge.

Within Vermont there are several types of elderly care facilities which are subject to State regulation, specifically including nursing homes and residential care facilities. Nursing homes provide nursing care and related services for people who need nursing, medical, rehabilitation, or other special services. They are licensed by the state and may be certified to participate in the Medicaid and/or Medicare programs. Certain nursing homes may also meet specific standards for subacute care or dementia care. Residential care homes are state licensed group living arrangements designed to meet the needs of people who cannot live independently and usually do not require the type of care provided in a nursing home. When needed, help is provided with daily activities such as eating, walking, toileting, bathing, and dressing. Residential care homes may provide nursing home level of care to residents under certain conditions. Daily rates at residential care homes are usually less than rates at nursing homes.

The Vermont Department of Disabilities, Aging and Independent Living classifies residential care homes in two groups, depending upon the level of care they provide. Level III homes provide nursing overview, but not full-time nursing care. Level IV homes do not provide nursing overview or nursing care. Nursing homes, which have full time nursing care, are considered Level II. At present, there are

no options for elderly care located in Tunbridge. The nearest options are in Randolph (Number of beds: 30 Level II, 18 Level III) and Chelsea (Number of beds: 22 Level III). However, given the size of the populations in both Randolph and Chelsea, it is likely that there is a large population waiting for vacancies at these locations.

In the Vermont Housing Finance Agency's issue paper "Housing and the Needs of Vermont's Aging Population", it is acknowledged that more seniors today want to "age in place," which means choosing to remain at home or in a supportive living community as they grow older without having to move each time their needs increase. Considering the lack of availability of nursing homes in Tunbridge and Vermont as a whole, this may be the optimal way to address elderly housing in the future. Having the right housing includes the ability to stay active and engaged in community life, which is a great benefit not only to the individual, but to the community as a whole. However, considering the high costs of housing and the lack of age-appropriate homes in Tunbridge, aging in place in the community may not be an option that can be considered by older residents without retrofits to existing homes or construction of smaller, new units. Options such as HomeShare, which can pair elders with others to help care for them are promising ways to solve the needs of seniors living in large homes and younger people seeking housing.

Several municipalities have benefited from planned retirement communities which provide for older persons. Innovative land use policies and controls to direct special needs are encouraged. Such land usages are best located in close proximity to existing hamlet centers where basic services are available and not in rural areas.

G. Goals, Policies and Recommendations

Goals

1. To encourage the retention of existing housing and construction of new housing that meets the natural population growth.
2. To encourage the preservation of historic structures in ways that appropriately serves the need for housing.
3. To encourage the creation of additional rental properties throughout Town, provided that they do not put an undue burden on Town services and facilities.
4. To encourage the development of affordable senior housing within the Town.
5. To support the creation of affordable housing in Tunbridge, of multi-dwelling and single dwelling units.
6. To encourage the use of accessory apartments.

Policies

1. Tunbridge supports the creation of affordable housing that meets the definition of affordability in that it accounts for no more than 30% of an individual’s income.
2. It is the policy of the Town to ensure that the timing and rate of new housing construction or rehabilitation does not exceed the community's ability to provide adequate public facilities (e.g. schools and municipal services).
3. It is the policy of the Town to keep housing affordable by encouraging accessory apartments multi-dwelling units, and clustered developments.
4. It is the policy of the Town to encourage the location of future housing so as to complement existing or planned employment patterns, travel times, and energy requirements.

5. It is the policy of the Town that the location of housing, related amenities, and land uses should be planned with due regard to the physical limitations of the site and its proximity to current or planned public and private services such as roads and commercial/service centers.'
6. Multi-unit affordable housing is appropriate in the village areas or along significant transportation infrastructure, provided that this housing does not put an undue burden on existing infrastructure, particularly with regard to access to water.
7. Affordable housing development within the villages shall be designed so as perpetuate the aesthetic and architectural character of Tunbridge's villages, and it shall be at a scale that fits appropriately and does not have an undue adverse impact on the character of the community or the ability for the town to provide services.

Recommendations

1. The Town should apply for grant funding to conduct a housing needs assessment in Tunbridge.
2. Tunbridge shall make educational pamphlets available to interested landlords to support affordable and available housing in Tunbridge.

Growth is inevitable and desirable, but destruction of community character is not. The question is not whether your part of the world is going to change. The question is how. -Edward T. McMahon

VI. Education

A. Introduction

During the previous drafting of this Plan, the Town of Tunbridge was in the process of merging its elementary school with the neighboring Town of Chelsea. The Tunbridge Central School building is located on Route 110 in North Tunbridge Village and offers education for grades K-8. Chelsea's school previously consisted of grades K-12, but as part of the two Town school merger, it now consists of grades K-8. Both Tunbridge and Chelsea now have choice for-grades 9-12. As of July 1, 2018, the new school district between the two towns is the First Branch Unified District.
See Appendix B for additional information on education resources.

The Tunbridge community plays a critical role in supporting the educational institution of the Town through its generous volunteerism. Tunbridge residents volunteer in numerous ways by enhancing school programs, such as reading, quilting, artistic endeavors, and field trips.

B. Student Enrollment

Enrollments of students in the Tunbridge Central School are reported annually to the Vermont Department of Education. Based upon annual student resident counts from the Department, student enrollment at the school for grades (K-8) in recent years has been as follows:

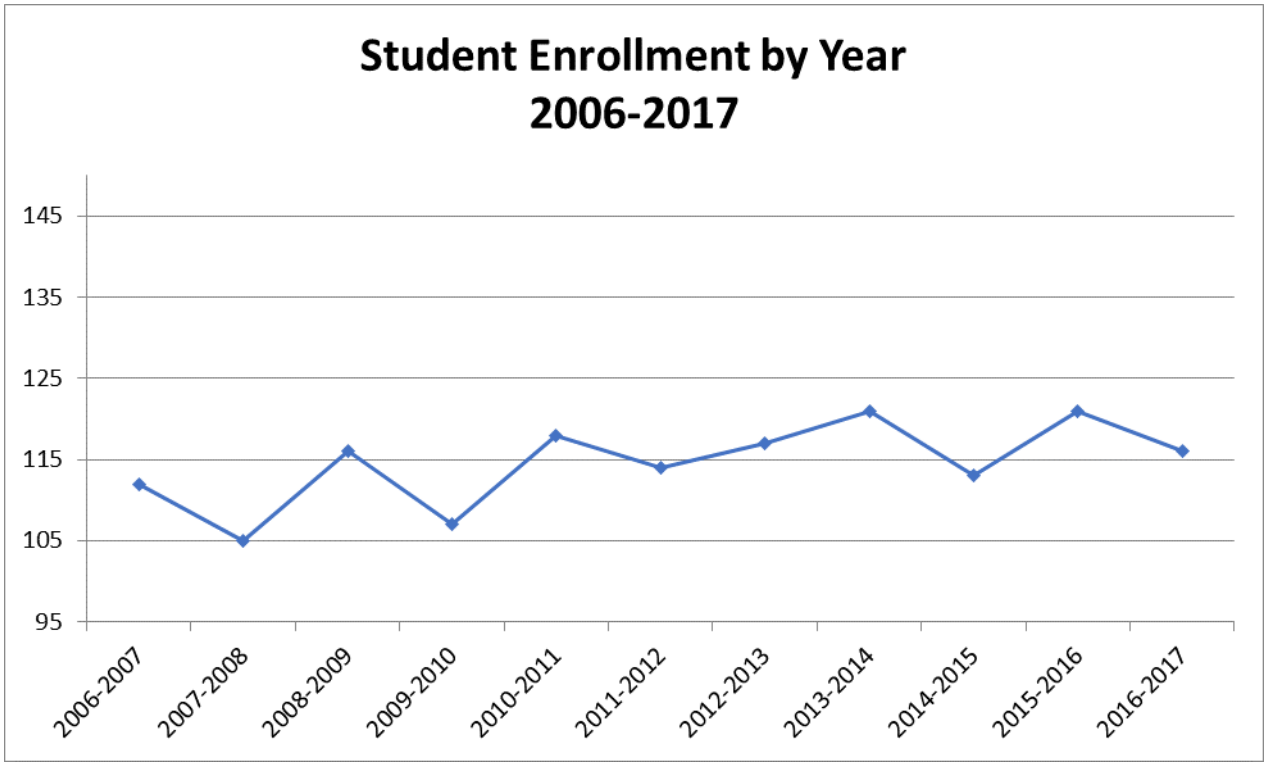

Figure 15 Tunbridge Central School Student Enrollment, Tunbridge School 2006-2017 (Source: VT Dept. of Education)

Enrollment at the Tunbridge Central School has fluctuated on a yearly basis, but the average number of students over the past eleven years has been 114, resulting in a static trend line, bucking a statewide trend of lower enrollment. In school year 2016-2017 the Tunbridge Central School had a 6.4 student to teacher ratio, which is slightly more than the statewide average of 10.55.

Secondary School Enrollment

Because Tunbridge does not have a secondary school, students who graduate from the Tunbridge Central School have the option of attending neighboring high schools in the region. According to the 2016-2017 school year, secondary students attend public secondary schools that include but are not limited to those located in Hartford, Randolph, Royalton, and Thetford (a public/private school), Sharon Academy (which is an independent school) in Vermont, Hanover in New Hampshire, and the private institution of Kimball Union Academy, in Plainfield, New Hampshire. Buses, travel times, and family commuting patterns play an important role in secondary school choice.

School Programs

- Everybody Wins! Vermont: This literary based mentoring program based in Montpelier pairs adult mentors and students in elementary schools for weekly lunch reading sessions. This Power Lunch program helps to encourage reading from a young age and takes place in 26 schools, including the Tunbridge Central School.
- BackPack Program: This food donation program, which is run by the Vermont Foodbank in cooperation with the Tunbridge Food Shelf, distributes nonperishable and healthy food-filled backpacks to hungry children in need.
- Farm to school and Agricultural programming: the Tunbridge Central School students work intimately with the agricultural community in preparation for the Tunbridge World Fair. The School and its students participate in hobbies, arts/crafts, scavenger hunts, and agricultural events. The Schools is also closed for the duration of the Tunbridge World Far.
- Tunbridge One Planet Program (TOPs): This Program provides after-school services to students in K-6 grades. It also offers 5-6 weeks of summer programming.

C. School Building

The Tunbridge Central School building was originally built in 1954, and additions were added in 1987 and 2000. One of the additions was a multi-purpose room, which is made available for town functions such as Town Meeting and for recreational activities such as community basketball and volleyball. The 1954 section of the building is clearly aging, and work will need to be done to upgrade this section of the school. Otherwise, the school is in good condition. During the 2018 School Merger, the Town of Tunbridge voted to consolidate with the Town of Chelsea, and, as part of that process, sold the Tunbridge Central School Building to the First Branch Unified District. During the drafting of the Town Plan in Spring 2018, the Town was in the process of upgrading the Heating, Ventilation, and Air Condition (HVAC) system in the Tunbridge Central School Building. A mechanical engineer was contracted to consider energy saving measures and collaborated with Efficiency Vermont in the process.

D. Adult/Vocational Education

Tunbridge has a fairly limited amount of adult or vocational education opportunities in town. Most students and adults take advantage of the opportunities that are available in Randolph or Hartford as an alternative.

Vermont Technical College (VTC) - Vermont Technical College is located in Randolph Center. VTC is part of the Vermont State College system and offers full and part time educational opportunities that range from computer technology, to agriculture to health services. Attendees may choose a two-year program that leads to an associate's degree, a four-year program that leads to a bachelor's degree, or the college's one-year program that leads to a Practical Nursing certificate.

Randolph Technical Career Center (RTCC) – Located in Randolph village, the RTCC is part of Randolph Union High School. RTCC offers adult education courses that range from the traditional tech center focuses of mechanical and woodworking, to computer technology, small business management, bookkeeping as well as arts, crafts and languages. RTCC's adult education classes are open to all for a fee.

Hartford Area Career & Technology Center (HACTC) – Associated with Hartford High School, HACTC offers similar programs to RTCC and has been a preferred choice for numerous Tunbridge students.

Orange County Parent Child Center (OCPCC) – Located in Tunbridge, OCPCC offers a range of educational services through its Families Learning Together Program. This program supports adolescents and young parents seeking to complete their education, acquire relevant and desirable employment skills, and enhance life and parenting skills. Services offered through this program include parenting classes, academic tutoring, career exploration, and peer support.

Central Vermont Adult Basic Education (CVABE): CVABE operates in six locations, serves Orange, Lamoille, and Washington counties, and has its closest location in Randolph. CVABE provides free, individualized academic services to adults and teenagers, including GED preparation, and testing materials in one-on-one tutorials, small group sessions, and classes.

The Friends of the Tunbridge Public Library offers Winter Evenings, a regular educational programming during the winter months, that covers a wide range of presentations.

E. Childcare

Childcare, 2018
Childcare providers, by town.

	Registered	Licensed
Chelsea	0	1
Bethel	1	2
Randolph	2	5
Royalton	1	3
Strafford	0	2
Tunbridge	**0**	**2**
Vershire	0	0

Figure 16 Childcare providers by Town, 2018 (Source: VT Bright Futures Childcare Information System)

An inventory of registered childcare facilities reveals that Tunbridge has a very limited amount of childcare available to the community. The State of Vermont has two classifications of childcare that are regulated, they are:

- Registered Family Child Care Home: A child care program approved only in the provider's residence, which is limited to a small number of children based on specific criteria.
- Licensed Program: A child care program providing care to children in any approved location. The number and ages of children served are based on available approved space and staffing qualifications, as well as play and learning equipment. A Licensed program must be inspected by the Department of Labor and Industry's Fire Safety Inspectors and must obtain a Water and Wastewater Disposal Permit from the Agency of Environmental Conservation. A Licensed program is considered a public building under Vermont Law. Types of licensed programs include: early childhood programs, school-age care, family homes and non-recurring care programs.

There are currently two licensed childcare services in Tunbridge: Orange County Parent Child Center (OCPCC) and One Planet Program (TOPS). Most residents currently arrange for care with relatives, or take their children to childcare facilities beyond the borders of Tunbridge to neighboring towns like Chelsea or Royalton.

Orange County Parent Child Center (OCPCC)

OCPCC is a non-profit organization that provides a wide range of childcare services to the community and is a tremendous resource for the Town of Tunbridge and Orange County. OCPCC provides full-service childcare and preschool program for children aged six weeks through five years, it provides early educational child care programming for infants, toddlers, and preschoolers, it runs the Families Learning Together adult education program, and it provides 10 hours of free programming per week through public funding

For children in the Tunbridge school system, there is the option of participating in an after-school program. As of January of 2007, there were 30 children enrolled in the program, which offers kids math, reading and physical-education components. The program was originally funded by a 3-year "21st century" grant awarded in 2004. At this time, the program manager is currently trying to secure funding to continue the program. Because our current economy requires that both family members work, programs such as this one are needed to fill time gap between when school gets out and when parents can be home from work. It is in the best interest of the Town to make every effort to support the Tunbridge after-school program.

In addition to concerns about the availability of affordable housing for purchase and affordable rental or transitional housing, the lack of available childcare may be acting as a disincentive for young families to move to Tunbridge.

F. Goals, Policies, and Recommendations

Goals

1. To provide a safe and secure learning environment where quality educational opportunities are provided to all students.
2. To ensure that vocational and adult education opportunities are available for residents.
3. To enable the best opportunity to educate our students at the most equitable cost to the Town's taxpayers.

4. To encourage the creation of affordable childcare facilities that meet the established needs of residents in Tunbridge.

Policies

1. Land development that is likely to result in large numbers of school children must be phased or planned so as to not place an undue financial burden on the capacity of the Town to provide educational services.
2. The Town should continue to consider the future of its educational systems and its physical assets.

Recommendations

1. The Town should replace the HVAC system in the Tunbridge Central School.
2. The Town should continue to investigate implementing efficiency measures in the Tunbridge Central School.
3. The Town should take advantage of its Village Designation benefits to implement improvements to educational facilities.
4. The Town's educational programing should encompass vocational and place-based learning initiatives and outdoor recreation, especially incorporating the Town Forest parcels.
5. The Town should continue to work with the Vermont State Police, Orange County Sheriff, and the Tunbridge Emergency Management Coordinator to investigate increased security measures at the Tunbridge Central School.
6. The Town should continue to support programs that alleviate food insecurity.
7. The Town encourages its residents to take advantage of adult education programs.
8. The Town should continue to support volunteer engagement in the school community.

"Planning is bringing the future into the present so that you can do something about it now" ~ Alan Lakein

VII. Utilities, Facilities, and Recreation

The provision of services and maintenance of facilities is one of the key roles of any municipal government. The cost of services and public facility maintenance can represent a substantial amount of a municipality's yearly budget (not including transportation, which is generally the largest portion).

A. Capital Budgeting & Planning

State statute enables communities to create a Capital Budget and Program for the purposes of planning and investing in long-range capital planning. Although most communities have some form of capital account where they save money, many do not have a Capital Budget and Program. A capital budget outlines the capital projects to be taken in the next year, and a capital program covers those that are to be undertaken in the coming fiscal years over a five-year period. It includes estimated costs and a proposed method of financing those costs. Also outlined in the Program is an indication of priority of need and the order in which these investments will be made. Any Capital Budget and Program must be consistent with this section of the Town Plan and shall include an analysis of what effect capital investments might have on the operating costs of the community.

When planning for routine major facilities investments, such as roof replacements, foundation repairs, etc., it is important to also consider making energy efficiency improvements at the same time. The cost to replace or renovate a community facility will only be slightly higher if energy efficiency improvements are done at the same time, rather than on their own.

The Town of Tunbridge created a formal Capital Improvement Plan in 2016 which estimates capital expenditures, mostly transportation-related, for five fiscal years from Fiscal Year 18 through Fiscal Year 22. This document helps to guide expenditures regarding community infrastructure and equipment. The Planning Commission may make recommendations to the Selectboard with regard to what capital investments should be considered annually as part of its Capital Budget and Program.

B. Town Offices

This building was originally known as the Market School and was the first two-roomed schoolhouse in Tunbridge. It was built in 1904. Until 2000, half of the building was used by the Tunbridge Library. It was renovated in 2001 when the Library moved to its current location. Currently, the building houses the Tunbridge Town Offices including the Town Clerk and the Town Listers office. The building is in good shape for its age. In 2006, the Town Hall, the church, and the Town Offices were all attached to the Union Agricultural Society's well. In 2010, the town successfully replaced the Town Office's septic system. Energy efficiency improvements were made to the Town Hall as well, including new blown-in attic insulation and the installation of programmable thermostats. No needs are identified for the next 5 years.

C. Town Hall

The Tunbridge Town Hall was built in 1840. It is generally used for public purposes such as Town Meetings, the Memorial Day Services, local theatre groups and other community programs, but it also gets rented for weddings and parties. The availability of a fully functional kitchen in the basement level helps facilities these events.

In 2004 the building was upgraded with funds from an Accessibility Modification Grant through the Vermont Community Development Block Grant program as well as countless donations of money, labor and materials. Renovations included a new heating system for the entire building, insulation improvements, an upgraded kitchen area, handicapped accessibility, plumbing, and electrical in the downstairs meeting area. The Town Hall committee installed a handicapped accessible elevator in the facility to allow better access to the upstairs main hall. The recent upgrades to the building have greatly improved its usability.

In general, the building is in excellent condition, particularly due to the recent renovations. The upstairs hall area of the building has the classic large windows of a hall. These windows are very old and inefficient. Upgrading to more modern and efficient windows, while still maintaining the historic appearance of the building, would benefit the hall. Studies are needed to determine the best way to upgrade these windows.

D. Town Garage

The Town Garage is located at the end of Recreation Road, just north of Tunbridge Village. It is purely a functional building. It is in good condition and is adequate for the needs of Town. In 2010, spray foam insulation was installed in the Town Garage's ceiling and high-efficiency lighting was installed. Programmable thermostats were also included as part of these energy efficiency upgrades. The Town Garage roof was repaired in 2016 to make it more secure.

E. Tunbridge Public Library

The Tunbridge Public Library offers many things for Tunbridge residents: a collection of audio, video, 60+ magazines and over 9,000 books; interlibrary loan; computer and internet access; and access to the Vermont Online Library. According to a 2006 public libraries survey, there are 10,883 library visits per year at the Tunbridge Public Library, and over a thousand registered borrowers.

In addition to offering books and other services typically found at libraries, the Tunbridge Public Library hosts a number of events, including "Winter Evenings", a series of six lectures featuring guest speakers, "Thursday Night Stories," and a summer reading program. The library also features art exhibits in the "ArtSpace" area and co-sponsors programs with the Tunbridge Historical Society. The diversity of community events and services offered by the library make it a center for volunteerism in Tunbridge.

Built in 1829, the former Gibbs building is in excellent condition and no capital projects are needed soon. This building was donated to the Town by the Union Agricultural Society and upgraded in 2001 (including an addition) to accommodate the library. Water supply for the library is serviced by well water.

The organization is supported in part by a yearly budget item in the Town budget. In 2016, the Library received $53,325 in support from the Town and offset the remaining budget needs with fundraising, support from Friends of the Library, grants and other gifts.

In 2012 a new addition was built to the Tunbridge Library, the Community Meeting Room, which was funded entirely by private donations. The addition was made in memory of Kitty Sporn, an important

member of the community. The basement floor of the library features a vault that is used by the Tunbridge Historical Society to maintain archival documents.

F. Public Cemeteries

There are 22 cemeteries in town, 19 of which are public. Town responsibilities in these cemeteries include mowing, other general maintenance, and restoration. Tunbridge recently developed a cemetery on Russell Road, which expands the community burial capacity.

G. Solid Waste Services

Tunbridge is a member of the seventeen-town Central Vermont Solid Waste District (CVSWD). The Town and the Solid Waste district have a unique arrangement whereby Tunbridge utilizes their own transfer station for both trash and recycling. They contract with Northeast Waste Services (Cassella, Inc.) for pickup of both trash and recycling. The Solid Waste District assists the Town with arranging contracts for these services and handles the final destination of all trash leaving Tunbridge. In 2016, Tunbridge paid $41,400 toward landfill, hauling, and recycling fees.

The Tunbridge Transfer Station has been operating at a loss for a significant period of time, due primarily to falling number of “trash tickets” and rising costs for trucking and disposal. This deficit is currently covered by additional taxes, but the desire is to have the transfer station be self-sufficient. Friends of the Dump, a Town-wide organization of concerned citizens, are working on upgrading the facilities of the transfer station, but there are no firm plans for this yet.

H. Water Supply and Wastewater Treatment Facilities

The Town has no public water or sewer system. Individual wells supply water, and septic systems handle sewage disposal. Design and construction of on-site sewage systems requires a permit issued by the Town Health Officer. The Town does not plan to engineer or construct either of these types of facilities in the next eight years, with the exception of the water supply for the Tunbridge Town Offices, Town Hall, and Library. As noted above, attempts to drill a well for the three public buildings were only partially successful. The library has a well of its own, with the Town Offices, Town Hall and Church attached to the Union Agricultural Society’s well.

I. Communication Facilities

Telephone
Landline Communications - Most of the telephone related services in Tunbridge are still offered via the traditional telephone lines and poles (landline). Coverage over landlines in Tunbridge is provided exclusively by Consolidated Communications.

Cellular Communications
There are no cell towers located in Tunbridge, and coverage is poor. While communities are enabled by statute to regulate cell towers, there is an often-used exception: any cellular provider who is creating a network of cell towers is exempt from local land use regulations under V.S.A Title 30, Chapter 5, §248a. While these facilities are exempt from local regulations, due consideration to the municipal plan is supposed to occur as part of the permitting process.

While residents are supportive of expanding cellular service within the community, they do not want to do so to the detriment of the rural character of the town. Any cell tower that is proposed for development in Tunbridge must be designed so as to not have an undo adverse impact on the rural character of the area in which it is located, this shall be achieved by utilizing the following concepts (at a minimum):

- siting the tower below the ridgeline
- using stealth design to have it blend in with surrounding trees
- altering the color of the tower to reduce visibility
- use of landscaping to effectively screen the view of the equipment shelters, necessary structures or access roads from adjacent public ways, public property and residential property

Towers must be capable of supporting multiple antennae/cell service suppliers in order to limit the total number of towers located throughout the town, and thereby limiting the impact on the rural character of the community.

High-Speed Internet.

Dial-up - Dial-up access is still used by some residents in Town, but speeds over a telephone modem are very slow, and given the ever-increasing need for bandwidth in day-to-day use of the internet, it is not practical. The faster and more stable options available to residents are via satellite modem, fiber optics, Cable, and DSL.

Cable Internet – Charter Communications Cable service offers internet through their existing cable TV system. Speeds are generally considered good for home users, and businesses can acquire higher speeds through business specific packages. Home cable internet can be subject to slow-downs at peak hours when many users are simultaneously accessing the internet. Cable is most commonly available along main roads.

DSL (Digital Subscriber Line) - DSL is very similar to cable in speed. It is less subject to decreases in speed caused by heavy internet traffic because a certain amount of bandwidth is dedicated for each user. DSL is provided to those within the service area of Consolidated Communications, but only within three line-miles of the switching station in Tunbridge Village. Residents who live close to the Royalton town line are more likely to have DSL due to their proximity to South Royalton.

Satellite Internet - Provided by companies such as HughesNet, Direcway and Wildblue, satellite internet is an option for residents who are unable to access the internet via cable or DSL provided they have a clear view of the southern sky from their location. Although bandwidth over satellite is on average three times faster than a dial-up connection, it is more expensive than other methods of access and it can be affected by heavy weather such as torrential rains and blizzards.

EC Fiber Net

East Central Vermont Community Fiber Network has developed fiber cable in towns in the Upper Valley and surrounding areas. This organization has developed a long-term plan to extend fiber optic cable throughout the region and is implementing it. Fiber optic cables offer the fastest connection speed available. This project is ongoing and has already benefited some Tunbridge residents.

J. Future Transportation Facility Needs

The 2016 Capital Improvement Plan identifies several Tunbridge transportation and facility needs for Tunbridge from Fiscal Year 18 through Fiscal Year 22 so that the Town can efficiently address its

long-range capital needs. The Capital Improvement Plan also allows the Town to develop a consistent annual capital budget funding process that limits variation. The Town currently maintains an equipment replacement fund, which would be the major financing mechanism employed to the fund following future facility needs. However, in order to fund the following facility needs, increased financial commitment must be made to the equipment replacement fund, most likely with town appropriations and VTrans grants.

Major Equipment and Material Needs in Order of Priority

- Belknap Brook Road bridge replacement: $140,000: planned for implementation in 2019
- Monarch Road bridge replacement: unknown cost at this time
- Frye and Moses Road large culvert upgrade: unknown cost
- Darrow Drive stone bridge replacement: unknown cost at this time
- Town Excavator: approximately $218,545.
- Stone bridge replacement at Strafford, Hoyt, and Tuttle Road intersection: unknown cost

K. Recreation

Tunbridge is rich in history and natural beauty with numerous recreational activities on dirt roads and trails in all parts of town. There has been a noted increase in hiking, horseback trail riding, road bike riding, mountain bike trail riding, and backcountry skiing and snowshoeing in Tunbridge in the past 10 years by locals and visitors alike. Existing local groups that are actively using this network of back roads and trails include;

- The Tunbridge Walking Group. Founded in 2011, this group meets three times a week year-round. With the support of the Tunbridge Historical Society, the Tunbridge Recreation Committee, and the Tunbridge Conservation Committee, this group plans to publish a walking guide detailing walking options with directions to access points, historical points of interest, and maps with lengths of hikes and approximate completion times.
- Tri-Town Trail Runners Snow Machine Club. Founded in 1971, this club maintains 53 miles of groomed trails running through Tunbridge as well as connector trails to adjoining towns.
- Annual mountain bike events in June and August organized by WFVR Community Radio and the Alliance for Vermont Communities. These rides encompass more than thirty miles of gravel roads and trails through Tunbridge, Strafford and Randolph.

Recreational activities have strengthened the outdoor community of Tunbridge, have increased connections between people in Town, and have provided recreational links to neighboring communities. Community residents support the expansion of bicycle and walking trails. Two specific locations identified for a path were between the villages of Tunbridge and North Tunbridge and a trail along the First Branch of the White River to link Chelsea, Tunbridge, and Royalton.

In 2010 Tunbridge developed a management plan for the Tunbridge Town Forest with the Orange County Forester, including preliminary delineation of potential recreational resources. Former skid roads in the Town Forest are generally capable of serving as good hiking/skiing trails, though some portions need minor clearing and maintenance work. Some of this work was conducted by volunteers in 2010, and several guided and informational hikes were conducted in the Town Forest. Week-long educational courses by the former Tunbridge Central School and Chelsea School have been held in the Town Forest to foster ecological stewardship by children and adults. Strong interest has been expressed in expanding these types of offerings, but it has been evident that parking facilities to access

the Town Forest may need to be upgraded or expanded to permit access to a broader audience. The Town currently features a Forest Committee that manages the Town Forest parcels. Improvements are slated for the Drew Lot of the Town Forest, including the entrance/parking and a kiosk. The Garage Lot town forest has completed a harvest, and the Forest Committee had and early summer 2020 walk with Tunbridge School educators to check out new trails, discuss possible pavilion locations, water, and relocating the access road. Support for these projects is hoped to be funds gleaned from past and future planned harvests along with town volunteer effort and talent.

In 2010, the Recreation Committee was reestablished after a decade hiatus. The Committee currently has four members but has no designated maximum or minimum membership requirements. The Recreation Committee receives funding from the Town to support programs related to recreation in Tunbridge, including maintenance of a 50 by 100-foot skating rink at the Tunbridge Central School with the Tunbridge Volunteer Fire Department, coordination of volunteers and transportation to local "learn-to-ski" program, the restoration of the Town pool, and the Memorial Day "Cow-Pie Bingo" event. The Recreation Committee also collaborates with the Tunbridge Central School 8th grade to host a series of monthly breakfasts at the Town Hall to fund the "Cow-Pie Bingo" event. The Tunbridge Recreation Committee has also partnered with the Tunbridge Central School, the School Club, and the Tunbridge One Planet Program to organize and present a Winter Carnival Family Day following the school carnival day in February. The Recreation Committee runs Tunbridge's recreation fields and the Town Pool.

The One Planet program has partnered with the Recreation Committee to offer a variety of programs that ensure regular physical activity and time outdoors for K-6th grade kids in the summer months and allow working families to make use of the services. One Planet charges fees but also uses scholarships and reduced fee rates to ensure that the program is available to any child who is interested in attending

There is a general sense that many opportunities exist for broadening the scope of recreational activities in town, and also broadening the age range that is served. Success in achieving these general goals will require connecting with the instinct for volunteerism that is still a strong part of the Tunbridge community, while at the same time building acceptance for increased use of town funding for recreation programs.

L. Goals, Policies, and Recommendations

Goals

1. To continue and foster partnerships such as those between the Recreation Committee, Tunbridge Central School, the School Club, and the Tunbridge One Planet Program to provide a broad range of affordable recreational activities and opportunities.
2. To continue summer recreational programs for school-age children, especially through effective partnerships such as that with the Tunbridge One Planet program
3. To continue the tradition of unposted land remaining open for recreational use when used in a responsible, appropriate manner.
4. To support the overall health and well-being of adults and children of all ages by providing easily accessible opportunities for physical activity, outdoor recreation, and connection with the natural world.
5. To continue to support the Forest Committee. To provide town services and facilities that meet established needs of current and incoming residents in a cost-effective manner.

Policies

1. Plan for future services and facilities on a reasonable yet conservative growth estimate that reflects the desire of the community to retain its rural and agricultural character.
2. The Town of Tunbridge shall consider repurposing its municipally owned buildings for alternative uses before demolition or sale.
3. Recreational trails for Town Residents abide by "carry-in, carry-out" policy to maintain the long-term vitality of these resources.
4. A cooperative approach to drinking and wastewater systems shall be used when possible.

Recommendations

1. The Town should increase the yearly contribution to the Town's equipment replacement fund.
2. The Town should upgrade the Town Hall building's windows to modern efficient windows to increase energy efficiency.
3. Improve the entrance and parking on the landing of the Town Forest – known as the Drew Lot – after the upcoming harvest is completed, and construct a kiosk to highlight the forest boundaries, guidelines of use, features, and a map of the trails.
4. Identify and develop access to the trail system at the Town Garage Lot of the Tunbridge Town Forest.
5. The Town should continue to make upgrades and renovations to the acoustics and kitchen of the Town Hall.
6. Work with surrounding towns on connecting trail systems and conservation of the Taylor Valley area.
7. Tunbridge should support mixed-use trail development on private land to expand access and offer additional recreational activities.

"We never know the worth of water till the well is dry." ~ Benjamin Franklin

VIII. Health and Emergency Services

A. Health Care Facilities

Health care facilities are essential in the prevention, treatment, and management of illness, and in the preservation of mental and physical well-being through the services that they offer. Rural locations such as Tunbridge are served by small facilities that can assist residents with general health care needs but are not suited for more complex acute care services that require specialized services and equipment.

The lower population density of Vermont's rural countryside and the larger the area over which the population is distributed can make providing adequate health care more difficult, particularly for the elderly who may not be able to drive themselves to major health care facilities. Likewise, in rural areas, emergency care for severe trauma or major acute illnesses such as stroke and heart attack may take longer to arrive than in more populated locations, risking potential loss of life.

There are no options in terms of town-based health care services in Tunbridge. The Chelsea Health Center is the closest location for family medical care. For more specific health care issues, Gifford Medical Center is located in the nearby town of Randolph. Gifford Medical Center offers a wide range of services to serve most medical needs. Dartmouth-Hitchcock Medical Center, located in Lebanon, New Hampshire, is the major medical facility in the Upper Valley, and is a Level One Trauma Center. For local veterans, the Veterans Administration Medical Center in Hartford, Vermont is a medical resource.

B. Tunbridge Volunteer Fire Department

The Tunbridge Volunteer Fire Department (TVFD) is a non-profit organization that serves Tunbridge and is part of the mutual aid network. It also responds to all automobile related rescue squad calls. In 2017, the TVFD responded to 29 calls, which included medical assistance calls, service calls, motor vehicle accidents and mutual aid calls.

Staff

In 2018, the TVFD had 15 firefighters on its roster. Additional volunteers are always needed to serve as firefighters, to help raise money, and to help care for equipment. However, TVFD has had a difficult time in recent years recruiting new members. This is a common problem statewide. Changes in Tunbridge’s demographics, the effect of living in a bedroom community, and the many State and Federal requirements for training have decreased the TVFD’s pool of interested volunteers. In particular, day coverage is spotty because many residents work out of town. The staff of the fire department has taken steps to try to encourage people to become involved with the TVFD.

Fire Station

The Tunbridge Fire Station is located at the corner of Monarch Hill Rd. and Route 110. The building itself is quite old, but part of it was damaged in a flood during the early 1990’s and was rebuilt. The most recent improvement to the building was the installation of a generator. The building does not meet the needs of the TVFD, but like most volunteer fire departments they make do with what they have. The building is undersized, barely allowing for all of the fire and rescue vehicles to fit inside.

Additionally, the building lacks floor drainage making the cleaning of vehicles during the winter impractical. The Tunbridge Fire Department houses four engines and one rescue vehicle. The TVFD has worked to improve its communication methods throughout Town and in 2016 and 2017 it upgraded its fireground repeater. The TVFD is currently in the process of upgrading its dispatch center communication.

Funding

The TVFD receives funding from the Town, but most funding comes from either grants or donations. Taxpayers pay for the department's operating expenses, and large purchases are made out of the Town's capital budget. In 2010, the Town paid $26,920 for fire department expenses.

C. Police Protection Services

Tunbridge has two constable positions, each elected by town vote. Police coverage is provided by the Vermont State Police in Royalton. Tunbridge also contracts with the Orange County Sheriff's department for police protection services. In 2017 the cost of this contract was $6,000.

D. Emergency Medical Services

First Branch Ambulance and South Royalton Rescue
Emergency medical transportation is provided to the north portion of Tunbridge by First Branch Ambulance in Chelsea. The southern portion of Tunbridge is serviced by South Royalton. Vehicle extrication is performed by the Tunbridge Volunteer Fire Department. Tunbridge maintains representation on the boards of both ambulance services.

DHART
The Dartmouth-Hitchcock Advanced Response Team is based in Lebanon, NH at Dartmouth-Hitchcock Medical Center. DHART crews provide both air medical transportation services to the medical communities of Northern New England. In addition, DHART flight crews respond to public safety agency requests for medical evacuation of trauma patients from scenes of injury, and will transport to the closest Trauma Center in the region's five states. Operating 24 hours a day and seven days a week, weather permitting. DHART Crews transport adult, pediatric and neonatal patients to ANY appropriate medical facility in New England. Tunbridge Volunteer Fire Department coordinates DHART landing sites, of which there are several in Town.

E. Emergency Preparedness

The Town of Tunbridge, with assistance from the Two Rivers-Ottauquechee Regional Commission maintains a Local Emergency Management Plan (LEMP). The LEMP document contains contact information for Selectboard members and emergency service providers, assigns Incident Command System roles and outlines the course of action in the event of an emergency. The LEMP is updated and adopted by the Selectboard on a yearly basis.

The community has developed an Emergency Response Plan, which can be used to address numerous disasters, hazards, or emergencies should they occur. The Plan used the Tunbridge World's Fair as a model due to its large scale, but is flexible enough to apply to the entire town during any major incident.

F. Emergency Access

Any new development in Tunbridge should be designed so as to allow safe access for emergency services. Poorly designed driveways that are too steep or too narrow can limit access, particularly in the winter and may represent a safety hazard for the emergency responder.

G. Goals, Policies and Recommendations

Goals

1. High quality medical care should be available to all Tunbridge residents.
2. To ensure the protection and safety of the citizens of Tunbridge against crime and violations of law.
3. To ensure the availability of emergency services to all Tunbridge residents.

Policies

1. It is the policy of the town to support efforts to decrease response times for emergency services.
2. To provide the residents of Tunbridge adequate fire protection services.
3. That the law enforcement needs of the town and its citizens be reviewed and assessed on an annual basis by town officials with input from the citizens to determine the adequacy of police protection provided and to provide greater protection if determined to be inadequate.
4. The design of driveways for new subdivisions or developments that trigger Act 250 shall be done in consultation with the Tunbridge Volunteer Fire Department.
5. Tunbridge supports the development of assisted living or other facilities or services dedicated to supporting the elderly in Tunbridge.
6. Tunbridge supports the access of its residents to high quality physical and mental health care.

Recommendations

1. The Tunbridge Selectboard shall annually update the Town's Local Emergency Management Plan.
2. Tunbridge's Emergency Services Committee shall review and update Tunbridge's police, fire, ambulance, services every five years or as needed.
3. The Town of Tunbridge should be proactive in preparation for potential changes in Public Safety Access Point (PSAP) dispatch services.

"I rode my motorcycle across the country and only couldn't get service in two locations: the bottom of the Grand Canyon and here" ~ Anonymous Tunbridge Resident

IX. Transportation

A. Introduction

The Vermont Agency of Transportation and the Tunbridge Board of Selectmen jointly determine our road classification. There are four road classifications used by the State of Vermont. The classification determines the rate of State financial aid in the repair and maintenance of Town roads (there is no State aid for Class Four roads). The classes are:

- Class 1: town highways that form the extension of a state highway route and that carry a state highway route number.
- Class 2: important town highways, often paved, with the primary purpose of linking towns and high traffic areas such as village settlements and state highways.
- Class 3: all traveled town highways other than Class 1 or Class 2 highways that are negotiable under normal conditions, all seasons of the year by a standard manufactured pleasure car.
- Class 4: all other town highways on which public use is limited.
- Legal Trail: A public right-of-way which are not highways and are generally used for recreational purposes. They may have previously been a town highway or may be newly laid out. There is no minimum width required and the municipality has no maintenance obligations to the road, its, bridges, or its culverts.

B. Town Roads and Road Maintenance

Tunbridge has a total of 70.76 miles, excluding Class 4, of Town roads, consisting mostly of Class 3 roads. This does not include the 7.93 miles of Vermont Route 110 that runs through Tunbridge and is maintained by the State. The total mileage of roads in Tunbridge is slightly higher than the average of 65 miles per town in Orange County.

Class	Mileage
1	0
2	4.84
3	65.92
4	12.85
Legal Trail	2.45

Figure 17 Road Classes by Mileage (Source: VT Dept. of Transportation)

Most of Tunbridge's residential properties are on Class 2 and Class 3 roads. There are about 60 residential properties on Class 4 roads in Tunbridge. In general, it is the policy of the Town to limit the amount of maintenance that occurs on Class 4 roads. Plowing does not occur on Class 4 roads.

The quality of Town roads and their level of maintenance affect not only the Town tax rate, but also the type and rate of Town development. Road improvements may make Tunbridge a more attractive

place of residence and increase the commuter population. This, in turn, may increase demand for Town services and thus additionally raise the tax rate.

Overall, the condition of the roads in Tunbridge is good.

Tunbridge uses approximately 10,000 yards of gravel and crushed stone for its roads, which the Town buys from Chelsea. Tunbridge uses approximately 5000 yards of sand a year, which Tunbridge purchases from East Randolph.

The highway budget has consistently been one of the largest parts of the Town's budget. In the 2015-2016 fiscal year the Town expended $869,355.00 on highway maintenance costs. The highway budget is not entirely funded by Town revenues. State Aid contributed $110,000 or 12.7% of the total for the 2015-2016 fiscal year. The Tunbridge Highway Fund does not receive Federal Revenue Sharing funds. Tunbridge has a strong desire to maintain its rural roads, road maintenance is of high priority to the Town.

C. Bridges

Tunbridge has five covered bridges (all listed on the National Register):

- Cilley (or Lower) Bridge — Southwest of Tunbridge Village
- Flint Bridge — Northeast of Tunbridge Village (off VT 110)
- Larkin Bridge — North Tunbridge (off VT 110)
- Howe Bridge — South of Tunbridge Village (off VT 110)
- Mill (or Hayward & Noble or Spring Rd.) Bridge — West of VT 110 on Spring Road

These bridges are important to the history of Tunbridge as well as adding to the rural character of the Town. They are maintained through a joint collaboration between the Town of Tunbridge and the Vermont Agency of Transportation (VTRANS). Much of the funding to rehabilitate and maintain these historic bridges comes from the State in an effort to preserve historic structures and help support tourism. Vermont’s covered bridges are a popular tourist attraction.

There are twelve bridges in Tunbridge that are maintained by VTRANS. The remaining 24 bridges in Tunbridge are on town roads and therefore are maintained by the town road crew.

D. Road Standards

The Town currently uses highway rules and regulations based on state standards that were adopted by the Selectboard on June, 17, 2013. This policy details road construction standards and policies for road classifications, right-of-way, access, road acceptance, and numerous other construction and maintenance related activities. These highway rules and standards can be found at the Town Office. The responsibility of ordinance implementation rests with the Selectboard and the Tunbridge Road crew. In the event that a proposed development is considered under Act 250, the following shall apply:

- Emergency management services will have guaranteed safe access to all development.
- Roads should be designed with multi-modal transportation safety (pedestrian, bicycle, etc.) in mind.

- 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 shall adhere to the relevant Town Plan goals and objectives - land use, natural resources and transportation elements.
- All roads shall reflect a context-sensitive design that preserves and enhances the adjacent land uses and transportation system.

Major transportation projects often place a greater emphasis on contemporary engineering design standards. However, in some instances, the design and engineering of our roadways and bridges fail to consider the Town's unique historical and natural landscapes. The design of a transportation project should 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.

E. 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.

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 the Town will work with the Regional Planning Commission to obtain the appropriate data.

F. Other Modes of Travel

Non-Motorized Use

Many residents bike or walk on town roads in Tunbridge. The rural nature of most of Tunbridge's roads makes bike and pedestrian travel reasonably safe. However, bike and pedestrian travel along the Route 110 is less safe due to higher traffic volume and speed and a lack of available shoulders.

Tunbridge has 2.45 miles of legal trails, all of which are accessible to the public according to town policy. Additional recreational opportunities can be found using trails maintained by VAST.

Rail and Air

Tunbridge does not any rail lines or airports. The closest rail line is just south of town in Royalton that serves both freight rail and AMTRAK. AMTRAK stops in both Randolph and White River Junction. The closest regional airport is in Lebanon, New Hampshire and major airport in Burlington, Vermont.

ATVs/Snowmobiles

ATVs and snowmobiles are popular forms of recreation in the Town, however, misuse can lead to long-term road or trail damage. Some ATV use is allowed on town roads, but it is limited to Class 4 roads as long as damage does not incur. Snowmobiles may cross town roads, and utilize Class 4 roads and Legal Trails with Selectboard permission, but most of the VAST snowmobile trail network is on private lands.

Public Transportation

Tunbridge, like most Vermont Towns, lacks public transportation. Stagecoach, Inc. offers limited public transportation in the form of special requests for individuals who need transportation for medical reasons, etc. Although there is no Stagecoach bus route in Tunbridge, there are a number of routes that depart from nearby Randolph where Stagecoach is located. Tunbridge residents can take advantage of Stagecoach's "Ticket to Ride" Program helps pay a substantial percentage of the cost of rides for senior citizens (60+) and persons with disabilities when there is not available transportation in the household or the person requesting the trips is unable to drive on the day of the trip. Ticket to Ride is available for a broad array of destinations, such as medical services, shopping, errands, and social purposes.

Other major forms of transportation, including air and rail services, are not available in Tunbridge, but can be accessed in neighboring communities in the Upper Connecticut River Valley. The closest rail facility is located in Royalton. Vermont. The closest airport is located in Lebanon, New Hampshire.

Given that Tunbridge's elderly population is growing, the need for an affordable source of public transportation that can bring the elderly to major medical facilities like Dartmouth Hitchcock and

larger commercial centers for day-to-day shopping needs is important. See Appendix B for additional transportation information.

G. Goals, Policies, and Recommendations

Goals

1. To maintain a transportation system that is safe, efficient, meets the needs of residents, and complements the other goals and policies of this Plan.
2. To ensure that future development does not unnecessarily or unreasonably impact the public investment in Town and regional transportation systems or facilities, including highways, bikeways, and trails.
3. To support local, regional and statewide efforts to provide public and private transportation systems that meet the needs of all population segments and not just those who use automobiles.
4. To minimize transportation energy consumption and use of fossil fuels by encouraging carpooling, transit, electric vehicle usage, and creative alternatives for sharing transportation resources.
5. To provide pedestrians with safe areas to travel within the Villages of Tunbridge and North Tunbridge, such as sidewalks, crosswalks, and bike paths.
6. To provide regular maintenance and upgrades to road equipment and facilities, provided that the costs do not put an undue burden on the people of Tunbridge.
7. To recognize the importance of balancing the need to have safe roadways with the desire to maintain appropriate widths and the health of existing vegetation in its role as a structural component of the roads.

Policies

1. Prior to a final decision to proceed with a major capital transportation project, policy makers should first analyze the project against reasonable alternatives and include public input. In examining the alternatives, investigation should focus on the environmental, energy, social and investment costs and the extent to which such costs meet the goals and policies of this Plan.
2. Development and the associated costs that create impacts on Tunbridge's road system or that require improvements to Town highways shall be borne by the developer, in consultation with the Selectboard. The Selectboard shall have sole power to change the classification of the road.
3. It is the policy of the town to minimize curb cuts to ensure the proper function and performance of a town highway.
4. It is the policy of the town that the design of access roads and related facilities provide for proper alignment of new or relocated driveways along a roadway.
5. The Town shall seek public input in any decision to substantially change the maintenance level or surface treatment of any town road.
6. The Town, as written in V.S.A. Title 19 Section 310, does not maintain Class 4 Highways, excepting bridges and culverts. The policy of the Selectboard is that before the town would consider adopting a new road or upgrading an existing highway, the abutting property owners shall be responsible for the cost of improving and/or building the road to Town specifications. Final decision regarding the nature of the improvement rests with the Selectboard.
7. Private landowners shall not improve or update town-maintained roads without previously getting approval for the Selectboard.
8. The Town supports increased facilities for park and ride, transit services, and the installation of charging stations.
9. ATV usage shall not lead to the damage of roads.

Recommendations

1. In reviewing requests to improve or update town-maintained roads, the Selectboard shall consider all of the following criteria:
    a. Volume of traffic,
    b. Noise of vehicles,
    c. Impact to neighbors, and
    d. Weight of vehicles.
2. The Town shall continue to update its Road and Bridge standards.
3. In the event that any of Tunbridge's five covered bridges were to collapse, break, or fall into disrepair, the Town should improve it for emergency access.
4. Given the interest in the benefits from biking, hiking, snowmobiling, cross-country skiing, and similar outdoor recreational activities, the Town should, as an alternative to complete discontinuance of a highway, give full consideration to preserving Class 4 roads for recreational use by downgrading their status to a legal trail and thus retaining the public's interest in them.
5. The Town should investigate the right-of-way and width of its roads in terms of feet and rods.
6. Tunbridge should work with the Vermont Agency of Transportation to analyze speed limits on town-maintained roads to ensure the safety of drivers and residents.
7. The Town should consider lowering the speed-limit from 35 to 30 mph in its Village Areas.
8. The Town should promote a dialogue to improve the safety of multiple use on Recreation Road.
9. The Town should look into placing an EV charging station at the town office or library.
10. The Selectboard should establish a policy for permitted uses on Legal Trails.

"In the end, our society will be defined not only by what we create, but by what we refuse to destroy." ~ John Sawhill, Nature Conservancy

X. Agriculture

A. Introduction

For the past several decades, the perception has been that Vermont is losing its farms. In fact, this isn't the case. According to the 1974 Census of Agriculture, there were just fewer than 6000 farms in Vermont. By 2007, that number had increased by 16.4% to 6,984 farms. In 2012, there were 7,338 farms in Vermont, which represents a 5.07% increase from 2007. The reality is that Vermont has been losing *dairy* farms at a rapid rate, there were only1,075 dairy farms in Vermont in 2012 as compared to over 3000 in the late 1870's. Dairy farms have been replaced by other types of farming. Three quarters of Vermont farms are diversified farms – farms that farm or raise multiple products to contribute to their income stream.

In 2012, USDA data indicated the estimated agricultural revenue in Vermont to be $776 million per year. Vermont's major agricultural and food product output totaled $2.7 billion in 2007, the latest year of the Census of Agriculture.

Many other businesses in Vermont depend on the "farm economy." According to the Vermont Farm to Plate Strategic Plan (F2PSP), which was released in 2011, Vermont has at least 457 food processing establishments that employ at least 4,356 people and is the second-largest manufacturing sector employer in the state, behind computer and electronic products. In addition, Vermont has at least 263 wholesale distribution establishments that collectively employ at least 2,288 people. The farm-related food industry is clearly connected to the farm economy.

Though federal law recognizes the importance of farmland and farmland protection, local planning and zoning regulations often neglect the issue of prime agricultural land and the conflicts that arise between expanding development and successful farming.

The distinctiveness of the working landscape gives Vermont its beauty. Farms provide open space for wildlife habitat, scenic views and a connection to the land that is hard to find in other places. They also help our towns avoid sprawl and maintain small town and village settlement patterns. As such, to continue to receive the benefits farming has to offer, a community must encourage farming. Citizens have said farming and agriculture must be protected and encouraged to grow. If residents want the landscape to remain open, then someone has to be actively working that land, whether they are grazing cattle on it, or growing hay or other products.

B. Historic Agriculture in Tunbridge

During the early to mid-1900's, Tunbridge had many more farms than it has today. It was not uncommon for these farms to be operated by multiple generations of a family during the early to mid-1900's, but in the 70's and 80's younger generations became less interested in farming. By the 1980's many of the farmers who followed in their parents' footsteps had reached their later years of life, making farming a challenge physically. This, coupled with the lack of a successor to take over the farm also led to the closing of some farms.

"Moving from diversified to specializing in dairy was the biggest mistake we ever made." – Euclid Farnham

Farms of the early to mid-1900's were generally diversified in nature, having a wide range of products which were sold at a broad number of markets locally and in New England. In the 1950's and 1960's, trends in agriculture began to move from this diversified model to one where farms specialized primarily in a single product, dairy. This reliance on a single product put farmers at the mercy of national milk markets, which were notoriously unstable. There are many reasons that farm closures occurred, particularly during the 1980's.

- Bulk Tanks and Parlor Floors
- Farm Consolidation
- Impacts of Mechanization
- Milk Market Instability and the Whole Herd Buyout Program

C. Present Day Agriculture in Tunbridge and the State of Vermont

PC members and volunteers conducted an inventory of active farmland. This was effective in determining the present-day status of agricultural land use in Tunbridge but did little to establish any discernible pattern of the relationship between agriculture and other land uses over time. While the community still values agriculture statistics in the Plan indicate that only 6% of the working community has jobs in agriculture. The limited amount of actual farming in the community begs the question: Is Tunbridge still an "agricultural community?"

For census purposes, a farm is defined as "a place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year."

An analysis of the United States Census of Agriculture data between 2002 and 2012 (2012 being the most recent period of data collected) shows that farming in Vermont is shifting away from the larger scale farm that developed as a result of trends toward consolidation. Between 2002 and 2012, the number of farms in Vermont increased by 6%. The average size of farms decreased from 189 acres to 171 acres between agricultural censuses. This is most likely due to the fact that 35% of Vermont's farms in 2012 were considered "hobby farms" that sell under $2,500 in agricultural products per year. While the number of "hobby farms" continues to grow, these farms only produce slightly less than 3% of Vermont's agricultural income.

In Vermont, dairy remains the principal form of agriculture. In 2012, 12.7% of Vermont's farms generated 65% of Vermont's agricultural income, many of which are dairy farms. In Tunbridge, dairy represents the community's largest farms. Dairy's role as one of thee stronger elements of the state's economy can be measured by its contribution to the state's gross domestic product. In only 13 states does dairying make up more than 1% of the state's GDP. Dairying in Vermont is responsible for 7% of the state's economy, second only to the fast-growing dairy industry in Idaho with 11.5%. Records maintained by Tunbridge listers indicate that at least 53% of the land (approximately 15,000 of Tunbridge's 28,000 acres) in Tunbridge is in some form of agricultural use. According to the U.S. Census of Agriculture, there were 36 farms (including all types of farming) in Tunbridge in 2007.

D. Types of Farming

Dairy

Dairy has been the dominant form of Agriculture in Vermont for over 100 years, and continues to bring the largest amount of gross income from farming into the state. 65% of Vermont's total

agricultural market value in 2012 was dairy (nearly $505 million). Despite dairy's dominance in Vermont's agricultural system, the number of working dairy farms has decreased by 91% over last nine decades. Presently, there are five active dairy farms located in Tunbridge, and an additional four dairies that work lands in Tunbridge but are based in a neighboring town. These dairies work approximately 60-70% of the open lands in town, consisting of grass/legume production, hay, pasture, or corn.

According to the Vermont Agency of Agriculture, Food and Markets, the average size of a Vermont dairy herd in 2020 was approximately 193 milking cows. In Tunbridge, the average number of milking cows is only 40 to 50 cows. While this may somewhat be dictated by the topography of Tunbridge, which is hillier than the areas of Vermont that dominate the dairy industry, the smaller herd size indicates that viable Tunbridge dairy farms are adapted to optimizing the land base available.

According to the Northeast Organic Farming Association (NOFA-VT), there were 187 organic dairy producers in Vermont in 2020, or 30% of all dairy farms in the state. That number has been driven by conventional dairy farms shifting to the more stable prices of organic milk. Four out the 6 active dairies in Tunbridge currently are certified organic farms.

Livestock

The sale of livestock is a growing facet of diversified agriculture in Vermont. Livestock sales generated over $598 million for Vermont farmers in 2012. In Tunbridge, there are 7 beef producers, 7 poultry producers, and three pork producers, and four sheep and goat producers.

Maple Sugaring

Maple syrup has long been associated with the State of Vermont. The history and tradition, coupled with the market image surrounding maple syrup, make it a popular Vermont branded product. Vermont was the largest producer of pure maple syrup in the United States, equal to 46% (1,955,000 gallons) of total U.S. production in 2010 and currently produces more than enough maple syrup to meet local demand and exports most of its annual crop. Direct retail sales of maple syrup in Vermont are valued at $15 million.

It is very common for farms of all types to pursue maple sugaring as a way to supplement their income. In Tunbridge, for example, there were 19 farmers who reported sugaring as one of their endeavors in the 2005 Agricultural Survey.

Vegetable and Berry Farming

The 2012 Census of Agriculture estimated a market value of over $34.7 million for Vermont vegetable, fruit, berry, and nut production. Based on the inventory collected during the Tunbridge Agricultural survey in 2005, there were three farms that list their "primary endeavor" as vegetable growing.

Community Shared Agriculture (CSA) has rapidly expanded in Tunbridge, and many residents in Town obtain their produce through these producers. CSA typically operate on a platform where participants receive a "share" of vegetables on a weekly basis. However, some CSA operations have expanded to sell their produce at famers markets, have made it available for Farm to School programs, or have shipped it to larger markets out-of-state.

Organic Farming

Organic farming is a rapidly growing sector of agriculture in Vermont, and according to the Northeast Organic Farmers Association – Vermont, the state has a greater proportion of organic to non-organic farms than any other state in the nation. Vermont Organic Farmers, LLC estimates that in 2011 gross sales from organic farms was over $69.8 million, and $129 million including both producers and processors of organic products.

Because of strict requirements regarding the use of fertilizers, hormones and pesticides, organic products are generally considered healthier and more natural than their conventional counterparts. Organic livestock grown for meat does not contain antibiotics. Organic vegetables are grown in healthier soil and contain higher levels of nutrients than conventionally grown vegetables. Organic farms are encouraged to use regenerative soil building practices. Livestock have pasture and humane treatment requirements as well. Farms that wish to have their product bear the "certified organic" label must meet the requirements set forth by the USDA in 2002. Vermont standards, set by NOFA-VT are actually more stringent. Six farms in Tunbridge are Certified Organic by NOFA-VT.

E. Agricultural Challenges

Agriculture is important to the Town of Tunbridge, but it can be a challenging profession for those involved in all its forms.

- **Instability in the Milk Market:** fluctuating milk prices can affect dairy farmer incomes and their budget uncertainty, making a stable farm operation difficult.
- **Cost of Feed:** Grain prices have increased in recent years.
- **Potential future loss of agricultural land:** The 2005 Tunbridge Agriculture Survey showed that over 50% of land in Town is currently devoted to agricultural uses. Farms need to be large in order to maintain a viable operation. If land is subdivided, fragmented, and the agricultural use of the land is lost, then that use cannot be easily restored.
- **Taxes:** High property taxes make long-term farm operations difficult to maintain.
- **Property Values and Initial Investment:** High property values create a hurdle for young people interested in buying land for agriculture-related enterprises.

F. Conservation Easements

Conservation easements are a common method used to ensure that the working landscape gets preserved. The Vermont Land Trust (VLT), Vermont's largest non-profit conservation organization, has conserved more than 590 parcels of land in agricultural use throughout the state, totaling 145,109 acres. Approximately 484 acres of land have been conserved by VLT in Tunbridge. Most land purchased with the intent of applying a conservation easement to it is funded, at least in part, by some form of grant funding from either state or private sources. The Planning Commission acknowledges that conservation easements are one potential solution to preserving the working landscape.

G. The Community's Role in Agriculture

The 2011 Analysis of Agriculture in Tunbridge indicated that the Town values its long agricultural heritage and seeks to maintain this relationship with the land. The 2011 Analysis made the following series of recommendations:

- Form an Agricultural Advisory Committee
- Continue to showcase Tunbridge's agricultural heritage through the Tunbridge World's Fair
- Market the Tunbridge Brand
- Create municipal financial programs that recognize the importance of agriculture to the town
- Support state-level agricultural initiatives

H. Goals, Policies and Recommendations

Goals

1. To maintain the essential rural character of Tunbridge, encourage the growth of agriculture, in all its forms.
2. To encourage the growth, marketing, and consumption of local foods and value-added agricultural products.
3. To promote or encourage self-sufficiency and sustainability through agriculture.
4. To connect Tunbridge residents with their local food producers.

Policies

1. The Town supports agriculture provided that it is conducted at a scale that does not degrade the natural resources or disrupt the existing infrastructure of Tunbridge.
2. The Town supports the continued operation of the Tunbridge World's Fair.
3. Agriculturally related development should not negatively impact the health, welfare or safety of nearby residents.
4. The Town encourages sound forest and agricultural management practices

Recommendations

1. The Town encourages an update of the Tunbridge Agricultural Survey.
2. The Agricultural Advisory Committee shall support the agricultural community in Tunbridge.
3. The Selectboard should consider possible municipal financial programs, such as tax abatements or low-cost loans, to support local agriculture.
4. Continue to encourage the Tunbridge Farmers' Market to promote agriculture in Tunbridge so that local buyers can utilize locally produced farm products.
5. Landowners should consider all options thoroughly and should commit to the conservation easement process when it is appropriate for the long-term maintenance of specific properties.
6. Large-scale agricultural operations, such as 300 heads of cattle on 3-acres of land or concentrated animal feeding operations, that negatively impact the health and quality of surface waters and air quality should be discouraged in Tunbridge.
7. Prime agricultural soils in Tunbridge should not be disrupted, damaged, or converted from their agricultural nature.
8. Landowners in Tunbridge shall not fragment or subdivide the agricultural and forested parcels that have been conserved through easements.
9. The Town should work with State of Vermont agencies and various farm support groups to develop viable farming opportunities in town.
10. The Town should consider offering property tax incentives to farming endeavors.
11. As farmers often rely on nearby leased fields, and some landowners need these leases to continue in the Current Use program, the Agricultural Advisory Committee should work with new owners of farmland to help keep fields accessible to local farmers.

"Tunbridge time can be described as BF and AF (before fair and after fair)." Tunbridge Resident

XI. Land Use

A. Introduction

Land use planning rises to a principal concern for the members of the Planning Commission and the citizens of the Town of Tunbridge because our actions today directly influence and impact the way our Town's landscape will look in the future. How we use our land, our policies for land use, and our plans for future land development can affect a wide range of issues, including the town's character and its ability to adequately and efficiently provide services. In order to ensure that the impacts of future development in Tunbridge do not have unintended consequences, the town's growth must be managed to reflect the vision of this plan.

This section discusses both current and future land use patterns and provides goals, policies and recommendations for future implementation. V.S.A. Title 24, §4411(a) authorizes towns to implement land use regulations, such as zoning, subdivision and site plan preview, provided that those regulations are in conformance with this plan and §4302 of Title 24, which addresses the state's planning goals.

A wide range of tools are available to town planners for the purposes of implementing the town plan. These tools include subdivision regulations, zoning bylaws, capital budget and programming, as well as other ordinances (see chapter XVI for more information). All of these tools must conform to the policies of the Town Plan and once drafted, the Planning Commission is required to issue a report on how the newly drafted tools implement the plan.

B. Historic and Current Land Use

The First Branch of the White River runs north and south through the approximate center of town. Most of the town's area lies within parallel ridges east and west of the river. (A small portion lies over the western ridge on the uplands of the next valley.)

Historically, Tunbridge's land use pattern has been one of concentrated villages and diffused residential and agricultural development. Although Tunbridge Village (also known as "Market Village") and North Tunbridge are denser hamlets of 30 to 40 principal buildings each, the majority of the population is spread throughout the town, living along the network of mostly unpaved roads (Class 3 and 4 roads). Tunbridge's settlement pattern, with residential populations living outside villages, has remained unchanged since the 1820s, when the population was as high as 2,003 people. As an indication of these historic settlement patterns, Tunbridge once had 18 separate schoolhouses and several post offices.

Small, compact villages and open, working landscapes define Tunbridge. The continued balance between the concentrated development in Tunbridge's villages and hamlets, and the residential and agricultural development of the areas surrounding the villages remains essential to maintaining the rural character of Tunbridge.

Tunbridge Village and North Tunbridge are centers of public activity. The Town Offices, Public Library, Tunbridge Church & Parish House, Town Hall, and the Post Office are located in Tunbridge Village; the school, Baptist Church, Grange, and another store are located in North Tunbridge in South Tunbridge, which has only four or five residences, the Methodist Church is active one month each summer. These types of traditional rural village development typify the rural character in Tunbridge.

Above all, agriculture, as was echoed in the 2015 survey, remains an important land use in Tunbridge that defines the character of the Town. The rural character of Tunbridge is entwined with its agricultural history, and both are important to residents. Residents acknowledged, in the 2015 survey, that without active efforts to encourage farming, the distinct appearance of Tunbridge's working landscape will not persist. The character of the town is defined in part by agriculture, the direct and indirect contributions agriculture has to the economy, and people's connection to the working landscape.

C. Land Use Regulation and Future Land Use Areas

Historically, the citizens of Tunbridge have opposed zoning regulations that have been considered. Land use regulations, such as zoning and subdivision, have divided residents in Town. However, land use regulations can be an important tool to combat unwanted development. Although opinion from the 2015 survey is not united about the need for land use regulations, all residents agree they would like to maintain Tunbridge's current aesthetics. Residents of Tunbridge value and wish to maintain the existing working landscape.

State regulators have designated all towns without land use regulation as "1 Acre Towns"; therefore, the following actions trigger Act 250 review:

- Any commercial or industrial developments of over one acre of property shall trigger a review under Act 250.
- The subdivision of land into six or more lots within a continuous period of five years shall trigger review under Act 250.

Under Criterion 10 of Act 250, any proposed project must conform to all duly adopted local and regional plans. Under Criteria 9 of Act 250, developments will also assess their impact on primary agricultural soils.

Overall Goals

1. To continue Tunbridge's historical land use pattern of concentrated villages and diffused residential and agricultural development.
2. To maintain rural character by balancing developmental pressures, natural resources, agricultural activities, and home-based businesses.
3. To protect the rural character of Tunbridge, its agricultural uses, and its natural resources.
4. To maintain the current aesthetics of Tunbridge's working landscape.
5. To recognize that each property is not isolated from others and encourage responsible development and resource management within the community.

Overall Policies:

1. Agricultural businesses that support the rural character of the Town are encouraged.
2. Large-scale development that undermines Tunbridge's rural character is highly discouraged.
3. Tunbridge encourages and supports agricultural uses in the Town to maintain the aesthetics of its working landscape
4. New development shall be similar in character and density with the surrounding area.
5. All new development in all of Tunbridge's land use areas shall be of a type, scale, and physical appearance that is consistent with existing land uses.
6. Density of development in all of Tunbridge's land use areas shall be similar to that of the area in which it is located.

7. The scale of new buildings in a development shall be similar to others in the immediate area.
8. Development in Tunbridge shall not result in a significant increase in traffic volume.
9. Chain retail enterprises (including factory outlets, large grocery stores, fast food establishments, and shopping malls) shall not be located in Tunbridge.
10. Strip development (including but not limited to convenience stores, and fast food establishments) shall not be located outside Tunbridge's Village Center Areas.
11. Development in Tunbridge shall support local needs of residents and shall foster the health of the local economy.

Overall Recommendation

1. Tunbridge should consider adopting subdivision regulation to protect the Town's forests, fields, and natural resources.

D. Village Center Areas

Tunbridge's Village Center Areas cover the densely developed Tunbridge Village and North Tunbridge Village. These centers are intended to be the center of public activity; offer community services, appropriate retail and commercial opportunities; and preserve the historical nature of the villages.

Density in Tunbridge Village and North Tunbridge Village is much higher than in other areas of the community, with some parcels being as small as half an acre and others larger than six acres. This level of density is appropriate provided that new development does not put an undue burden on the availability of potable water. In the "Utilities and Facilities" section of this plan, it was noted that the Town of Tunbridge has had difficulties finding a reliable water source for their buildings in the Village. Clearly, there are limited water resources in Tunbridge Village, and as such any new development or improvements that would require a new water system or upgraded capacity would need to prove that such activity would not negatively impact the existing water resources.

Goal

1. To maintain viable village centers through good planning and subsequent development.

Policies

1. The density of development in this area should reflect existing settlement patterns, land capability, and the availability of utilities for expansion.
2. Shops, services, professional offices and public facilities shall be developed at a scale and design appropriate to existing characteristics in each area.
3. Rehabilitation and renovation of structures and older buildings of historic merit is encouraged to enable new and more economical uses of property and to avoid obsolescence.
4. Where new development is being planned, efforts shall be directed to ensure that such development is complementary and compatible to the configuration of existing buildings and streetscape. Development shall respect traditional scales, proportions, and shapes of the surrounding village. Appearance of new development shall conform with existing buildings.
5. Major public investments, such as improvements to Route 110, should be encouraged and endorsed only on finding that they will not unreasonably or unnecessarily jeopardize or endanger the character of the Village Centers. Prior to the commencement of plans, state planners shall consult with the Town and affected property owners regarding these types of activities.
6. The Plan supports pedestrian enhancements that will promote walkability and safety.

7. New development shall not create an adverse impact on the aesthetic quality and existing character of North Tunbridge and Tunbridge Village Center Areas.
8. Commercial ground-mounted solar is not allowed.

Recommendations

1. Tunbridge shall renew its village designations when they expire.

E. Working Landscape and Resource Conservation Area

The Working Landscape and Resource Conservation land use area will assist in the protection of Tunbridge's forests, farms, natural resources, and working lands. The purpose of the land use area is to protect the natural resource value of these lands, which are largely undeveloped, and to ensure the longevity of Tunbridge's working landscape. Lands within these conservation areas typically need special protection due to their fragile nature, irreparable value, and important ecological function. They typically consist of unpaved and unimproved roads and remoteness from the Town's designated village areas.

Goals

1. Protect scenic areas, open space, forest blocks and wildlife corridors.
2. Preserve Tunbridge's historic settlement pattern, defined by the Town's existing village areas, surrounded by rural countryside.
3. Maintain the character of Tunbridge's rural countryside and support agriculture, forestry, and recreational uses in these areas, as well as low-density residential uses.
4. Maintain and enhance Tunbridge's heritage of working farm and forest lands as part of a sustainable, ecological, and local economy.

Policies

1. The only appropriate uses in the Working Landscape and Resources Conservation Area are conservation uses, outdoor recreation, earth extraction, agricultural uses, forestry uses, residences and home occupations.

Recommendations

1. The minimum lot size in the Working Landscape and Resource Conservation area can be as small as 1 acre, but density of this Working Landscape and Resource Conservation Area shall not exceed 1 residential structure (which may have multiple units) or commercial establishment per 27 acres.
2. Residential structures in the Working Landscape and Resource Conservation Area, specifically multi-family units, shall not exceed 5 units per structure. 3. No development or affiliated subdivision shall create more than 20 lots or dwelling units.
3. Subdivisions within identified forest blocks shall minimize intrusion into interior sections (greater than 300') of forest blocks or on agricultural lands by ensuring roads and building construction envelopes, cut lines remain at the edges of fields and forests.
4. Subdivision layouts shall minimize fragmentation of forest and farm land through the location of lot lines and roads.

F. Route 110 Corridor Area

Vermont Route 110 parallels the First Branch of the White River along the valley floor, running north-south through Town. The purpose of the Route 110 Corridor land use area is to maintain the important aesthetic qualities of the White River's watershed and the First Branch's valley area. This valley floor was cited as an important visual element of Tunbridge's rural character during the 2005 public meetings. There is little commercial development along this road, with the exception of what lies within the Village Center Areas. (See Map 7 –Future Land Use Areas),

In general, the Route 110 Corridor Area is a mix of densities, with denser development being located to existing transportation corridors and lower density development being located in more rural areas. Uses that are residential or agricultural in nature are preferred in this land use area

Due to the constant ebb and flow of the First Branch of the White River, the Route 110 valley floor has the most concentrated amount of prime agricultural soils in Tunbridge. Prime Agricultural (Prime Ag) land is defined by the National Soil Conservation Service as land that is well suited for the production of food, feed, forage, fiber, and oilseed crops, with the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when properly treated and managed. This definition, although one dimensional (focused only on growth of products and not taking into account aesthetic values), does point out the value these soils represent to farmers.

The First Branch is also a center for recreational opportunities in Tunbridge. Access to the river allows for swimming, fishing, canoeing, kayaking and other activities. Plus, it is a thriving riparian ecosystem that would likely be upset if development were allowed to occur in this valley uncontrolled.

Goals

1. To maintain this area as largely open and scenic and retain the recreational, agricultural and ecological value of the land.
2. To protect the Prime Agricultural Farmland in the Route 110 corridor.

Policies

1. The density of development in this area shall reflect existing settlement patterns, and shall not exceed 10 units per structure. Large-scale condominiums and industrial developments shall not be located in this area.
2. The types of commercial development appropriate for this area include small professional offices, small service businesses and inns as well as low-impact light industrial. Primary retail establishments shall not locate in the Route 110 corridor area.
3. Any development that occurs in this highly visible area shall be designed so as to minimize the impact on the rural character of this area.
4. New development proposed in for the Route 110 Corridor Area shall be of a nature that effectively blends in with the existing landscape.
5. Any development that is proposed for the Route 110 Corridor Area shall carefully consider the potential negative impacts on Prime Agricultural Soils, and shall make all reasonable attempts to avoid them. Development on Prime Agricultural soils is strongly discouraged, and any development that does take place shall be required to provide for off-site mitigation, preferably in the Corridor.
6. If more than one building is to be included in a development, the buildings shall be clustered to avoid impact on the rural character of the Route 110 Corridor.

7. Buildings and roads shall be located at the edges of woodlands and fields and along hedgerows to preserve tillable units, whether or not in the same ownership.
8. Commercial development in this area shall be limited to low-impact light industry, small professional offices and services, and agricultural businesses that are located in clusters.
9. Land use activities which potentially threaten groundwater shall be carefully reviewed and monitored to prevent undue loss of quality and quantity to groundwater.

Recommendation

1. Land in this land use area should be considered a priority for conservation.

G. Special Flood Hazard Areas

The Purpose of the Special Flood Hazard Area is to limit development in areas in Town that are vulnerable to flooding and erosion. The Special Flood Hazard Areas in Tunbridge, which were last mapped by the Federal Emergency Management Agency in 1985, follow the First Branch of the White River. For more information on Special Flood Hazard Areas, see the Natural Resources chapter of this Plan or refer to Tunbridge's Flood Hazard Ordinance.

Floodplains are often excellent agricultural land due to the thick layers of river-borne soil deposited there. Floodplains also provide natural storage of floodwaters resulting from snowmelt, high volume rain events, or prolonged rainstorms. Floodplains are poorly suited for structural development.

Goals

1. To encourage agricultural use on the high-quality soils of the floodplain.
2. To recognize and maintain the flood plain functions of the valley, particularly sediment storage and nutrient retention.

Policy

1. New development within the limits of the 100-year floodplain is discouraged to mitigate the damage to health and property from future flooding. Improvements to existing structures in the floodplain are acceptable, provided that careful planning is done to insure against unnecessary loss of property or public endangerment.

Recommendations

1. Land in this land use area should be considered a priority for conservation.
2. Tunbridge should consider adopting a 50-foot vegetated streambank setback buffer as well as river corridor protections.

H. Residential/Agriculture Area

This area encompasses all areas in Tunbridge not designated in sections D, E, F and G of this chapter. Its primary purpose is to protect the working landscape while allowing for a reasonable mix of low-impact uses.

The Residential/Agriculture Area is a mix of residential and agricultural development. Appropriate uses in this area include farming, forestry, small professional offices, small service providers, residential development, home occupations, recreation, agriculture- and cottage industries.

Residents in this area should expect to encounter the sights, sounds, smells and activities typically associated with a working landscape. Likewise, "right-to-farm" ordinances, and other measures designed to protect and encourage agricultural uses should be included in any future land use ordinances.

Goals

1. It is a goal of the Town to encourage agriculture of all varieties throughout Tunbridge.
2. It is a goal of the town to support new agricultural developments provided that they continue to maintain the rural character of the Town.

Policies

1. Industrial (excepting wood or agricultural processing, quarries and sand pits) and principal retail uses are prohibited from development in this area.
2. Maintenance of a working landscape is the primary goal for the Residential/Agricultural Area. Projects which adversely affect the rural setting and conflict with the existing working landscape should not be located in this area.
3. Agricultural and residential uses are to be the primary and dominant land uses in the Residential/Agricultural Area. New development in this area shall not adversely affect the rural character of this area.
4. Only commercial development uses consisting of small professional offices, small service providers, home occupations, cottage industries, agriculture and accessory farm businesses, quarries, sand pits, and forestry are appropriate in the Residential/Agriculture area.
5. Development that creates a substantial amount of traffic, or causes a single town-maintained road to exceed than 400 trips per day, shall not be allowed due to the burden it will have on existing road infrastructure.
6. Home businesses, light industry, and developments that contribute to Tunbridge's rural character are encouraged, provided they do not create undue traffic impacts.

Light industry are uses that have little exterior impacts and are contained inside buildings, typically smaller manufacturing facilities.

I. Act 250/Section 248 Requirements

All projects requiring an Act 250 permit or Section 248 Certificate of Public Good shall conform to the following requirements.

<u>Lot Layout – All Uses/Areas</u>

- Avoid monotonous lot layout of equally sized and shaped lots, especially along a road frontage. Subdivision into a series of 10-acre lots with similar proportions is specifically prohibited.
- The amount of frontage and building position will be varied from lot to lot to avoid a suburban pattern of repeated houses or other buildings situated at or near the middle of adjacent lots one after another.
- Creating more than one adjacent lot with a depth greater than four times its frontage ("spaghetti lots") is prohibited.
- Buildings shall be located at the edges of woodlands and fields, relatively close to roads, along hedgerows, etc., in an effort to preserve tillable units, whether or not in the same ownership.
- Lay out lots to take advantage of and preserve desirable features, such as stone walls, hedgerows, fields, natural clearings, and land contours.

- Locating buildings at the top of ridgelines or at the brows of hills where land is open and sites would be highly visible from nearby public roads is prohibited.
- Excavation/blasting for roads or buildings shall be minimized and where excessive erosion will be likely is prohibited.
- Locate buildings and other construction such that they will not detract from natural or scenic features, such as bodies of water or historic resources.
- In the case of multiple unit projects, buildings shall be clustered.
- On developments involving adjacent buildings or lots, driveways must be shared, and lots shall be limited to a single access point onto state or town roads when topography allows.
- Locate light industrial and commercial uses where they will not be prominently visible, or screen such uses with vegetation to minimize detrimental impacts on neighboring uses.
- Locate any noisy, toxic, or noxious uses where they will not be detected from public roads or neighboring uses, (especially housing), and/or take all reasonable means to screen or lessen any detrimental impacts of such uses. This provision does not apply to agricultural uses.

Construction in Village Center Areas: Tunbridge Village Historic District or North Tunbridge

- Construct buildings that are of the size and scale of other buildings in the Village Area.
- Use traditional building massing, forms and materials within these two settled areas.
- Where alteration of "contributing structures" (structures that are deemed architecturally or culturally significant to a historic district) within the Village Historic District is contemplated, such alterations shall maintain the original character.
- Within Village Center Areas, home businesses are deemed to be a use compatible with existing uses.
- Any development within the Village Districts may have an impact on the existing water supply due to the limited space. Developers must prove that their development will not have any negative effects on public or private water supplies within this area.

Commercial Development in Route 110 Corridor Area

- Development shall be located in clusters set back from the highway, provided that no commercial development shall occur more than 200 feet from the highway.
- Existing buildings or parts thereof shall be reused for commercial development.
- Large parking or delivery areas shall not be located in front of commercial buildings. Large parking areas shall be located at the sides or rear of such buildings. Where feasible, share parking areas between adjacent uses.
- Large commercial signs (4' by 4' or greater in dimensions) are prohibited.
- Maintain trees and existing vegetation adjacent to Route 110. A generously landscaped buffer (using native plants and trees) shall be part of any new construction adjacent to Route 110 to screen structures and parking lots from view and set them into the landscape.
- Share all curb cuts to Route 110. Minimize paved or impermeable areas.

Development in the Residential/Agriculture Area

- No subdivisions of more than 5 total lots shall be permitted in the Residential/Agriculture Area
- No development of more than 20 total housing units shall be permitted in the Residential/Agriculture Area.

- No commercial development shall be permitted in the Residential/Agriculture Area except for development directly related to agricultural, forestry, recreational uses, or home occupations on the same lot.
- No building in the Residential/Agriculture Area, for any use other than agricultural, shall exceed a total of 10,000 square feet.

Development in the Working Landscape and Resource Conservation Area

- Development, including the creation of lot lines, cut areas, and roads shall minimize fragmentation of forest blocks and habitat connectors by concentrating development near existing roads and power lines, and field and forest edges. Intrusions of greater than 300 feet into forested areas is prohibited.

Only put off until tomorrow what you are willing to die having left undone. -Pablo Picasso

XII. Natural Resources

A. Wetlands

Background

Wetlands are ecologically fragile areas and the management of these lands has a direct bearing on the quality and quantity of water resources.

The Vermont Water Resources Board estimates that wetlands comprise less than 5 percent of the surface area of Vermont. In addition to being Vermont's most productive ecosystem, wetlands serve a wide variety of functions beneficial to the health, safety and welfare of the general public, including the following:

- Retaining storm water run-off, reducing flood peaks and thereby reducing flooding;
- Improving surface water quality through storage of organic materials, chemical decomposition and filtration of sediments and other matter from surface water;
- Providing spawning, feeding and general habitat for fish;
- Providing habitat for a wide diversity of wildlife and rare, threatened or endangered plants; and
- Contributing to the open space character and the overall beauty of the rural landscape.

In 1986, Vermont adopted legislation for the protection and management of wetlands [10 V.S.A., Chapter 37]. Determination of whether a wetland merits protection is based on an evaluation of the extent to which it serves the general functions outlined in the bulleted list above.

Under the Rules, if land development can be expected to impact a protected wetland, such activity cannot commence unless the Vermont Agency of Natural Resources first grants a Conditional Use Determination (CUD). A CUD will be granted when the proposed use will not have an undue adverse impact on the function of the wetland. In many cases, such approvals are granted with conditions to mitigate impacts and to more readily protect wetlands.

For Tunbridge, as well as the State, the most significant wetlands have been mapped and are included as part of the National Wetlands Inventory (NWI) or the Vermont Significant Wetland Inventory (VSWI), which are prepared by the U.S. Fish and Wildlife Service. These wetlands have been delineated on USGS topographic maps, and by reference are made a part of this Plan (see Map 6, Natural Resources). Other smaller wetlands often do not show on these maps, so a field determination by a qualified biologist is needed for most activities that involve state permits.

It is important to note that future investigations of wetlands within Tunbridge may result in additional areas being determined as significant or important for conservation.

Goal

1. To identify and encourage land use development practices that will avoid or mitigate adverse impacts on significant wetlands.

Policies

1. Structural development or intensive land uses shall not be located in significant wetlands or within buffer zones to significant wetlands.
2. Developments adjacent to wetlands should be planned so as not to result in undue disturbance to wetland areas or their function. Mitigating measures to protect the function of a wetland are an acceptable measure.
3. Structural development or intensive land uses are discouraged from locating in Class I and Class II wetlands and their buffer zones. (See Map 6 – Natural Resources.)
4. Developments, and their associated stormwater discharges, that are adjacent to wetlands should be planned so they do not cause undue disturbance to wetland areas.
5. Maintenance of a 100-foot naturally vegetated buffer area from a Class 1 wetland or a 50-foot naturally vegetated buffer strip between a Class 2 wetland and the project site is encouraged to prevent ground water pollution and direct discharges into a wetland.

Recommendation

1. The town should conduct an inventory of wetlands and vernal pools to determine where, if any, wetlands that have not been mapped by the State of Vermont are located.

B. Flood Hazard Areas and Floodplains

Background

There is a general scientific consensus that our climate is experiencing a warming trend that has been induced by human activity. According to the U.S. Global Change Research Program, changes in climate extremes may not result in more rain overall, but in an increase of extreme weather events. Flood frequency and amplitude may increase in some regions while other areas may experience drought.

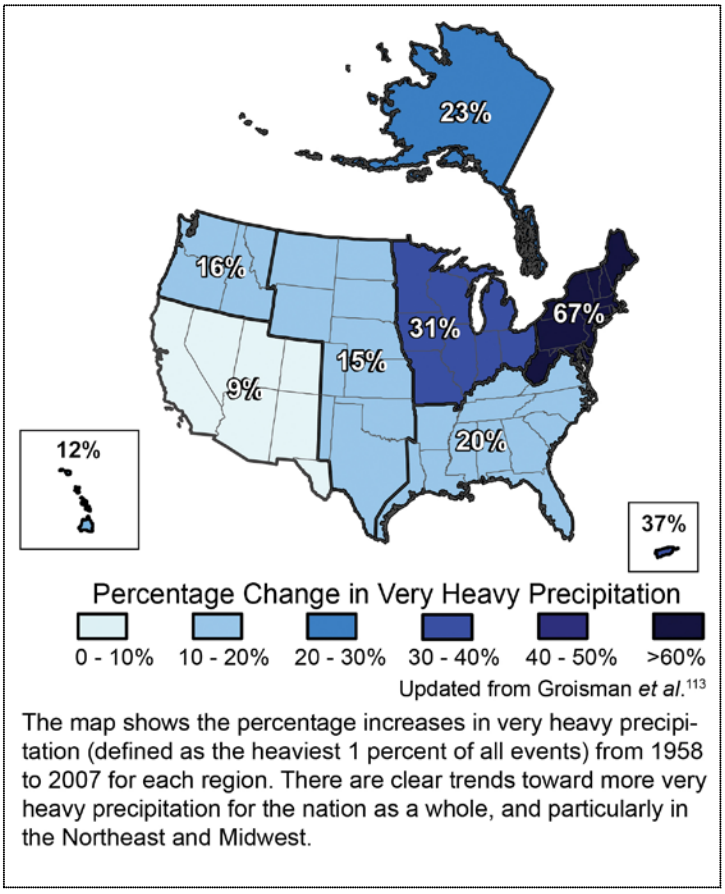

Figure 18 Increases in Amounts of Very Heavy Precipitation (1958-2007) – Source: "Contemporary Changes of the Hydrological Cycle over the Contiguous United States: Trends Derived from In Situ Observations." Journal of Hydrometeorology 5, no. 1 (2004): 64-85

Floods are inevitable and uncontrollable natural events which occur sporadically and affect lands adjacent to watercourses. It is therefore in the public interest to plan for floods, and to implement land use strategies which will protect these areas and minimize the risks to public health, safety, and property.

Floodplains, lands adjacent to watercourses, are periodically inundated by heavy rains or during spring thaws. They are porous and can absorb considerable water before reaching flood stage. Floodplains make excellent agricultural land but are poorly suited for

development, both because of their propensity for flooding and because of their proximity to watercourses, which creates the potential for pollution.

Types of Flooding
Generally speaking, 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 of time 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 its topography, Tunbridge is vulnerable to flash flooding and fluvial erosion.

Causes of Flooding
Severe storms with particularly heavy precipitation have the ability to create flash flood conditions. However, over an extended period of time, severe storms may cause inundation flooding due to the cumulative effects of continuous rain, saturated soils, and a high water table/high aquifer levels.

Floodplains and river corridors fill an important need, 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.

Ice jams have presented a significant source of flooding in Tunbridge. Ice jams occur less frequently than typical riverine flooding, but can be a destructive force to Town infrastructure. Ice jams occur when the accumulation of ice in a river, stream, brook, or other flowing water body inhibits the flow and increases the surface elevation of that water body. Ice jams typically occur in late winter or early spring, are prone to occur when heavy rain and rising temperatures cause rapid snowmelt. They are associated with the warming of ice that initiates river flow and an increase of rainfall and spring runoff that increases surface water volume. Rivers, subsequently, swell and ice layers begin to break, which

then flow downstream and create obstructions around natural and man-made barriers. Ice jams have caused damage in the past to the Mill Bridge in Tunbridge.

Historic Flood Events and Tropical Storm Irene
Vermont has experienced 21 statewide and regional floods since 1973, and the potential for these severe events is increasing dramatically. All but one of these were declared federal disasters, and economic losses were significant. Damage was not limited to designated floodplains, but often occurred along unstable river systems and steep streams. In some cases, recovery costs to the public sector alone amounted to several million dollars per flooding event. Public interest dictates that every reasonable attempt should be made to avoid or reduce such exposure to flood damage.

One of the worst flood disasters to hit the Town of Tunbridge, as well as the overarching region and the State of Vermont, occurred on November 3, 1927. This event was caused by up to 10 inches of heavy rain from the remnants of a tropical storm that fell on frozen ground. A more recent flood event that devastated the region and the state was the result of Tropical Storm Irene, which occurred on August 28, 2011. Record flooding was reported across the state and was responsible for several deaths, as well as hundreds of millions of dollars of home, road, and infrastructure damage. Due to the strong winds, some in an excess of 60 mph, 50,000 Vermont residents were initially without power, and many did not have electricity restored to their homes and businesses for over a week.

On August 28, 2011 the state of Vermont found itself in the path of Tropical Storm Irene. In many areas, the storm's impact was almost as severe as the Great Flood of 1927. Areas of Vermont sustained extraordinary damage, when record rainfall resulted in catastrophic flooding. Some areas received ten inches of rain and were battered by winds of 50 miles per hour during an eight-hour period. Rivers across the state crested at levels not seen for generations, some exceeding historic records established during the flood of 1927.

The 2012 Vermont CDBG Recovery Action Plan described the storm's impact thusly: "*The damage was severe and widespread. Six Vermonters lost their lives. Fifty thousand households lost power, affecting 74,000 people. Over 3,500 homes were damaged or destroyed, displacing 1,500 families; more than 500 of the impacted homes were mobile homes. Transportation and public infrastructure were decimated. Of Vermont's 251 towns and cities, 225 suffered damage to municipal infrastructure. In the immediate aftermath, over 500 miles of state roads were damaged, more than 200 miles of state-owned rail made impassable, over 200 bridges damaged, and 34 state bridges closed. Thirteen communities were completely cut off for days, as National Guard units were mobilized to deliver emergency supplies to these towns by air. More than 300 businesses sustained losses or were destroyed. Agricultural impacts include the flooding of 20,000 acres of farmland, and the loss of over 400 acres of crops as well as many herds of livestock for Vermont's family farms. The largest state office complex was completely flooded, forcing the evacuation of state employees and clients of the Vermont State Hospital (an acute mental health facility), displacing 1,500 state workers indefinitely. Even the State Emergency Operations Center (SEOC) was flooded, necessitating its relocation to the FEMA Joint Field Office. Sixteen public schools could not open for weeks.*"

The localized impact of this disaster has placed many Vermont communities under severe fiscal stress. The cost of damage in many rural towns is several times their total annual operating budget. To pay for repairs and replacement, nearly 50 small Vermont communities have had to obtain loans and lines credit, some for more than $1,000,000. This is a significant amount considering these are small rural towns, in some cases with only a few hundred residents. These towns will be paying off Irene related debt for many years to come. Fortunately for Tunbridge, the impact of Irene was minimal when

compared to harder hit communities. With the percentage of severe storms that have heavy precipitation increasing, it is clear that Tunbridge, like all communities, needs to be prepared for the possibility of an Irene-like event.

Another significant flooding event occurred in Tunbridge in July and August of 2013.Showers and thunderstorms occurred daily and rainfall rates as high as 2-3 inches an hour caused flash flooding in Tunbridge. The Town experienced damage on Falls Hill Road and Ordway Road, damage for this flooding event totaled $73,150 in Tunbridge according to FEMA's public assistance database.

National Flood Insurance Program (NFIP)

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. The FEMA maps primarily consider inundation flooding (like a bathtub filling), while the River Corridor area maps are designed to consider the potential impacts of flash flooding and fluvial erosion (caused by rapidly migrating streams or changes in channel location).

FEMA administers the National Flood Insurance Program, which provides flood hazard insurance at subsidized rates for property owners in affected areas. Rates are based on calculated risks. In order to qualify for federal insurance, towns must adopt and retain a bylaw to control land development within this area. Minimum standards must be included and approved by FEMA. Coverage is only available to landowners if a town elects to participate in the program. The Town of Tunbridge incorporates Flood Hazard regulations as part of its Flood Hazard Area Ordinance, and has been recognized as a participating community the National Flood Insurance Program since it enrolled in September 18, 1985.

FEMA has prepared a Flood Hazard Boundary Map for the Town of Tunbridge, which includes flood hazard areas for the First Branch of the White River (these maps are typically only detailed for larger streams and rivers). These FEMA Flood Insurance Rate Maps (FIRMs) show the floodplain that FEMA has calculated would be covered by water in a 1% chance annual inundation event also referred to as the "100-year flood" or base flood. This area of inundation is also called the Special Flood Hazard Area (SFHA). The floodplain depicted on these maps comprises roughly 350 acres, approximately 1% of the town. FEMA FIRMs sometimes also show stream flood profiles, expected base flood elevations (BFEs), and floodways (smaller areas that carry the bulk of the stream current).

FEMA FIRM Maps were last updated for the Town of Tunbridge in September 1985, and did not include BFEs or a floodway delineation. Because FEMA maps lacked this information for several other Orange County communities as well, the United States Department of Agriculture Soil Conservation Service was engaged to conduct Flood Insurance Studies for several Orange County towns that included more detailed mapping, hydrologic studies and evaluations.

The Town of Tunbridge has adopted the Flood Plain Management Study for Tunbridge (prepared in 1991 by the USDA Soil Conservation Service), in conjunction with the FEMA maps, as the official maps referenced for administration of the Flood Hazard Area Ordinance last updated in June 2014. This study provides survey reference points, stream flood profiles and BFEs against which surveyed elevations can be compared, greatly reducing the burden of developing costly hydrologic studies for trying to determine impacts to or from development along the First Branch floodplain.

These maps are on file at the Town Office and at the Two Rivers-Ottauquechee Regional Commission.

Contact the Tunbridge Town Clerk to determine if a proposed development is in the Flood Hazard Area.

Fluvial Erosion Hazards and River Corridor Areas

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 areas outside of Special Flood Hazard Areas ("100-year" floodplains) are not required to have flood insurance, but may be able to obtain it cheaply if they are outside of these SFHAs). Flash flooding in these reaches can be extremely erosive, causing damage to road infrastructure, threatening topographic features including stream beds and the sides of hills and mountains, and creating landslide risk. The presence of undersized or blocked culverts can lead to further erosion and streambank/mountainside 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, sudden surges, and associated erosion are a greater threat than inundation by floodwaters. The ANR mapped River Corridors represent the area where rivers and streams will need to meander and move over time to reduce instability, and they depict areas that are at risk from erosion. Elevation or floodproofing may not be protective in these areas as erosion can undermine structures. Rivers, streams, and brooks that have mapped River Corridors include the First Branch of the White River, the Farnham Branch of the White River, Dickerman Brook, Bicknell Brook, and several unnamed tributaries of the First Branch of the White River. Several of these corridor delineations were refined based on fieldwork conducted during a 2013 geomorphic assessment of the First Branch and some of its major tributaries. ANR further recommends that small streams draining less than a 2 square mile watershed have a 50-foot setback for any development to reduce potential damage from flash flooding. While Tunbridge has not formally adopted these Corridors for consideration in its Flood Hazard Ordinance to date, ANR does consider these Corridors in Act 250 proceedings.

In the Town of Tunbridge, 25 total structures reside in the special flood hazard area, meaning they have a 1% chance of flooding every year. These consist of 17 buildings and 8 out-buildings or accessary structures. If all of the structures in the Special Flood Hazard Area were damage or destroyed in a flooding event, the damage would total approximately $1,993,140.

Additionally, there are 43 structures that reside within the mapped River Corridor. Presently, these structures consist of 26 single-family dwellings, 7 camps, 6 mobile homes, 1 seasonal home, 1 government building, and 2 commercial structures. If all of these structures were damaged and destroyed, the damage would total approximately $6,613,830. In an effort 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 to increase the overall area for accommodation of floodwaters in Tunbridge.

Flooding and Land Use

Floodplains are fragile areas which are part of the land and water interface between lakes, ponds, rivers and streams. How these lands are managed has a direct bearing on the quality and quantity of water resources, as well as the safety of the town. Flood hazards can be exacerbated by poor development practices, such as allowing development in the floodplain without accounting for "no net fill", channelizing or straightening river segments, and eliminating buffer areas next to rivers and streams. Conversely, flood risks can be lessened by adopting sound land use policies.

Goals

1. To minimize flood risk and enhance and maintain use of flood hazard areas as open space, greenways, non-commercial recreation and/or agricultural land.
2. To ensure no net loss of flood storage capacity in an effort to minimize potential negative impacts. These impacts include the loss of life and property, disruption of commerce, and demand for extraordinary public services and expenditures that result from flood damage.
3. To maintain maps that reflect as accurately as possible the flood hazard areas to assist in appropriate land use decisions.
4. To recognize that river corridor areas adjacent to unstable rivers and to steep streams may be at risk of erosion during floods.

Policies

1. It is the policy of the Town that the preferred uses for flood hazard areas shall be for natural areas, open space, greenbelts, and non-commercial recreational or agricultural uses.
2. Any land use activity (filling, or removal of earth or rock) within flood hazard areas which would result in net loss of flood storage or increased or diverted flood levels or increased risk to adjacent areas shall be prohibited.
3. Structural development and placement of fill, except for permitted stabilization projects, within the limits of the Special Flood Hazard Area is discouraged. Where careful planning at the local level accepts development within the floodplain, the development should be designed to achieve no-net-fill, and located so they do not impede the floodwaters and endanger the health, safety, and welfare of the public. No new structural development, except bridges, shall be located within the limits of a floodway.
4. Utilities or facilities serving existing development (e.g. water lines, electrical service, waste disposal systems, roads, and bridges) may be located within special flood hazard areas and mapped river corridors only when off-site options are not feasible and provided that these utilities or facilities are relatively protected from flooding damage.
5. Tunbridge prohibits all new net fill and construction of buildings floodways.
6. Roads that often experience flooding that do not serve developed areas should be considered for relocation or converting to trails, including not repairing damaged bridges where the repair exceeds the value of development the bridge serves.
7. Design culverts and bridges to comply with VTrans Hydraulics Manual, ANR Stream Alteration Standards, most recent VTrans Codes and Standards.
8. Do not build Tunbridge's new emergency services, power substations, or municipal buildings with the 500-year Special Flood Hazard or River Corridor Areas.
9. Maintain Tunbridge's upland forests and watershed predominately in forest use to ensure high quality valley streams and to reduce flood flows.

Recommendations

1. Flood hazard regulations should be extended to limit development in River Corridor areas identified as at risk to fluvial erosion and not protected by town highways or existing development.

2. Tunbridge should consider prohibiting new development and maintaining vegetative buffers within 50 feet of perennial surface water resources in Town.
3. All substantial improvements to structures should be elevated 2 feet above base flood elevation (BFE).
4. Tunbridge should continue working to update hazard mitigation plans and emergency preparedness and recovery procedures.
5. The Town should continue to maintain and update town bridge and culvert inventories. This information should be used to develop a schedule to replace and update undersized structures.

C. Water Resources

Background

Water resources include aquifers (groundwater) and surface waters. Sustainable yields of quality water are necessary for the lives and livelihood of citizens of Tunbridge.

The continued availability of clean, high-quality drinking water is a concern for all Vermonters. Because of this, in 2006 the Groundwater Management Act was passed by the Vermont Legislature and signed into law by Governor Jim Douglas. This Act [10 V.S.A. chapter 48 (5)] is designed to help define the groundwater system, enable greater scrutiny of commercial water extraction operations and provide for the study and mapping of groundwater resources throughout the State. Hopefully, this legislation will bring Vermont "up to speed" with neighboring states regarding groundwater protection and mapping. Tunbridge has no mapped groundwater information.

The process for mapping groundwater is complicated. It involves multiple scientific methods including using technology to create a detailed picture of groundwater situations and use patterns, analysis of well data provided to the state by well drillers and site specific analysis. Unfortunately, there is no easy method. Due to this fact, the Vermont Geological Survey completed a series of coarse scale groundwater studies at state and county-wide levels and the Vermont ANR Atlas now includes information from private well logs as well as displaying information on Source Protection Areas.

The health of Tunbridge's surface waters is essential to maintaining quality groundwater, as well as an important element for outdoor recreation and natural beauty. There are a number of state and federal programs that help fund stream-management projects, such as the Conservation Reserve Enhancement Program (CREP). CREP provides funds to farmers for the purpose of preserving lands once used for agriculture, with the goal of introducing and encouraging plant life to prevent erosion and provide habitat. Stream instability can lead to excessive flooding and other types of damage due to increased flow velocity.

Riparian buffers are strips of bankside vegetation along waterways that provide a transition zone between water and land use. Construction or development along shorelines, or removal or disruption of vegetation within these areas can create increased water pollution, higher water temperatures, destabilization of banks, higher soil erosion rates and loss of fish or wildlife habitats.

The Vermont Agency of Natural Resources, in cooperation with federal and other state agencies, has evaluated aquifer recharge areas serving systems involving 10 or more connections or 25 or more people. These recharge areas are acknowledged and are recognized as important for protection. Land developments that are potential threats to water quality and significant aquifers are discouraged from

locating in these areas. The area surrounding the Tunbridge Central School well has been designated a Source Protection Area by the State of Vermont.

The Drew Lot of the Town Forest, which consists of a 97-acre parcel that is owned by the Town of Tunbridge, The Town Forest was originally set aside to ensure adequate protection and water availability by the Village Improvement Society as a resource to Tunbridge Village. The Town, including the Village Center Areas, operates predominantly upon private wells. Tunbridge currently has a Town Forest Committee that participates in the protection and management of this municipal resource.

As it has been noted in other chapters, the Town has discovered that there are some serious limitations to the availability of groundwater in Tunbridge Village. Because an increase in the number of wells in the Village could strain an already limited system, any future development in Tunbridge Village that requires a new well or septic system to be created shall be carefully reviewed. Because of these issues, the town of Tunbridge is particularly concerned with criteria 1, 2 and 3 of the Act 250 process. [See 10 V.S.A. Section 6086 (A)(1)(2)(3).]

Goals

1. To maintain or enhance the quality and quantity of drinking-quality resources.
2. To allow use of groundwater resources by new development in such a manner as to protect the public right to adequate quality and quantity of the resource. There is particular concern that most of Tunbridge's water supply is private wells with strong potential to be negatively impacted by large withdrawals (as well as many small streams, as the 2016 drought indicated)
3. To consider surface water and groundwater impacts and effects related to proposed or existing uses of land.
4. To maintain or improve surface water quality and quantity.
5. To ensure adequate protection for the water resources of the Drew Lot of the Town Forest, historically set aside by the Village Improvement Society in large part due to the importance of these resources to Tunbridge Village

Policies

1. No new development or improvements in Tunbridge Village that require a new well or septic system shall be allowed unless the builder can prove that there will not be a significant impact on the availability and quality of already limited resources.
2. Land use activities that potentially threaten groundwater quality and quantity, should be carefully reviewed and monitored to prevent undue loss of groundwater quality.
3. Act 250 permit applications for commercial, industrial, commercial-residential, or mixed-use development shall provide estimates of projected water usage, and if expected to exceed 20,000 gallons/day withdrawals will require semi-annual reporting to the Agency of Natural Resources and the District Environmental Commission of actual usage if permitted.
4. Development in Tunbridge should not diminish the quality and quantity of surface water and groundwater resources in the Town.
5. Maintenance or enhancement of water resources for recreation, fisheries, necessary wildlife habitats and quality aesthetics are high priorities. Water resource policy and practices should protect these uses.
6. The location, sizing and density of on-site sewage disposal facilities should be determined by the capacity of the soil, the natural limitations of the site, and underlying substrata conditions, such as depth to bedrock and seasonal high-water tables. For the most current information regarding permitting, see http://www.anr.state.vt.us/dec/ww/rules.htm.

7. Preservation of the natural state of streams should be encouraged by,
    - Protection of adjacent wetlands and natural areas;
    - Protection of natural scenic qualities; and
    - Maintenance of existing stream bank and buffer vegetation including trees, together with wildlife habitat.

Recommendations

1. Continue to support the White River Partnership water quality monitoring and watershed planning efforts for the First Branch, including projects identified in the 2014 White River Stream Geomorphic Assessment and River Corridor Plan.
2. Investigate maintaining and improving public access to the river for recreational use.
3. Conduct a mapping study of groundwater resources in Tunbridge.
4. The Planning Commission should consider creating a policy regarding development and riparian buffer zones in future versions of this plan.
5. Tunbridge shall participate in the White River Tactical Basin Planning Process in coordination with the Vermont Department of Environmental Conservation.
6. Tunbridge should develop a Source Water Protection Plan for the Drew Lot of the Town Forest, clarify deeded water rights from these sources, and develop a plan for future allocation.
7. Develop an emergency operations protocol with the Tunbridge Trout Pond Association to manage water levels to mitigate flooding hazards during high intensity rain events.

D. Forest Resources

Forests

Healthy forests provide a significant number of benefits to our communities, including environmental benefits (such as clean water supply, clean air, mitigation against climate change, wildlife habitat, and biological diversity), and economic benefits (such as tourism, recreation, and the wood products industry).

Trends in forest health have changed over the past decade. In the 2013 US Forest Service's National Forest Inventory and Analysis Program report, figures indicated that since 2007 there has been a continuing, though gradual, loss of about 75,000 acres of forestland in Vermont. Developed land in Vermont increased significantly between 1980-2010 (67%). The pattern of development growth has led to significant forest fragmentation throughout the state.

Forest Fragmentation

Forest fragmentation is the breaking of large, contiguous forested areas into smaller pieces of forest. For natural communities and wildlife habitat, the continued dividing of land with naturally occurring vegetation and ecological processes into smaller and smaller areas creates barriers that limit species' movement and interrupt ecological processes. Since the 1980s, Vermont has experienced "parcelization," which is the result of larger tracts of land being divided into smaller ownerships or land holdings. The more individuals that own smaller parcels of forest, the more likely that the land will ultimately be developed with infrastructure (such as roads and utilities) and buildings. The 2015 Vermont Forest Fragmentation Report identifies the following causes for this trend:

- Escalating land prices;
- Increased property taxes;
- Conveyance of land from aging landowners; and
- Exurbanization (the trend of moving out of urban areas into rural areas).

Forest fragmentation affects water quality and quantity, fish and wildlife populations, and the biological health and diversity of the forest itself. When many small habitat losses occur over time, the combined effect may be as dramatic as one large loss. Forest fragmentation can disrupt animal travel corridors, increase flooding, promote the invasion of exotic vegetation, expose forest interiors, and create conflicts between people and wildlife. Habitat loss reduces the number of many wildlife species and totally eliminates others.

To help mitigate the effects of human population growth and land consumption, many scientists and conservationists urge governments to establish protected corridors, which connect patches of important wildlife habitat. These corridors, if planned correctly, allow wildlife to move between habitats and allow individual animals to move between groups, helping to restore or maintain genetic diversity that is essential both to the long-term viability of populations and to the restoration of functional ecosystems. Important corridors have been mapped in Tunbridge particularly on the eastern side of Town, in relation to work done by the Linking Lands Alliance.

Tunbridge has approximately 148 acres of Town Forest which are available for public use, including a trail system for walking and biking. The total acreage is broken into two parcels: the Drew lot is 97 acres and the Town Garage lot is 51 acres. A Forestry Management Plan for both parcels was developed in 2011. The plan allows for the possibility of harvesting lumber from the parcels, and highlights the history of the Drew Lot in protecting water resources for Tunbridge Village.

As of 2019 Tunbridge had the largest number of parcels (207) enrolled in Use Value Appraisal Program in the State of Vermont. This totals 14,896 acres of forestland and 3,797 acres of agricultural land enrolled in the program. Forest management plans required for enrollment of forest land in the Current Use Program are obliged to be updated every 10 years, and well-crafted management plans can play a large role in ensuring vital wildlife habitat and corridor connectivity.

There are several other important forest blocks and habitat connector areas in Tunbridge that are priority locations for protection where development and fragmentation should be avoided to protect ecological function.

- **Taylor Valley and Brocklebank Hill:** The northeastern corner of town constitutes the highest priority interior forest and habitat connectivity. This area, which is part of the larger Taylor Valley Conservation Area, is located north of Strafford Road and east of County Turnpike. This large interior forest block continues into the Towns of Strafford, Chelsea, and Vershire, and is one of the most ecologically significant forest blocks in Vermont. Brocklebank Hill is 2,111 feet in elevation and features the highest elevation in Tunbridge
- **Curtis Hill:** A priority interior forest block is located east of Route 110, north of Larkin Road, and west of Bicknell Hill Road.
- **Tunbridge Town Forest Town Garage Lot to County Road:** A priority interior forest block is located north of Strafford Road, South of Foundry Road, east of Route 110, and west of County Road.
- **Tunbridge Town Forest Drew Lot, East Hill, and Williams Hill:** A priority connectivity forest area is located south of Strafford Road and Drew Road, and east of Potash Hill Road. This area provides important habitat connectivity that for wildlife that connects crucial core habitat for far-ranging animal species.

- **Hurricane Hill and Tunbridge Hill**: The ridgeline spanning six miles along the western flank of Tunbridge includes Hurricane Hill at 1,910 feet in elevation and Tunbridge Hill (also known as Monarch Hill) at 1,640 feet in elevation. This area is largely uninhibited by roads and features large priority interior forest blocks
- **Kelsey Mountain Range**: The Western portion of Town features ridgelines that originate in the southwest portion of Town and continue north. This range consists of large priority interior forest blocks.

Goal

1. To maintain upland areas in forest and preserve large forest blocks.

Policies

1. Conservation easements are encouraged on large blocks of forest lands.
2. Sound forestry management practices must be used to ensure forest health.
3. Forest harvests should ensure that forests continue to sequester more carbon.

Recommendations

1. Tunbridge should work with other towns to conserve forest blocks and connect forests so that they serve as corridors as well.
2. Tunbridge's Conservation Commission should work with landowners on sound forest management education.

E. Wildlife

Wildlife is one of the popular attractions to the area and provides some citizens of Tunbridge with direct and indirect livelihoods from sports, tourism or direct harvest of wildlife. Additionally, the interconnection of wildlife with their environment has an impact on the natural environment.

Wildlife management requires management of human activities around animals as much as management of animals around human activities. Managing for specific species is not as desirable as managing for the entire ecosystem supporting the species.

Tunbridge's fields, forests, wetlands and streams are home to a diverse and healthy wildlife population that includes bear, bobcat, moose, deer, otter, geese, ducks and mink, to name only a few. Nearly all open space provides habitat for game and non-game species. There are, however, some areas in Tunbridge which provide critical habitat that should remain intact. These areas include wetlands, deer wintering areas, bear mast stands, and edge (the transition zone between two cover types, such as field and forest). Development or logging in or adjacent to these areas should consider wildlife implications during the planning process.

Wintering areas are an important habitat requirement for deer during the critical winter months when snow depth and climate are limiting factors to survival. Typically, these areas consist of mature softwood stands, at low elevations or along stream beds, which provide cover and limit snow depths. Southerly facing slopes are also beneficial due to good sun exposure and may be utilized even in areas of limited softwood cover. More specific factors, such as percent canopy closure, species of softwoods, and stand age, also figure into the quality of the wintering area.

Most important when considering development and its impact on wildlife is the concept of habitat fragmentation. Forests provide habitat to a diverse population of wildlife, which are negatively impacted when forested land is fragmented through development

Goals

1. To maintain or enhance the natural diversity and population of wildlife, including natural predators, in proper balance.
2. To restore stable populations of endangered or threatened wildlife in appropriate habitat areas.
3. To maintain or improve the natural diversity, population, and migratory routes of wildlife.
4. To allow sport and subsistence hunting of ecologically sound intensities to provide continued success of the species.
5. To provide the community with access to quality forestland for recreational use.
6. To reduce the fragmentation of forestlands.

Policies

1. Wildlife populations and natural diversity should be maintained or enhanced.
2. Long-term protection of major habitats through conservation easements, land purchases, leases and other incentives is encouraged.
3. It is the policy of the Town to protect deer wintering areas from developments and other uses that adversely impact the resources.
4. Development other than isolated houses and camps shall be designed so as to preserve continuous areas of wildlife habitat. Fragmentation of wildlife habitat is discouraged. Effort shall be made to maintain connecting links between such areas.
5. Preference shall be given to development that utilizes existing roads and field lines.
6. The Forestry Management Plan shall be kept up-to-date in order to properly manage Tunbridge's municipal forests.
7. New developments shall take reasonable steps to avoid disruption or loss of major identified wildlife habitat connectors and corridor crossings.
8. The construction of utilities, roads, or other physical modifications in the priority areas identified in this plan as important forest blocks and habitat connectors is incompatible with this plan.
9. Subdivisions and other development on large lots shall minimize impacts on forestry potential and habitat values of undeveloped areas by concentrating development at the forest edge near other development and roads; shall use small lot sizes and shapes so that most of the remaining land is in a large undeveloped tract; shall minimize clearing forest; and shall avoid the creation of additional roads or power lines that would further future development into interior areas.

Recommendation

1. Encourage owners of necessary habitat for threatened species (see Appendix B, Vermont Fish & Wildlife Department, for listing of current threatened and endangered species of plants and animals) to contact the State for assistance in developing a management plan for these sites.

F. Mineral Resources

Background

The use and management of Tunbridge's earth and mineral resources are matters of public good. Maintenance of sustainable quantities of gravel, sand, crushed rock, and other materials are essential for business development, as well as state and local highways. In spite of this, public and private

interests are oftentimes in conflict over use of the resource. It is in the interest of the Tunbridge business owners and residents to enable utilization of these resources when such uses do not significantly inhibit or conflict with other existing or planned land uses, or are in conflict with other stated goals in this Plan.

Goal

1. To support extraction and processing of mineral resources only where such activities are appropriately managed and the public interest is clearly benefited.

Policies

1. Existing and proposed mineral extraction and processing facilities shall be planned, constructed, and managed:
   - So as not to adversely impact existing or planned uses within the vicinity of the project site;
   - To not significantly interfere with the function and safety of existing road systems serving the project site;
   - To minimize any adverse effects on water quality, fish and wildlife habitats, viewsheds and adjacent land uses; and
   - To reclaim and re-vegetate sites following extraction.
   - To minimize noise impacts on adjacent uses including residential areas.

Recommendation

1. Tunbridge should consider the Town Garage parcel for potential future ledge extraction and quarrying.

G. Plant Communities

In Tunbridge, there are a broad range of communities that exist in the older forests, early successional forests, open fields and valley floors. The breadth and diversity of wildlife and plant communities indicate a healthy, thriving ecosystem, exemplary of the outstanding soils Tunbridge is blessed with. Yet plant communities are usually strongly affected by the surrounding environment. Plants respond to soil structure and chemistry, hydrology, and climate. The effects of unmanaged development can have a negative impact on plant communities, which in turn will harm the overall ecosystem in the area affected.

Invasive species are a growing problem in Vermont. Invasive species are defined as plant and animal species which are introduced, usually by human methods, to an area outside of their native range. These species often have no natural predators or population controls in their new ecosystem, which allows their population to increase and their new home ranges to expand. Once in the wild, invasive species may continue to reproduce and displace native species, causing biodiversity to suffer and throwing entire ecosystems out of alignment. Both Federal and State governments have guidelines in place for handling invasive species, and there are resources available to interested parties through the University of Vermont. While the list of invasive species in Vermont is extensive, the most common invasive plants in Tunbridge are Wild Chervil, honeysuckle, Japanese Knotweed, and Wild Parsnip; and invasive pests such as the emerald ash borer threaten forests. See Appendix B for additional sources of information on natural resources.

Goal

1. To minimize the spread of invasive plant and animal species in Tunbridge.

Policies

1. Developers should locate their projects in areas to avoid sensitive plant communities.
2. Developers, excavation companies, logging operations, and construction companies should maintain buffer areas during development to protect against silt runoff.

Recommendations

1. Research what other communities in Vermont and elsewhere have done to minimize the spread of invasive plant species.
2. Advise utility crews, road crews, private landowners, and local excavators and construction works to take care to minimize the spread of invasive species such as Japanese Knotweed, Wild Chervil, Wild Parsnip and Purple Loosestrife.
3. Whenever possible, have the road crew mow roadsides before invasive species go to seed and wash equipment thoroughly after mowing areas with the presence of invasive species.
4. Educate landowners as to what invasive plant species look like and how to control their spread, possibly through the printing of a basic document.

For every complex and difficult problem, there is an answer that is simple, easy, and wrong. -H. L. Mencken

XIII. Energy

A. Global Perspective on Energy Resources

Concern about sustainability has rapidly accelerated in recent years due to our nation's dependence on foreign fossil fuels and the growing local and global catastrophic effects of climate change. Volatile costs and heat trapping emissions of carbon intensive fuels like gasoline and home heating fuels have become increasingly burdensome for the average Tunbridge resident and the regional environment.

While the Planning Commission recognizes that energy supply and demand are directly influenced by economic forces at the state, federal, and international levels, the manner in which Tunbridge plans for future growth can still have an important impact on global energy resources. For example, a highly dispersed and unplanned pattern of land can waste both land and energy resources.

Energy Supply
Vermont has renewable electricity and plentiful wood. We have no real fossil fuel supply. Theories such as the Hubbert Peak Theory of Peak Oil suggest that at some point the worldwide consumption of oil will outpace the existing supply. Although new technologies are enabling energy providers to extract oil from locations that were previously impossible to reach, there is a finite amount of oil that is economically recoverable. There are currently sufficient reserves for decades of use. However, there is definitely a finite amount of pollution that the earth can incorporate before exhibiting significant additional climatic changes, and the current reserves of fossil fuels cannot be used without sequestering the carbon dioxide that would be created unless we want catastrophic and permanent climate change. Such sequestration would require massive land use changes and unknown technology.

Regardless of the predictions of Peak Oil, the Town of Tunbridge, like the rest of the world, should prepare for a very different future. Declining oil production and increasingly worrisome signs of climate change underscore the need for good planning and active discussion about energy alternatives. Principles of energy conservation, stewardship, and independence can surely help.

Carbon Sequestration
Although energy and fossil fuel reductions must be implemented in order to limit human impacts on the Earth's climate, many of these mechanisms occur on long scales and timelines. Reducing net greenhouse gases through carbons sequestration in the soil is powerful, and reducing greenhouse gases to the point where warming has reversed to cooling may take thirty years. Some scientists predict that humans must reverse warming trends within ten years to prevent irreversible warming. Humans must focus on cooling practices that can have short-term effects on our local environments while initiating long-term cooling trends.

- Bare soil radiates heat more powerfully than the radiation from actively growing green plants. Any process that grows plants and trees in bare places contributes to global cooling.
- As much as 50% of the energy captured by plants photosynthesizing is injected directly into the soil, which absorbs heat, feeds biological activity, and sequesters carbon dioxide. More importantly the organic matter created holds more water, which improves resilience to flooding and drought and increases the availability of water to drive the rain-water cycle.

- Heat is thrown off when raindrops form. At cloud height a portion of the heat is radiated back into space, thus cooling the planet. The more times the water is cycled from earth to cloud, the more cooling takes place. The cycling of rain makes more plants grow and further drives this positive feedback loop.
- High humidity in the air and clouds alone does not cause rain because rain drops coalesce around a hygroscopic nucleus. Hygroscopic nuclei come from many sources, but specifically originate from bacteria living on plants that are often lofted up into the atmosphere. The science of this is ongoing, but introducing bacteria that are more beneficial to the plant and to raindrop formation could lead to enhanced cooling.
- Overall, covering soil and enhancing the rain cycle will lead to increased cooling of the earth. These short-term cooling practices, coupled with longer term removal of greenhouse gases from that atmosphere will augment each other to mitigate the effects of global climate change.

B. Vermont's Energy Future

Vermont strongly supports reducing its reliance on fossil fuels and securing energy independence for the state by improving the energy efficiency of residential, business, and government buildings, and utilizing in-state renewable energy resources. To highlight the state's commitment to efficiency, the State set a 5% energy savings goal for state government, a standard that is now mandated by law. Additionally, the State set a long-term goal of obtaining 90% of Vermont's energy demand from renewable resources by 2050. To teach this challenging goal, Vermont's towns will need to be proactive in reducing local fossil fuel use and transitioning to both statewide and local production of renewable energy via solar, small-scale hydroelectric, small-scale wind, and emphasis on shifting our transportation sector to electric power. In early 2018, Vermont is behind in reaching the 90% renewables goal by 2050. Other states, such as California, have a more ambitious timeline than Vermont.

C. Local Energy Demands

In referring to energy, this plan is not just talking about electricity. Wood, gas, oil, and other sources are all forms of energy. To compare energy use across source types, it is useful to use a common unit of energy. For this plan we will use MMBtu (million British thermal units) and kWh (kilowatt hours). 1MMBtu converts to 293 kWh.

According to the 2016 Vermont Comprehensive Energy Plan, overall energy demand in the state remains flat with an uptick in the use of wood and natural gas from heating and a slight decrease in heating oil usage.

In terms of per capita energy consumption for residential and transportation purposes, the Northeast is about the same as the rest of the U.S. In Vermont, almost 80% of residential energy is dedicated to space heating and domestic hot water, while approximately 34% of the state's total energy usage goes toward transportation. Of the energy dedicated to transportation, over 50% is used to fuel private cars for residents (as opposed to being used for public transit, road maintenance, or another public purpose). Transportation emissions in Vermont account for 50% of its total greenhouse gas emissions. Vermont's high transportation emissions rate represents on the highest per capita percentages in the United States.

In Tunbridge, available data indicates that our residential energy usage is about 43% of the overall use, with roughly 55,000 MMBtus for thermal and 4,448,000 kWhs (15,181 MMBtus) for electricity. Non-residential uses account for just 12.4% with 12,000 MMBtus for thermal needs and 2,434,000 kWhs (8,307 MMBtus) for electricity. Transportation is the largest sector at 44.6%, using roughly 73,000 MMBtus. Altogether, annual energy use in town is a sizable 163,488 MMBtus.

Energy is essential. We like the modern benefits of our energy system, and as can be seen above, we use a lot. However, as enjoyable as the ways in which we use energy today, it is not sustainable due to pollution impacts alone. Even if there was not the overriding imperative to lessen the release of carbon dioxide into the atmosphere from burning fossil fuels, it is getting harder to extract these resources safely and affordably.

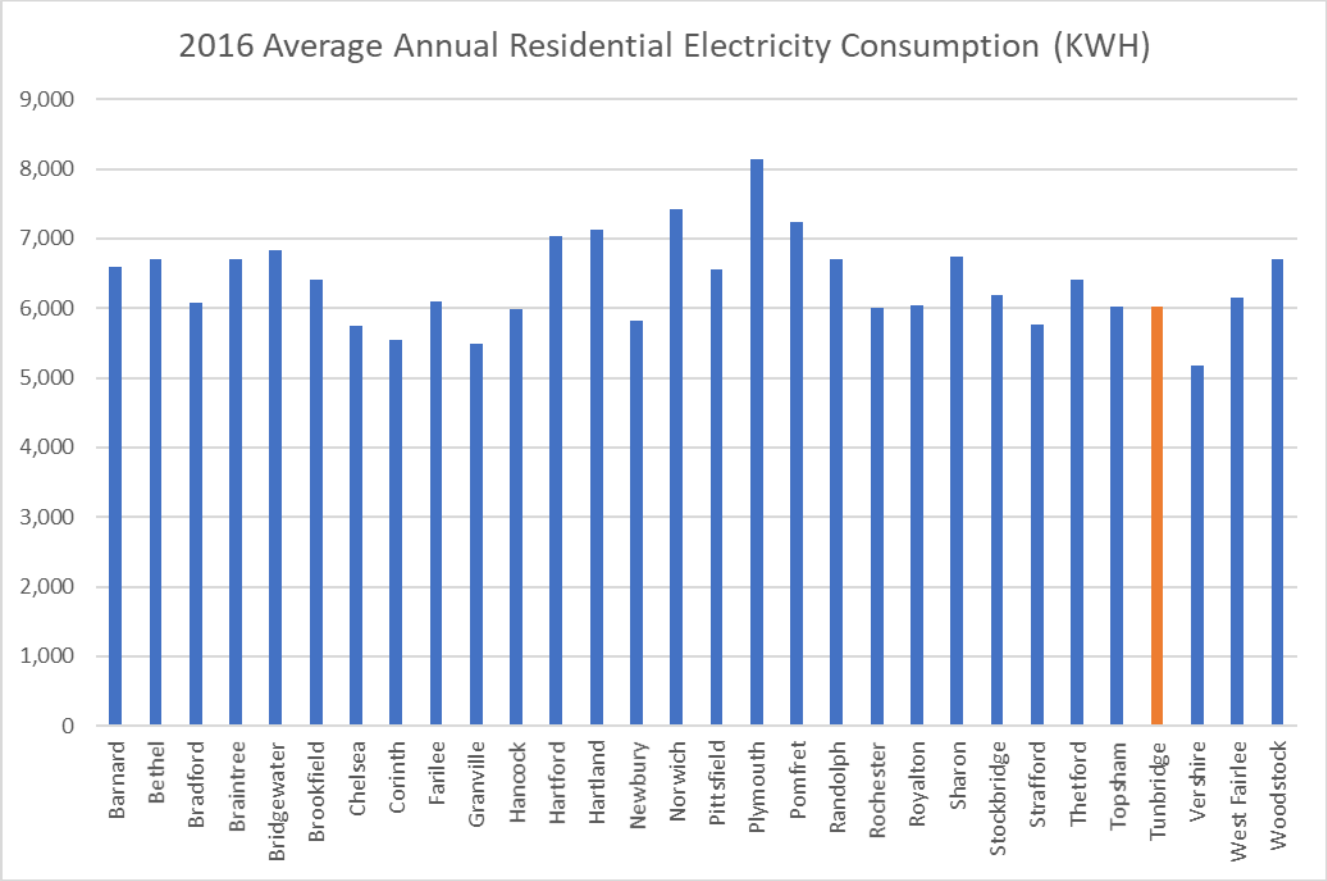

Figure 19 2016 Average Annual Residential Electricity Consumption (Source: Efficiency Vermont)

Data collected by Efficiency Vermont in 2016 reveals that the Town of Tunbridge used less energy per residence than 2/3 of the towns within the Two Rivers-Ottauquechee Region. In 2016, this data showed that the average Tunbridge residence used approximately 6,027 kWh of energy annually.

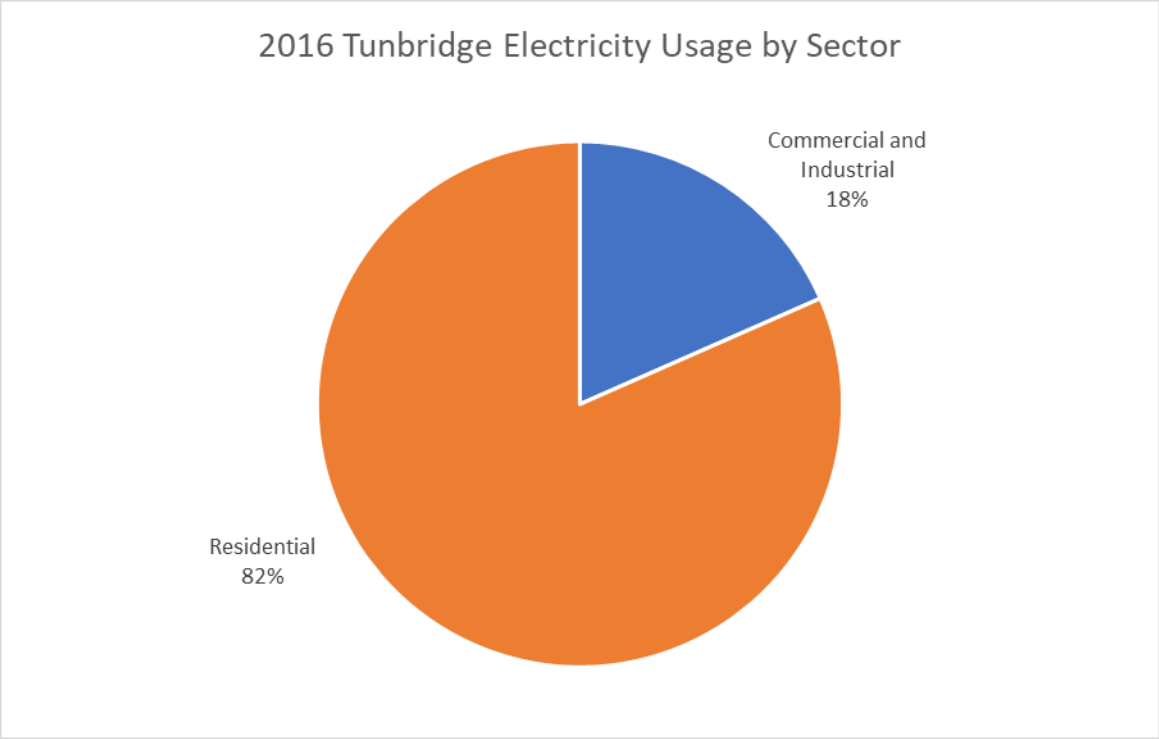

Figure 20 Tunbridge Electricity Usage by Sector (Source: Efficiency Vermont)

D. Scarcity and Costs

Energy is not scarce. There is plenty of electricity, wood, and oil available in the near term. The question is at what cost? Current and past use of energy has not taken into account the cost of pollution to the environment, and now the subsequent cost to humans from climate change. There are also other costs to be considered that are not for the energy itself, but for conservation measures and conversion to electricity as an energy source.

Conversions of our sources for the grid-based electric system have largely been made to renewables at modest cost, but that is not most of our energy. Now we will have to convert our heating and transportation. Heating can be partially solved through better buildings, but we have old buildings that will take a lot of work. Homes will also need to use wood more efficiently or convert to heat pumps. The local target would have roughly a dozen heat pumps installed each year. Transportation can largely convert to electric vehicles, but they are scarce and more expensive to purchase than comparable gas-powered cars. Transportation is probably the hardest goal to meet, as we would need to increase electric vehicles by several fold in the next five years and several fold again in the following decade. Within 15 years the goal is to have almost 650 electric vehicles in town.

Efforts to better weatherize homes and convert to electric cars will need public subsidy and better financing to make this change possible for lower-income households. These systems often have roughly equal costs over time, but sizable up-front capital costs. Some programs, credits, and rebates do exist, but need to be expanded to meet the scale of the problem. A 2016 Efficiency Vermont analysis shows that the “energy burden” quotient for Orange County is one of the highest in the state. Consequently, the economic stress on Tunbridge’s lower income residents is more pronounced than in

other Town's in the state. See the following link for more information about Efficiency Vermont's Energy Burden analysis:

https://www.efficiencyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-mapping-energy-burden-vermont-white-paper.pdf

E. Decentralized Energy

Since the Rural Electrification Act was signed in 1936, our nation has moved toward a centralized system to provide all but the most rural locations with electricity. On a simplified level, energy is produced at a generation plant and sent through transmission lines via a nationwide "grid". Energy from the grid is routed to transformer stations and then delivered to consumers.

In the past our energy production was decentralized, consisting of small, local energy producers. It was not uncommon for individual towns to have their own source of energy, usually through hydro-power. In Tunbridge, for example, residents recount that there were at least six different dams on the First Branch of the White River used to produce power or run machinery, including an historic, but no longer functioning dam in Tunbridge Village. As energy distribution became more industrialized, these small companies were replaced by larger regional power companies. Presently, Tunbridge is served by two electricity providers, Green Mountain Power (GMP) and Washington Electric, Co (WEC). GMP's power is mostly based on renewables and they have plans to be 100% renewable by 2030. WEC is 100% renewable now. However, that is just our electricity. Most of our energy comes to us in the form of heating oil, propane, gasoline and diesel.

For Tunbridge, it may be worth considering the concept of *decentralized* energy production. The ultimate goal of decentralized energy or distributed power production is to have every household or cluster of households producing its own energy using free and renewable resources. While this might be unrealistic in the near future, technological advances keep moving forward and make the likelihood of cost-effective home energy generation and storage a distinct possibility. As of 2016, Vermont produces less than 35% of the electricity it consumes. Solar power produced in 2016 from both large and small-scale generators accounted for 8% of the state's net electricity production. It is difficult to know the amount generated in town as off-grid systems do not have any reporting requirements. On-grid systems (small solar installations) in town produce 135 MWhrs, not quite 2% of our electricity usage.

As we move to a more fully electric energy system, it will be more important for that to not fail. A power outage now may mean you have to get in your car and go out for food or to get warm. When that car is electric outages become more problematic. The electric utilities are working to better interconnect grid systems, as well as upgrade lines and trim trees, in order to reduce occurrence of outages. Home and grid-level storage systems are also improving and will help smooth out power needs and cover short outages.

F. Local Renewable Energy Resources

The Vermont Energy Atlas is an online tool that can be used by anyone to gather information on existing and potential renewable energy resources by counties, towns, or individual parcels in the state. The following data for the Town of Tunbridge was collected at www.vtenergydashboard.org:

The TRORC 2017 Regional Energy Implementation Plan, which can be accessed here (http://www.trorc.org/wp/wp-content/uploads/2015/09/Regional-Energy-Implementation-Plan-Adopted-7-26-17.pdf) set municipal renewable energy targets to help Vermont reach its ambitious goal of 90% renewable energy by 2050. It determined that Tunbridge's new generation target is 7,209-8,811 MWh or roughly 10-11 MW of nameplate generation capacity.

Solar - Many locations in Vermont are capable of generating solar energy through photovoltaic panels or solar thermal systems. At present Efficiency Vermont reports that Tunbridge has 26 net-metered photovoltaic sites that have the capacity of generating 164.1 kW. and three thermal solar sites (usually used to heat water.) Tunbridge has 1,196 acres of prime solar potential, of which 384 acres is within 1 mile of Phase 3 power distribution. Only 40-50 acres of commercial solar is needed to reach the generation target if it was met totally by solar. Obviously, some of this can also be met in smaller systems and on roofs.

Wind Generation - There are multiple levels of potential wind energy generation, ranging from Class 1 (10-11 mph) to Class 7 (19-25 mph). Many towns in Vermont are unlikely to have commercial generating capacity due to topography. There are locations in town suitable for wind generation facilities solely in terms of wind and power lines, but large turbines would impact forest areas and our ridgelines.
Tunbridge has 1,847 acres of prime wind potential, of which 511 acres is within 1 mile of 3 phase power distribution.

Potential Wind Development Areas in Tunbridge (Acres)							
	Class 1 (10-11 mph)	Class 2 (12-13 mph)	Class 3 (13-14 mph)	Class 4 (15-16 mph)	Class 5 (16-17 mph)	Class 6 (17-18 mph)	Class 7 (19-25 mph)
Residential (30-meter)	9320	563	0	0	0	0	0
Small Commercial (50-meter)	0	1423	575	70	0	0	0
Large Commercial (70-meter)	0	0	27	274	0	0	0

Figure 21 Potential Wind Development in Tunbridge in Acres (Source: Vermont Energy Atlas, 2012)

The most viable location for small and large-scale commercial wind development would be on Brocklebank Hill, along the border between Tunbridge and Chelsea. Locations for small commercial or residential scale wind energy generation are greater. These areas align with Tunbridge's ridge-tops which occupy the eastern and western sides of the community. Based on Tunbridge's sensitivity to large-scale projects, the development of wind energy generation would be very controversial. Solar generation alone can produce sufficient energy at much less impact.

Biomass - The term 'biomass' refers to biologically-based feedstocks (that is, algae, food or vegetable wastes, grass, wood, methane, and much more). Biomass can be converted into an energy source to fuel vehicles (e.g. biodiesel), heat homes, or even generate electricity. Tunbridge still has operating dairy farms that could combine their resources to produce power at a locally sited methane digester, which is also known as "cow power".

Many homes use biomass for heating individual buildings in the winter, and sometimes to provide electricity. According to the 2011 Vermont Comprehensive Energy Plan, those using wood for primary heating consumed about 5.4 cords in 2007–08, while those using wood as a supplementary source used 2.25 cords. In that same year, Vermont households burned about 20,155 tons of wood pellets, with primary-heat-source consumers burning 3.8 tons and supplementary-heat-source consumers burning 1.2 tons for the season.

Commercial biomass energy generation facilities should be located close to available biofuels to reduce transportation impacts and costs. A biomass power plant would require a great deal of space to accommodate the various stages of collection and conversion of the mass into fuel before burning it to produce electricity. Water can also pose a problem as biomass facilities require large quantities to handle the recycling process of waste materials. Materials would have to be transported to and from the facility, so truck traffic should be a consideration in selecting a site. If a biomass energy generation facility is located in Tunbridge, it will be essential for the community to monitor biomass production for sustainability. It is possible that with a well-managed source of biomass, the community could generate income.

Biofuels: Biofuels are commonly grouped into two categories: 'first generation,' which refers to corn-based ethanol and oilseed crop-based biodiesel, and 'second generation, which refers to algae-based biodiesel and ethanol made from the cellulose in plants. Tunbridge has no existing biodiesel sites. Growing biomass to use in biofuels may be a viable way to encourage farming in Tunbridge; however, balance should be sought between growing for energy demands and for human and animal consumption. The state energy plan relies on a huge increase in biodiesel production, and how and where that would happen is unclear.

Hydropower: There are currently no hydropower facilities located in Tunbridge. However, Tunbridge has had small-scale hydro in the past. While large hydro facilities are more commonplace in Vermont, advances in technology are making it increasingly viable for small-scale residential use. Micro hydropower has the potential to generate enough electricity to power a home, provided that the essential ingredients – water and vertical drop – are available. Hydro can be an excellent complement to a solar system because water flow is often greater during the winter season when solar is less effective. At all times, the health and stability of the river ecosystem needs to be prioritized above the generation of energy.

There are a number of small-scale hydropower generation options that could be considered and with planning and the support of town government could be implemented. For example, use of the First Branch of the White River for power generation. A small hydro turbine placed in a logical location might be able to produce at least enough energy to provide power to the Village Areas. Tunbridge has a long history of small-scale hydro facilities powering mills and other businesses along the First Branch of the White River. However, hydro permitting is very expensive and takes years, and no new dams will likely be constructed. The major potential hydropower resources in Tunbridge include the First Branch of the White River and some of its steep streams, which would support smaller scale hydroelectric generation.

G. Meeting the Local Energy Demand – Increasing Awareness and Efficiency

There are a number of ways that the Town of Tunbridge can meet its local energy demand, first by lowering that demand, and then by working to meet the remaining need with local, untapped energy resources.

Decreasing Energy Use by Changing Behavior

Raising awareness about wasteful energy behaviors and energy saving behaviors reduces the strain on existing energy resources, and helps residents and businesses save money, making the town a more affordable place to live with a higher quality of life.

Decreasing Energy Use by Implementing Energy Efficiency

For those necessary or desired services that require energy, we can apply the principles of energy efficiency to ensure that we use less energy to provide the same level and quality of service. Low-cost energy audits are widely available through Efficiency Vermont (www.efficiencyvermont.com) to homeowners so they can identify ways to improve the conservation of energy in their households. Examples of energy efficiency measures include:

- Insulating with high R-value (or heat flow resistance) material,
- Using high efficiency windows,
- Installing energy efficient appliances like refrigerators, freezers, front loading washing machines, gas heated clothes driers and heating systems without blowers,
- Using high efficiency lighting,
- Using gas and/or solar hot water heaters,
- Siting buildings to make use of existing wind blocks and natural cooling patterns derived from the landscape's topography.
- Siting buildings with maximum southern exposure to capture passive solar energy.
- Automatic setback thermostat
- Caulking cord to make windows airtight
- Shrink plastic for windows

New residential development in the State of Vermont is required to comply with Vermont Residential Building Energy Code (RBES). Commercial development is subject to similar code regulations. Some examples of the types of development the RBES applies to include:

- Detached one- and two-family dwellings.
- Multi-family and other residential buildings three stories or fewer in height.
- Additions, alterations, renovations and repairs.
- Factory-built modular homes (not including mobile homes)

In order to comply with the RBES, a home, as built, must meet all of the Basic Requirements and the Performance Requirements for one of several possible compliance methods. If the home meets the technical requirement of the Residential Energy Code, a Vermont Residential Building Energy Standards Certificate must be completed, filed with the Town Clerk of the community and posted in the home. If a home required by law to meet the Residential Energy Code does not comply, a homeowner may seek damages in court. It includes heating and cooling systems as well.

H. Making Changes and Implementing Solutions at the Municipal Level

Although communities are unlikely to have an impact on energy consumption at the global level, they do have an impact at the local level given their demand for and use of energy. The relationship

between a municipality and its energy use creates opportunities to have an impact on local energy use reduction.

Auditing Municipally Owned Buildings
Many towns in Vermont own buildings that are old and inefficient in many respects. For instance, older buildings often have insufficient insulation, wasteful heating and cooling systems, and out-of-date lighting. These kinds of infrastructure problems result in higher energy use with the resulting cost passed onto taxpayers.

Capital Budget Planning
Given the potential expense of energy efficiency improvements, it is essential to wisely budget town funding to cover these costs. State statute enables communities to create a Capital Budget and Program for the purposes of planning and investing in long-range capital planning. Although most communities have some form of capital account where they save money, many do not have a true Capital Budget and Program. A capital budget outlines the capital projects that are to be undertaken in the coming fiscal years over a five-year period. It includes estimated costs and a proposed method of financing those costs. Also outlined in the Program is an indication of priority of need and the order in which these investments will be made. Any Capital Budget and Program must be consistent with the Town Plan and shall include an analysis of what effect capital investments might have on the operating costs of the community.

When planning for routine major facilities investments, such as roof replacements, foundation repairs, etc., it is important to also consider making energy efficiency improvements at the same time. The cost to replace or renovate a community facility will only be slightly higher if energy efficiency improvements are done at the same time, rather than on their own.

At present, the town of Tunbridge has a Capital Improvement Plan. The plan focusses primarily on transportation infrastructure, specifically on major five major bridge and culvert projects and the replacement of a portion of the Town Garage's roof, the last of which was completed in 2016. The existing Capital Improvement Plan does not incorporate energy efficiency improvements. The Planning Commission may make recommendations to the Selectboard with regard to what capital investments should be considered annually. An enhanced energy plan for the Town of Tunbridge can provide detailed information related to costs of energy use in Town. The *Tunbridge Municipal Energy Summary Worksheet* contains detailed energy information on usage and potential in Tunbridge and can be found in Appendix D.

Policy Making for Change
In addition to reducing the energy use related to facilities, municipalities can implement policies that lower energy use by town staff or encourage greater energy efficiency. Examples include:

Energy Efficient Purchasing policy – A policy of this nature would require energy efficiency to be considered when purchasing or planning for other town investments. For example, purchasing Energy Star rated equipment is a well-documented way to increase energy efficiency. Devices carrying the Energy Star logo, such as computer products and peripherals, kitchen appliances, buildings and other products, generally use 20%–30% less energy than required by federal standards.

Staff Policies - Towns can also implement policies that are designed to reduce wasteful energy practices. For example, the Town of Tunbridge could create a policy requiring that town vehicles (such as dump trucks and other road maintenance equipment) not idle for more than a set period of time.

Idling is an expensive waste of fuel, and a policy such as this could lead to substantial savings in money spent on fuel by the town.

Through policy making, local government can set a clear example for townspeople and encourage sustainable behavior that will ultimately result in both energy and financial savings. Please see the recommendations section (J, below) for more ideas.

I. Section 248 and Act 250

Energy generation in Vermont is subject to a number of different permitting requirements, most of which are limited to state level permitting. On the municipal level, state statute protects residential renewable energy generation systems from regulations that will prohibit their development.

Section 248
Distributed power generation facilities, such as hydropower dams, fossil fuel plants as well as wind power or solar systems owned by utilities or private persons or companies, are subject to review and approval by the Vermont Public Service Board (30 VSA §248) if they connect to the grid. Under this law, prior to the construction of a generation facility, the Board must issue a Certificate of Public Good. A Section 248 review addresses environmental, economic, and social impacts associated with a particular project, similar to Act 250. In making its determination, the Board must give "due consideration" to the recommendations of municipal and regional planning commissions and their respective plans, unless these plans have been given a determination of energy compliance. Such determination means the plans are then afforded "substantial deference". This plan has been written in the hopes of receiving such a determination. Accordingly, it is appropriate that the Tunbridge Town Plan address these land uses and provide guidance to town officials, regulators, and utilities.

For all energy generation facilities, the following policies shall apply:

1. Preferred Locations: New generation and transmission facilities shall be sited in locations that reinforce Tunbridge's traditional patterns of growth, of compact village centers surrounded by a rural countryside, including farm and forest land.
    - Larkin Hill is a preferred location for solar power due to its potential and its close proximity to 3 phase power distribution
    - Welch's Hill is a preferred location for small-scale wind generation

2. Prohibited Locations: Because of their distinctive natural, historic or scenic value, energy facility development shall be excluded from the following areas:
    - Floodways shown on FEMA Flood Insurance Rate Maps (except as required for hydro facilities)
    - Fluvial erosion hazard areas shown on Fluvial Erosion Hazard Area maps (except as required for hydro facilities)
    - Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis.
    - Rare, threatened or endangered species habitat or communities.

3. Significant Areas: All new generation, transmission, and distribution facilities shall be sited and designed to minimize and mitigate adverse impacts to the following:
    - Historic districts, landmarks, sites and structures listed, or eligible for listing, on state or national registers.

- Public parks and recreation areas.
- The Route 110 Corridor Area: Several potential solar sites exist in this area and it is located close to 3 Phase.
    - Roof structures located in this area are suitable for this area.
- Special flood hazard areas identified by National Flood Insurance Program maps (except as required for hydro facilities).
- Public and private drinking water supplies, including mapped source protection areas.
- Primary agricultural soils mapped by the U.S. Natural Resources Conservation Service.
- Necessary wildlife habitat identified by the state or through analysis, including core habitat areas, migration and travel corridors.

4. Natural Resource Protection: New generation and transmission facilities must be sited to avoid the fragmentation of, and undue adverse impacts to the town's working landscape, including large tracts of undeveloped forestland and core forest habitat areas, open farm land, and primary agricultural soils mapped by the US Natural Resource Conservation Service.

5. Protection of Wildlife: Designers must gather information about natural and wildlife habitats that exist in the project area and take measures to avoid any undue adverse impact on the resource. Consideration shall be given to the effects of the project on: natural communities, wildlife residing in the area and their migratory routes; the impacts of human activities at or near habitat areas; and any loss of vegetative cover or food sources for critical habitats.

6. Site Selection: Site selection should not be limited to generation facilities alone; other elements of the facility need to be considered as well. These include access roads, site clearing, onsite power lines, substations, lighting, and off-site power lines. Development of these elements shall be done in such a way as to minimize any negative impacts. Unnecessary site clearing and highly visible roadways can have greater visual impacts than the energy generation facility itself. In planning for facilities, designers should take steps to mitigate their impact on natural, scenic and historic resources and improve the harmony with their surroundings.

Act 250

Act 250 requires that the "best available technology" for energy efficiency and recovery be used in construction. In its review of development proposals, Act 250 applies a life cycle cost test to determine the "appropriate level" of energy efficiency. The appropriate level requires the developer to invest in energy efficiency up to the economic break-even point for a particular structure, occupant, and usage pattern. This standard allows for flexibility in design without sacrificing the energy efficiency of specific measures. In addition to the "best available technology" requirement, commercial developments under Act 250 are required to adhere to the rules set forth in Vermont's Commercial Building Energy Standards (CBES).

For all commercial facilities subject to Act 250, the following energy policies shall apply:

1. In addition to the "best available technology" consideration, Act 250 should also consider greenhouse gas emissions as a waste that must be minimized.
2. New commercial construction is required to make reasonable efforts to incorporate onsite generation from renewable resources and that the location of development must also be

determined to minimize transportation energy use through location adjacent to employment, housing or village centers.

J. Energy and Transportation Policy

It is important that communities recognize the clear connection between land use patterns, transportation and energy use. Most communities encourage the development of residences in rural areas, and these are in fact coveted locations to develop because of the aesthetics that make Vermont special. However, this rural development requires most of our population to drive to reach schools, work and services. The pattern of driving has exacerbated the Town and the state's high level of transportation greenhouse gas emissions. The average daily commute of Vermont residents consists of 50 miles and constitutes one of the highest in the United States.

Because transportation is such a substantial portion of local energy use, it is in the interest of the community to encourage any new developments that are proposed in Town to locate adjacent to existing roads. In particular dense residential developments should be located within or adjacent to existing village centers or within designated growth areas. Commercial development that requires trucking and freight handling should only locate on roads which can effectively handle the size of vehicle needed. The town is generally reluctant to take on additional roads, therefore new development in areas that are not presently served by town roads should be discouraged.

K. Goals, Policies and Recommendations

Goals

1. To encourage a continued pattern of settlement and land use that uses energy efficiently.
2. To promote the design, siting and construction of buildings and structures that are energy efficient and minimize the need for costly sources of energy.
3. To encourage the responsible development of local renewable energy sources and to reduce dependence on outside energy sources, especially fossil fuels.
4. To provide input on behalf of the citizens of Tunbridge in any Public Service Board Certificate of Public Good application relative to the generation of energy.

Policies

1. Major public investments, such as schools, public recreational areas, and municipal facilities, as well as major commercial or residential developments need to be situated within or in close proximity to state highways.
2. The rehabilitation or the development of new buildings and equipment should use proven design principles and practices with the lowest life cycle costs (cost of owning, operating, maintaining, and disposing of a building or a building system over a period of time):
    a. Where land development or subdivisions are proposed, design plans shall reflect sound energy conservation principles, such as solar and slope orientation and protective wind barriers. An example would be the cluster planning concept, which is an approach that encourages energy conservation and efficiency; and
    b. Visual effects of electrical generation, transmission, and distribution facilities shall be minimized whenever feasible.
3. Energy generation, transmission, and distribution facilities or service areas shall be encouraged only when they complement the recommended land use patterns set forth in this plan.

4. Tunbridge encourages reduced commuting distances, the development of broadband services, the commercial and residential conservation of energy, energy efficient home occupations and small-scale home business.
5. To promote energy efficient commuting, the community supports state and regional transportation programs serving Tunbridge.
6. Any commercial energy generation facility proposed in Tunbridge should be developed so as to avoid negative impacts on the rural character of the area in which they are proposed to be located. Developers should make all possible efforts to minimize damage to important natural areas as identified in the Natural Resource section of this Plan. Additionally, such facilities should be located as close to existing roads as possible to avoid any increase in the services provided by the town.
7. The Town of Tunbridge discourages renewable energy projects that include the sale of renewable energy credits (RECs).
8. The Town of Tunbridge prefers that the energy produced by renewable energy projects located in Town is primarily used in Town and benefits the residents of Tunbridge.

Recommendations

1. The Tunbridge Town Energy Committee should continue to play an active role in increasing public awareness of energy conservation practices and efficient appliances through educational efforts and to consider alternative energy sources in public facilities.
2. The Tunbridge Energy Committee should pursue enhanced energy planning for this Town Plan, which can include project site planning recommendations for future renewable energy generation projects to the Selectboard.
3. The Town should continue to investigate ways to reduce the cost of municipal energy use. Including conducting audits on additional town buildings in order to determine what improvements are necessary, and which projects would have the highest cost-benefit ratio in terms of energy and financial savings.
4. The Planning Commission should continue to identify areas in town that are appropriate for large and small-scale solar energy production.
5. The Town should investigate tax incentives that would encourage energy efficient siting of residences.
6. Tunbridge should consider locally sourced biofuels, including wood pellets or cordwood, as a viable energy source for municipal buildings.
7. Before a biomass energy generation facility is located in Tunbridge, developers should prove that their proposed project will not negatively impact the rural character of the community or the local road system.
8. Tunbridge and its neighboring Towns should collectively strategize about how best to provide a local “mass transit” option that augments the services provided by established entities like Stagecoach.

The only people, scientific or other, who never make mistakes, are those who do nothing. -Thomas Huxley

XIV. Relationship to Other Plans

Tunbridge's Town Plan primarily focusses on development and policy within the boundaries of Tunbridge. However, it is important to recognize that a community's growth and change can be impacted by development that takes place outside the community. Tunbridge is bordered by the Towns of Chelsea to the north, Randolph to the west, Royalton to the south, and Strafford to the east. It also shares corners with the Towns of Vershire, Sharon, Bethel, and Brookfield. All of these Towns engage in planning efforts that have summarized here. In general, each community's land use policies are similar to Tunbridge's in that they encourage densely populated village centers surrounded by open countryside. There are no significant differences in land use patterns and therefore there are no conflicts with this Plan. All of the town plans of neighboring and cornering communities include Current Land Use identification and Future Land Use provisions designed to further town planning and inform Act 250 decisions.

Chelsea:
Chelsea's Town Plan was last adopted on November 16, 2015 and its Zoning Bylaw was last adopted on March 3, 2009. The Town of Chelsea has designated much of the area on the border with Tunbridge as rural residential. The Rural Residential Zoning District and Future Land Use Area promotes a forested landscape interspersed by farmland and residential land uses. The Town of Chelsea has also designated a small section of approximately 2 miles along the Tunbridge border east of Route 110 as an Industrial District. The preferred use of this land use area is light industrial and municipal uses.

Randolph:
Randolph's Town Plan was last adopted on August 8, 2019, and Randolph's Zoning Bylaw was adopted on February 28, 2017. The east section of Randolph along the Tunbridge border is largely zoned as Rural Residential, which intends to maintain rural character and economy, including agriculture while allowing residential uses and encouraging clustered development to maintain large blocks of land. There are also small pockets of Randolph's Rural Agriculture District, which encourages agriculture by conserving Randolph's prime and statewide important agricultural soils.

Royalton:
Royalton's Town Plan was last adopted on March 3, 2020. The Town currently has Flood Hazard Area Regulations that were adopted on September 25, 2007 that applies to its floodplain areas. The northern portion of Royalton that borders Tunbridge is largely characterized by the Resource Conservation Future Land Use areas. The purpose of the Resource Conservation Area is to protect the natural resource value of lands that are essentially undeveloped, lack direct access to arterial and connector roads, are important for wildlife and wildlife habitat, have high potential forestry use, are unsuitable for land development, or include significant natural, recreation, or scenic resources. There are also small portions of the Agriculture/Residential Future Land Use Area surrounding major roads.

Strafford:
Strafford's Town Plan was last adopted on September 27, 2017 and its zoning regulations were last adopted on January 10, 2007. The Town was engaged in updating its Town Plan during the drafting of this Tunbridge Municipal Plan. The west portion of Strafford that borders Tunbridge is zoned as a mix of Land and Forest Conservation and Rural Residential. The Land and Forest Conservation areas are along Williams Hill in the central portion of the western border and the Taylor Valley area of the

northeast portion of Strafford. The purpose of this area is to encourage a pattern of land and forest conservation which sustains the rural and natural characteristics of the town and to discourage development. The Rural Residential areas are intended to provide and maintain residential and rural land uses.

Bethel:
Bethel's Town Plan was last adopted on September 22, 2014, and it adopted a Unified Bylaw, which includes its Zoning Ordinance and Subdivision Regulations, on June 12, 2017. The northeastern corner of Town, which borders Tunbridge, is characterized as the East Bethel Hamlet Area. This land use area supports clustered small-scale residential, civic, and commercial development.

Brookfield:
The Brookfield Town Plan was last adopted on September 12, 2016. Brookfield adopted a Base Zoning Map and Development Bylaw on April 12, 2010. They adopted subdivision regulations on November 14, 2005. The southeastern corner of Brookfield, which corners with Tunbridge, features sections that have been zoned as conservation due to slopes greater than 25% slope and wetland areas. This corner of Brookfield contains East Randolph Road/Chelsea Mountain Road, which continues into Tunbridge. There are also portions of this part of Brookfield that have been zoned for Agricultural/Residential Land Use.

Sharon:
The Sharon Town Plan was last adopted on April 6, 2015. Sharon has subdivision regulations that were adopted in 2008, and Flood Hazard Area Bylaw that was adopted on December 6, 2010. The northwestern corner of Sharon, which corners Tunbridge, features primarily of the rural residential land use area with some areas that are characterized as Forest Conservation areas.

Vershire:
The Town of Vershire last adopted its Town Plan in October 31, 2017. Vershire has a Development Ordinance and Map which was revised and adopted in 2008. The Town has designated the southwestern portion of the Town that corners Tunbridge, as Open Space Area. The Open Space Development Area covers lands that are primarily large areas of undisturbed and undeveloped land known to be favorable wildlife habitat, contain substantial wetlands, ridgetops in public view, and have large areas with steep slopes.

Relationship to the Two Rivers-Ottauquechee Regional Plan:
Tunbridge shares numerous activities and services with surrounding towns, including school services and fire protection, which is enhanced with mutual aid. Emergency medical services are divided between two squads to improve response times. The town is also a member of the Two Rivers-Ottauquechee Regional Commission (TRORC).

TRORC's 2017 Regional Plan covers 30 towns including Tunbridge. Since the preparation of the Tunbridge Town Plan was done with the assistance of the Regional Commission, no conflicts between the two have arisen. The two plans have similar policy statements regarding the need for development that does not overburden services. In addition, no specific development goals in this Plan conflict with any regional goals.

Recommendations:
1. To encourage continued communication and cooperation between Tunbridge and its neighboring towns.

2. To continue participation in the Two Rivers-Ottauquechee Regional Commission.
3. To exchange planning information and development data with neighboring communities.

"What's the use of a house if you haven't got a tolerable planet to put it on?" ~ Henry David Thoreau

XV. Implementation

A. Putting the Plan Into Action

The character of Tunbridge, its people, and landscape have been created over the years through the individual and collective decisions of its citizens and public officials. The efficiency, attractiveness, and well-being of the community is determined, in part, by the ability of the Town to plan for its needs and to find a mechanism to put planning goals into action.

Previous elements of this Plan have been centered on existing conditions, probable trends and policy development which, when combined, represent a vision for the kind of town Tunbridge desires for the future. One thing is certain – the community will change. The opportunity is that citizens and town officials together can direct this change consistent with their desires, using a variety of mechanisms.

The following sections describe the tools and techniques that could be used to implement the Tunbridge Town Plan.

B. Adoption of the Plan

Adoption of the Tunbridge Town Plan by the Selectboard, in accordance with the procedures outlined in the Vermont Planning and Development Act [24 V.S.A., Chapter 117], is the first step in putting this Plan into action. Through its adoption, the town accepts the principles and policies as set forth in this Plan as in the public interest and as a guide for the future growth and development decisions affecting Tunbridge.

C. Ongoing Planning

Planning for change is a continual process for Tunbridge and will require the involvement of the Planning Commission and the public to ensure that the goals and policies of the Plan are integrated into the decisions affecting land use, taxation, and public investments in Tunbridge.

The quality of a Town Plan is reflected in the amount of public involvement in its creation. Regular community meetings, held by the planning commission, that discuss important issues relevant to the Town plan will ensure that the document truly reflects the vision of the residents of Tunbridge.

The Tunbridge Town Plan is a dynamic document reflecting the community's visions and values. By statute [24 V.S.A., Section 4387] the plan must be revisited at least every eight years to be kept relevant. The Planning Commission is responsible for the maintenance and amendment of the plan. Within the next eight years following adoption of the plan, the Planning Commission will need to evaluate the plan in light of new conditions and needs. Re-adoption of an updated plan will require notice to the townspeople and action by the Selectboard.

At any time following adoption of the plan, the Selectboard may request the Regional Commission to approve the Plan or amendments to a plan. Before approving a plan, the Regional Commission shall find that the plan meets four basic tests [24 V.S.A., Section 4350(b)].

Approval of the plan provides an improved legal standing for Tunbridge to influence and integrate its planning policies with State agency planning affecting land use.

D. Implementation Tools

Vermont law enables Tunbridge to implement the adopted Tunbridge Town Plan through a variety of ways. Regulation of land use and development through rules adopted by the voters is one possible method. Because these regulations are susceptible to legal challenge and must clearly benefit the public, discretion must be used. Well recognized and utilized means include, but are not limited to, zoning bylaws and subdivision regulations. Examples of potential implementation tools include:

Zoning Bylaws - Zoning bylaws are a commonly used method for guiding development at the local level. Zoning may regulate,

- Uses of land,
- The placement of buildings on lots,
- The relationship of buildings to open space, and
- The provision of parking, signs, landscaping and open space.

Zoning generally involves partitioning the town into districts or zones that have a different set of uses, densities, and other standards for development. Zoning districts must be reasonably consistent with the Town Plan. As an alternative to conventional methods, Tunbridge may opt to implement a set of measurable performance standards for specific uses as opposed to dividing the Town into districts. This technique, referred to as "performance zoning", is designed to be more flexible and to recognize the specific conditions of each site proposed for development.

Subdivision Regulations - Tunbridge does not currently have subdivision regulations. These regulations, if adopted, would be administered by the Planning Commission. Such regulations govern the division of parcels of land and the creation of roads and other public improvements. Furthermore, subdivision regulations can ensure that land development reflects land capability and that critical open spaces and resources are protected from poor design or layout.

Flood Hazard Area Bylaws - Under Vermont law [24 V.S.A., Section 4412], the Town of Tunbridge may regulate the use of land in a defined flood hazard area adjacent to streams and ponds. These bylaws can be established to ensure that design and construction activities within the limits of the 100 Year Flood Plain are designed so as to minimize potential for flood damage and to maintain use of agricultural land in flood-prone areas. As noted in the Natural Resources section of this Plan, property owners are eligible for federal flood insurance on buildings and structures at relatively low federally subsidized premium rates. However, such insurance cannot be obtained for properties in Tunbridge unless the Town has in effect a Flood Hazard Bylaw which, at present, Tunbridge has.

Sewage Ordinance - In addition to zoning, subdivision, and flood hazard bylaws, Tunbridge may, through its Selectboard, adopt an ordinance to regulate the design and installation of on-site sewage systems. Under this ordinance, prior to the installation or replacement of a system, the landowner would first need a permit from the Tunbridge Board of Health (Select Board and Town Health Officer). However, this ordinance may be redundant as the state (since 2007) has the authority to regulate all new septic installations. (See Appendix B, Natural Resources)

Highway Ordinances - Tunbridge has in effect a Highway Ordinance setting forth the standards and conditions for the maintenance, improvement, discontinuance, laying out and acceptance of Town

highways. In addition, the ordinance includes provisions related to the reclassification of town highways (Classes 2, 3 and 4).

Lastly, Tunbridge does have, through its Selectboard, the ability to regulate private access to municipal roads through the issuance of "curb cut" permits to landowners. "Curb cuts" are places where a private driveway or road connects to a town highway. In granting a cut onto town roads, the Selectboard can give consideration to safety issues such as adequacy of sight distance and proximity to intersections as well as conformance with this Plan.

Capital Budget – A capital budget and program is a financing approach that benefits the town greatly in the selection, prioritization and costing of capital projects. Under the capital budget, a project is selected (e.g. bridge refurbishment), a funding source determined (e.g. general taxes, and general obligation bonds) and a priority year given for each activity (e.g. construction in 2006). Collectively these capital projects make clear when public facilities will be placed to accommodate projected growth. When used in conjunction with the Town Plan and local bylaws, it can be a powerful mechanism for limiting the rate of growth in accordance with the fiscal capacity of taxpayers and other funding sources.

In addition, it is noted that under Vermont's Act 250 law, in granting a Land Use Permit for a major development or subdivision, the District Environmental Commission must first find that the project is in conformance with the town's capital budget. [See 10 V.S.A., Section 6086(a)(10).] Accordingly, this mechanism gives the town an indirect method of implementing its policies and priorities as set forth in the Plan.

In 2016 a draft Tunbridge Capital Improvement Plan Fy2018-2022 was developed for the Town. It was not formally adopted, but it provides an overview of transportation capital improvement investments and a rough timeline for implementation. Beyond this, Tunbridge has a less formal systems of capital programming that continue to evolve. It is recommended that a Capital Budget Committee be established to work with the Select Board and School Directors in the development of a list of capital needs and expenditures, and to formally present a Capital Budget and Program for adoption.

Vermont Community Development Program – Since the mid-1970's, the Vermont Community Development Program (VCDP) has made grant funds available to towns for community projects. Historically, the major focus of the program has been on housing rehabilitation and affordable housing projects benefiting low and moderate-income families.

Tunbridge should investigate the Vermont Community Development Program and its potential to assist the community in addressing its housing needs. The Regional Commission and the Vermont Agency of Commerce and Community Development are resources available to assist. (PH: 802-828-3217).

Act 250 - Since 1970, Vermont has had in place a statewide review system for major developments and subdivisions of land. Exactly what constitutes a "development" or "subdivision" is subject to a rather large and involved set of definitions. However, generally, commercial and industrial projects on more than one acre of land; construction of 10 or more units of housing; subdivision of land into 6 or more lots; construction of a telecommunication tower over 20 feet in height; and development over 2,500 feet in elevation qualifies.

Prior to these activities being commenced, a permit must first be granted by the District Environmental Commission. In determining whether to grant a permit, the Commission shall evaluate the project in

relation to ten specific review criteria, which are typically documented by the Natural Resources Board.

These criteria relate to the environmental, economic, and social impacts of the proposed project on the community and region. Parties to Act 250 proceedings include Tunbridge, through the Planning Commission and Selectboard, the State, and the Regional Commission. One criterion that needs to be addressed is whether the project is in conformance with the Tunbridge Town Plan. If a project were determined not to be in conformance with the plan, the District Environmental Commission would have a basis to deny a permit. As such, Act 250 reviews can take into consideration protection of those types of resources considered important to the well-being of the community. Accordingly, it is in the interest of the Town to evaluate Act 250 projects affecting Tunbridge and to offer testimony, as appropriate.

Coordination of Private Actions - Citizens and private enterprise have a vested interest in the well-being of Tunbridge. The actions of the private sector, such as the construction of homes and businesses, land conservation, and the use of land for recreation and agriculture, should relate positively to the goals and policies as set forth in this Plan.

It is in the interest of Tunbridge, through the Planning Commission and Selectboard, to develop a cooperative relationship with private investment activities that may have a significant impact on the community values and policies set forth in the Plan. By working together in a cooperative venture early in the process of planning for a project, an adversarial relationship can be avoided. Contacts that should be maintained include the following:

- Green Mountain Economic Development Corporation
- Vermont Land Trust and Upper Valley Land Trust
- Twin State Housing Trust
- Owners of significant properties of high resource or development value, and
- Employers in Tunbridge.

Conservation Activities - Conservation programs are an effective means of securing protection of valuable farm and forestland or significant natural resources. Techniques available involve voluntary direct work between non-profit conservation organizations and affected landowners such as donation of conservation easements, bargain sales of land, and limited development schemes.

The land trust movement has grown immensely during the past twenty years, particularly in Vermont. Land trusts offer viable means of bringing together the needs of property owners with the community interests. The Vermont Land Trust, Upper Valley Land Trust, and the Nature Conservancy are particularly well-recognized organizations. Several organizations are also involved in water quality protection and associated conservation of riparian lands, including the White River Partnership. It is the intent of this Plan to implement its policies through coordination and the involvement of these organizations and others dedicated to public purposes.

E. Guidelines for Growth

The following guidelines are intended to help town officials, residents and developers work together to plan and design developments consistent with the goals and policies of this plan. These guidelines are suggested ways to implement the plan. They are not mandatory and are not intended to be strictly

adhered to in every case. They are offered to give landowners and officials a common, but flexible framework for preparing plans and making decisions. Where this Plan does have a specific goal, policy or recommendation that is stricter than presented below, that stricter version shall apply.

Siting New Development - New development should be sited to

1. Be compatible with the historic settlement pattern;
2. Maintain functional integrity of deer wintering yards and wildlife corridors;
3. Be cost efficient for municipal services; and
4. Conserve the agricultural potential of Prime and Important agricultural soils by
   - Keeping Prime and Important agricultural soils available for agricultural production unless the only economically viable use of the land would be from incompatible for uses;
   - And utilizing creative planning and design to minimize the reduction of agricultural potential.

Designing New Development - Landowners should design and phase new development, particularly large residential development to

1. Avoid compromising natural resources or overloading public facilities and services;
2. Protect and promote the harmonious balance between buildings and useful, well-defined open space, and a human-scaled character of structures and settlements;
3. Be compatible with desired habitat condition and public outdoor recreation;
4. Take advantage of opportunities to enhance and/or restore habitats by establishing native vegetative diversity or provide other wildlife benefits;
5. Mitigate the effects of proposed actions on identified archeological sites;
6. Be compatible with the qualities that make historic areas, structures or sites significant;
7. Protect the community trail system from activities which would unduly compromise desired trail experiences and uses;
8. Promote the design, siting and construction of buildings and structures that are energy efficient and minimize the need for costly sources of energy. See Appendix B for additional information on energy efficient building; and
9. Incorporate the following visual elements:
   - Unobtrusive heights of buildings;
   - Vegetative screening;
   - Preservation of native vegetation;
   - Unobtrusive location of utilities; and
   - Minimal alterations to topography.

Public Facilities and Services - Major new developments should pay a proportionate fair share of the increased cost of providing public facilities or services to the development.

Roads - New roads, private or public, should be designed and constructed to

- Minimize impacts to large woodlands and wildlife corridors (if roads and trails are desired, locate them along the outer edge of the areas and limit trail use to low-impact activities compatible with the habitat objectives);
- Meet town road standards; and

- Minimize impacts on desired habitat conditions, water quality and other ecological functions.

Landowners requesting upgrades of Class 4 roads to Class 3 should pay the costs of the necessary improvements. [See 19 V.S.A., Section 711], and shall meet applicable requirements of the Selectboard Road Policy.}

New private development of roads and ongoing plowing and maintenance, should remain the responsibility of the landowners.

If stream crossings are necessary for new development, efforts shall be made to minimize their impacts on aquatic life and meet the requirements of applicable Stream Alteration Permits.

Water and Sewer Systems - Prospective developers shall comply with applicable requirements of the Wastewater System and Potable Water Supply Permit and should demonstrate the ability to provide an adequate supply of potable water for their developments without impairing the quality or quantity of existing water supplies.

Developers should protect the quality and yield of groundwater by limiting land use activities within recharge areas.

Vegetation Management - Timber harvesting should be consistent with the Vermont Forest, Parks and Recreation's Acceptable Management Practices.

Deer wintering areas should be managed according to the Vermont Department of Fish and Wildlife's *Management Guide for Deer Wintering Areas in Vermont*, (1990).

When managing timber along streams designated as important wildlife corridors, avoid harvesting trees within 100 feet of a stream.

Energy - New development should reduce energy used for transportation by

- Minimizing unnecessary lengths and widths of new roads in order to reduce energy used for trips, materials, construction, and maintenance;
- Laying out new roads to allow clustering of structures, unit orientation for optimum solar gain, and location of structures in wind shadows;
- Locating development to facilitate creation of public and pooled transportation and promote pedestrian access to activities and facilities within and among settlements;
- Using local materials and labor in construction to reduce transportation energy costs; and
- Providing appropriate opportunities for jobs, retail goods and services within villages and neighborhoods in order to reduce the need for travel.

Involvement with the Regional Economy - Ideally, a new or expanding business affecting Tunbridge should:

- Create community pride and have a positive effect on the community's image;
- Strengthen and preserve the community's assets, particularly those identified in the Town Plan as important;

- Provide fiscal revenues that exceed direct and indirect costs;
- Invest in the community (e.g., sponsor groups and activities, allow community use of land and buildings, build affordable housing, provide day care);
- Help keep money circulating in the community (e.g., be owned by local residents; hire local people; use local resources or products; provide services or products presently obtained from outside community);
- Produce products or services that meet community needs and will benefit the community;
- Add value to a local renewable resource or product (e.g., dairy, cheese factory, furniture manufacturer);
- Be committed to reducing negative environmental impacts; and
- Minimize traffic impacts.

Preservation of Historic and Scenic Areas - Ideally, future development will include recognition of and consideration for historic and scenic areas including the following:

Historic:

- Tunbridge Village, listed on the National Register of Historic Places,
- 22 cemeteries, many containing graves of Revolutionary War soldiers, Indian raid victims, and original settlers,
- Indian raid sites,
- Five covered bridges,
- Old grist and saw mill complex,
- Several other historic mill sites, some with dams,
- Brocklebank quarry site,
- Foundry site,
- Four church buildings,
- Original fairgrounds in North Tunbridge
- 12 historic one-room schoolhouses that still exist, (of 18 existing at one time),
- Birthplace of Joseph Smith's brother,
- Site of original town meeting house and parade ground (adjacent to site of Rowell covered bridge),
- Site of first settlement (Gilley farm),
- Whitney octagonal barn,
- Tunbridge World's Fairgrounds,
- Town Farm, and
- Numerous historic houses.

Scenic:

- Tunbridge Mountain and western view,
- Sunnyside and peat bog,
- View from top of Strafford Road
- View of Town from the Cilley Bridge, from the top of Spring Road, from Potash Road,
- Tuttle Hill,
- Strawberry Hill,

- Bicknell Hill, and
- Numerous places along VT Route 110.

F. Responsibility for Implementation

In order to ensure that the policies of this Plan are implemented, it is essential to identify what municipal panel, organization, or citizen is most suited to act on them. Throughout this plan the Planning Commission has identified recommendations for action that indicated who should be responsible for them. Generally, the responsibility for implementation of the Plan falls either to the Planning Commission or the Selectboard. However, advisory committees as well as other community organizations could have responsibilities for implementation.

To ensure that the Plan is implemented, an Implementation Matrix has been developed. The Implementation Matrix collects a majority of the recommendations for action in this Plan and assigns a party or parties responsible for implementation. In addition, a rough timeframe for implementation is established, which is detailed here:

- **Short-term**: The responsible party should implement the recommendation for action within 1-3 years of the adoption of the Plan.
- **Mid-Term**: The responsible party should implement the recommendation for action with 4-8 years of the adoption of the Plan. These action items often require specific funding sources, multiple steps that must be taken to reach implementation, and/or substantial public process.
- **Long-Term**: These recommendations for action are important for the community of Tunbridge, but may take extensive effort and substantial shifts in policy at multiple levels of Government. Implementation of these action items may take longer than the eight-year lifespan of this Plan.

Ongoing: A substantial number of recommendations for actions contained in this Plan represent the day-to-day work of community members and governing bodies of the Town. By designating these action items as ongoing, the Planning Commission acknowledges that these items are being acted on and supports their continued completion.

G. Implementation Timeline

Action Item	Responsibility	Timeline
History and Community		
Add an historical section to the Tunbridge website to provide information about the Town to its residents and interested individuals.	Planning Commission	Short-term
Economic Base		
ECFiber.net should install fiber optic cable in Tunbridge by 2019.	Selectboard	Short-term
Continue to maintain the Tunbridge bulletin board so that its information remains current.	Town Clerk	Short-term
Continue to update and maintain the Town's website.	Town Clerk	Short-term

Further investigate policies which would assist the viability of family farms within Town.	Planning Commission	Mid-term
Tunbridge shall renew its village designations when they expire.	Planning Commission	Long-Term
The Town continues to encourage a Tunbridge farmers' market to support Tunbridge's strong agricultural character and community.	Planning Commission	Mid-term
Tunbridge supports the local exchange of agricultural products.	Planning Commission	Mid-term
Housing		
The Town should apply for grant funding to conduct a housing needs assessment in Tunbridge	Planning Commission	Mid-term
Tunbridge shall make educational pamphlets available to interested landlords to support affordable and available housing in Tunbridge.	Planning Commission	Mid-term
Education		
The Town should continue to investigate implementing efficiency measures in the Tunbridge Central School.	School Board	Short-term
The Town should continue to investigate implementing efficiency measures in the Tunbridge Central School.	School Board	Long-Term
The Town should take advantage of its Village Designation benefits to implement improvements to educational facilities.	School Board	Short-term
Utilities, Facilities, and Recreation		
A cooperative approach to drinking and wastewater systems shall be used when possible.	Selectboard, Forest Committee, & Conservation Commission	Long-Term
The Town should increase yearly contributions to the Town's equipment replacement fund.	Selectboard	Mid-term
The Town should upgrade the Town Hall building's windows to modern efficient windows to increase energy efficiency.	Selectboard	Mid-term
Update the landing at the Drew Lot of the Tunbridge Town Forest for use as a parking area (accessible to a range of vehicles) and consider a small kiosk with a welcome sign and/or maps of the trail layout.	Planning Commission	Mid-term
Identify and develop access to the trail system at the Town Garage Lot of the Tunbridge Town Forest.	Planning Commission	Mid-term
The Town should continue to make upgrades and renovations to the acoustics and kitchen of the Town Hall.	Selectboard	Long-Term

Health and Emergency Services		
The Tunbridge Selectboard shall annually update the Town's Local Emergency Operations Plan.	Selectboard	Short-term
Tunbridge's Emergency Services Committee shall review and update Tunbridge's police, fire, ambulance, services every five years or as needed.	Emergency Services Committee	Mid-term
The Town of Tunbridge should be proactive in preparation for potential changes in Public Safety Access Point (PSAP) dispatch services.	Fire Department	Mid-term
Transportation		
In reviewing requests to improve or update town-maintained roads, the Selectboard shall consider all of the following criteria: a. Volume of traffic, b. Noise of vehicles c. Impact to neighbors, and d. Weight of vehicles.	Selectboard	Ongoing
ATV usage shall not lead to the damage of roads	Selectboard	Ongoing
The Town shall continue to update its Road and Bridge standards	Selectboard	Annually
In the event that any of Tunbridge's five covered bridges were to collapse, break, or fall into disrepair, the Town should improve it for emergency services.	Selectboard	Long-Term
Given the interest in the benefits from biking, hiking, snowmobiling, cross-country skiing, and similar outdoor recreational activities, the Town should, as an alternative to complete discontinuance of a highway, give full consideration to preserving Class 4 roads for recreational use by downgrading their status to a legal trail and thus retaining the public's interest in them.	Selectboard	Long-Term
The Town should investigate the right-of-way and width of roads in terms of feet and rods	Planning Commission	Long-Term
Tunbridge should work with the Vermont Agency of Transportation to analyze speed limits on town maintained roads to ensure the safety of drivers and residents.	Planning Commission	Mid-term
The Town should consider lowering the speed-limit from 35 to 30 mph in the village areas	Selectboard	Mid-term
The Town should promote a dialogue to improve the safety of multiple use on Recreation Road.	Planning Commission	Mid-term

Agriculture		
The Town encourages an update of the Tunbridge Agricultural Survey.	Planning Commission	Mid-term
The Agricultural Advisory Committee shall support the agricultural community in Tunbridge.	Agricultural Advisory Committee	Mid-term
The Selectboard should consider possible municipal financial programs, such as tax abatements or low-cost loans, to support local agriculture.	Selectboard	Long-Term
Continue to encourage the Tunbridge Farmers' Market to promote agriculture in Tunbridge so that local buyers can utilize locally produced farm products.	Agricultural Advisory Committee	Mid-term
Landowners should consider all options thoroughly and should commit to the conservation easement process when it is appropriate for the long-term maintenance of specific properties.	Planning Commission	Long-Term
Large-scale agricultural operations, such as 300 heads of cattle on 3 acres of land or concentrated animal feeding operations, that negatively impact the health and quality of surface waters and air quality should be discouraged in Tunbridge.	Selectboard	Long-Term
Prime agricultural soils in Tunbridge should not be disrupted, damaged, or converted from their agricultural nature.	Planning Commission	Long-Term
Landowners in Tunbridge shall not fragment or subdivide the agricultural and forested parcels that have been conserved through easements.	Planning Commission	Long-Term
Land Use		
New development shall be similar in character and density with the surrounding area.	Planning Commission	Long-Term
All new development in all of Tunbridge's land use area shall be of a type, scale, and physical appearance that is consisted with existing land uses.	Planning Commission	Long-Term
Density of development in all of Tunbridge's land use area shall be similar to that of the area in which it is located.	Planning Commission	Long-Term
The scale of new buildings in a development shall be similar to others in the immediate area.	Planning Commission	Long-Term
Development in Tunbridge shall not result in a significant increase in traffic volume.	Planning Commission	Long-Term
Chain retail enterprises (including factory outlets, large grocery stores, fast food	Planning Commission	Long-Term

establishments and shopping malls) shall not be located in Tunbridge.		
Strip development (including but not limited to convenience stores, large chain retail stores, and fast food establishments) shall not be located outside Tunbridge's Village Center Areas.	Planning Commission	Long-Term
Development in Tunbridge shall support local needs of residents and shall foster the health of the local economy.	Planning Commission	Long-Term
Tunbridge should consider adopting subdivision regulations to protect the Town's forests, fields, and natural resources.	Planning Commission	Long-Term
New development shall not create an adverse impact on the aesthetic quality and existing character of North Tunbridge and Tunbridge Village Center Areas	Planning Commission	Long-Term
Tunbridge shall renew its village designations when they expire.	Planning Commission & Selectboard	Mid-term
The minimum lot size in the Working Landscape and Resource Conservation area can be as small as 1 acre, but density of this Working Landscape and Resource Conservation Area shall not exceed 1 principal year-round dwelling per 27 acres.	Planning Commission	Long-Term
Affiliated subdivisions in the Working Landscape and Resource Conservation Area, specifically multi-family units, shall not exceed 5 units per structure.	Planning Commission	Long-Term
No affiliated subdivision shall create more than 20 lots.	Planning Commission	Long-Term
Land in the Route 110 Corridor should be considered a priority for conservation.	Planning Commission	Long-Term
Land in the Special Flood Hazard Areas should be considered a priority for conservation.	Planning Commission	Long-Term
Tunbridge should consider adopting a 50-foot vegetated streambank setback buffer.	Planning Commission	Long-Term
Natural Resources		
The Town should conduct an inventory of wetlands and vernal pools to determine where, if any, wetlands that have not been mapped by the State of Vermont are located.	Conservation Commission	Mid-term
Flood hazard regulations should be extended to limit development in River Corridor areas identified as at risk to fluvial erosion.	Planning Commission	Long-Term

Tunbridge should consider prohibiting new development and maintaining vegetative buffers within 50 feet of surface water resources in Town.	Planning Commission	Long-Term
All substantial improvements to structures should be elevated 2 feet above base flood elevation (BFE).	Planning Commission	Long-Term
Tunbridge should continue working to update hazard mitigation plans and emergency preparedness and recovery procedures.	Planning Commission	Long-Term
The Town should continue to maintain and update town bridge and culvert inventories. This information should be used to develop a schedule to replace and update undersized structures.	Selectboard	Mid-term
Continue to support the White River Partnership water quality monitoring and watershed planning efforts of the First Branch, including projects identified in the 2014 White River Stream Geomorphic Assessment and River Corridor Plan.	Selectboard and Planning Commission	Short-term
Investigate mapping and improving public access to the river for recreational use.	Conservation Commission	Mid-term
Conduct a mapping study of groundwater resources in Tunbridge.	Conservation Commission	Long-Term
The planning commission should consider creating a policy regarding development and riparian buffer zones in future versions of this plan.	Planning Commission	Long-Term
Tunbridge shall participate in the White River Tactical Basin Planning Process in coordination with the Vermont Department of Environmental Conservation.	Conservation Commission and Planning Commission	Short-term
Tunbridge should develop a Source Water Protection Plan for the Drew Lot of the Town Forest, clarify deeded water rights from these sources, and develop a plan for future allocation.	Planning Commission	Long-Term
Develop an emergency operations protocol with the Tunbridge Trout Pond Association to manage water levels to mitigate flooding hazards during high intensity rain events.	Selectboard	Mid-term
Encourage owners of necessary habitat for threatened species to contact the State for assistance in developing a management plan for these sites.	Planning Commission	Long-Term
Tunbridge should consider the Town Garage parcel for potential future ledge extraction and	Selectboard	Long-Term

quarrying.		
Research what other communities in Vermont and elsewhere have done to minimize the spread of invasive plant species.	Conservation Commission	Mid-term
Advise utility crews, road crews, private landowners, and local excavators and construction works to take care to minimize the spread of invasive species such as Japanese Knotweed, Wild Chervil, Wild Parsnip, and Purple Loosestrife.	Conservation Commission	Mid-term
Whenever possible, road crew should mow roadsides before invasive species go to seed and wash equipment thoroughly after mowing areas with the presence of invasive species.	Road Foreman	Short-term
Educate landowners as to what invasive species look like and how to control their spread, possible through the printing of a basic document.	Conservation Commission	Mid-term
Energy		
The Tunbridge Town Energy Committee should continue to play an active role in increasing public awareness of energy conservation practices through educational efforts and to consider alternative energy sources in public facilities.	Tunbridge Energy Committee	Mid-term
The Tunbridge Energy Committee should pursue enhanced energy planning for this Town Plan, which can include project site planning recommendations for future renewable energy generation projects to the Selectboard.	Tunbridge Energy Committee	Mid-term
The Town should continue to investigate ways to reduce the cost of municipal energy use.	Selectboard	Mid-term
The Planning Commission should continue to identify areas in town that are appropriate for large and small-scale energy production, such as solar, wind, and hydro.	Planning Commission	Mid-term
The Town should investigate tax incentives that would encourage energy efficient siting of residents.	Planning Commission	Mid-term
Tunbridge should consider locally sourced biofuels, including wood pellets or cordwood, as a viable energy source for municipal buildings.	Planning Commission	Mid-term
Before a biomass energy generation facility is located in Tunbridge, developers should prove that their proposed project will not negatively impact the rural character of the community or	Planning Commission	Mid-term

the local road system.		
Tunbridge and its neighboring Towns should collectively strategize about how best to provide a local "mass transit" option that augments the services provided by established entities such as Stagecoach.	Tunbridge Energy Committee	Mid-term
Relationship to Other Plans		
To encourage continued communication between Tunbridge and its neighboring towns.	Planning Commission	Mid-term
To continue participation in the Two River-Ottauquechee Regional Commission.	Planning Commission	Short-term
To exchange planning information and development data with neighboring communities.	Planning Commission	Mid-term

"You can always amend a big plan, but you can never expand a little one. I don't believe in little plans. I believe in plans big enough to meet a situation which we can't possibly foresee now." ~ Harry Truman

MAPS

Transportation

Tunbridge, Vermont

Map 1 of 6

- TH cls 1 (village VT rt)
- TH cls 2
- TH cls 2 gravel
- TH cls 3
- TH cls 3 gravel
- TH cls 4 gravel
- TH cls 4 primitive
- TH cls 4 impassable
- VT forest hwy
- trail
- private
- VT route
- US route
- US interstate

Covered Bridges

DRAFT 2020

N

1:39,305

1 inch = 3,275 feet

0 0.5 1

Miles

POLITICAL BOUNDARIES: Town Parcel Boundaries, VCGI, 2003.
ROADS: 1:5000 Digital Road Centerline Project, VAOT, 1991-1994 & E911 Board GPS Updates, 2003.
SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2' quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2003.

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Current Land Use

Tunbridge, Vermont

Map 2 of 6

- TH cls 1 (village VT rt)
- TH cls 2
- TH cls 2 gravel
- TH cls 3
- TH cls 3 gravel
- TH cls 4 gravel
- TH cls 4 primitive
- TH cls 4 impassable
- VT forest hwy
- trail
- private
- VT route
- US route
- US interstate

- Public & Private Conserved Lands
- Parcels
- Wetlands
- Flood Plain (FEMA FIRM)

DRAFT 2020

N

1:40,050

1 inch = 3,337 feet

0 0.5 1

Miles

POLITICAL BOUNDARIES: Town Parcel Boundaries, VCGI, 2003. ROADS: 1:5000 Digital Road Centerline Project, VAOT, 1991-1994 & E911 Board GPS Updates, 2003.
STRUCTURES: E911 Board GPS Updates, 2003.
SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2' quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2003. FLOOD PLAIN: Digitized from FEMA Flood Insurance Rate Maps, TRORC. Floodplains for planning purposes only. Refer to the VANR-DEC, Water Quality Division, River Corridor Management Section, Floodplain Engineer for official determinations. (802) 241-3770 VSWI WETLANDS: These data include both NWI and VANR Class II wetlands. USFWS used 1:80000 color infrared aerial photos (flown between 1975 and 1978), USGS topo sheets and other mapped and text data to interpret locations. Two thirds were hand digitized from 1:24000 NWI Mylars. Remainder were scanned from 1:24000 or 1:25000 Mylars. Mylars were created by transferring wetland polygon boundaries from 1:25000 NWI Mylars to 1:24000 base maps. 3 acre min. mapping unit includes a 50' buffer. VANR updated as of 1996. Refer to the VANR-DEC, Water Quality Division, Wetlands Section, Wetlands Coordinator for official determinations. (802) 241-3770 DOQ: 1:5000 Digital Orthophotography flown 1995, 1996. 0.5 meter pixels. VT Mapping Program. PUBLIC CONSERVATION LANDS: Vermont Conserved Lands Database Project, 1:5000, UVM-SAL, TRORC, 2000. PARCELS: 1:5000 tax maps.

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Utilities, Facilities and Education

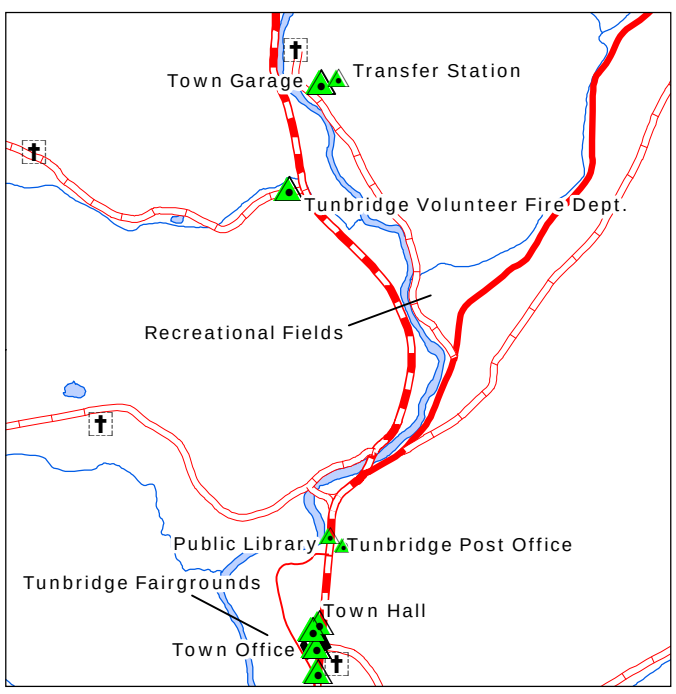
Tunbridge, Vermont

Map 3 of 6

- TH cls 1 (village VT rt)
- TH cls 2
- TH cls 2 gravel
- TH cls 3
- TH cls 3 gravel
- TH cls 4 gravel
- TH cls 4 primitive
- TH cls 4 impassable
- VT forest hwy
- trail
- private
- VT route
- US route
- US interstate

- Utilites, Facilites and Education
- Churches
- Cemeteries
- State Registered Water Supply
- E911 Addresses

DRAFT 2020



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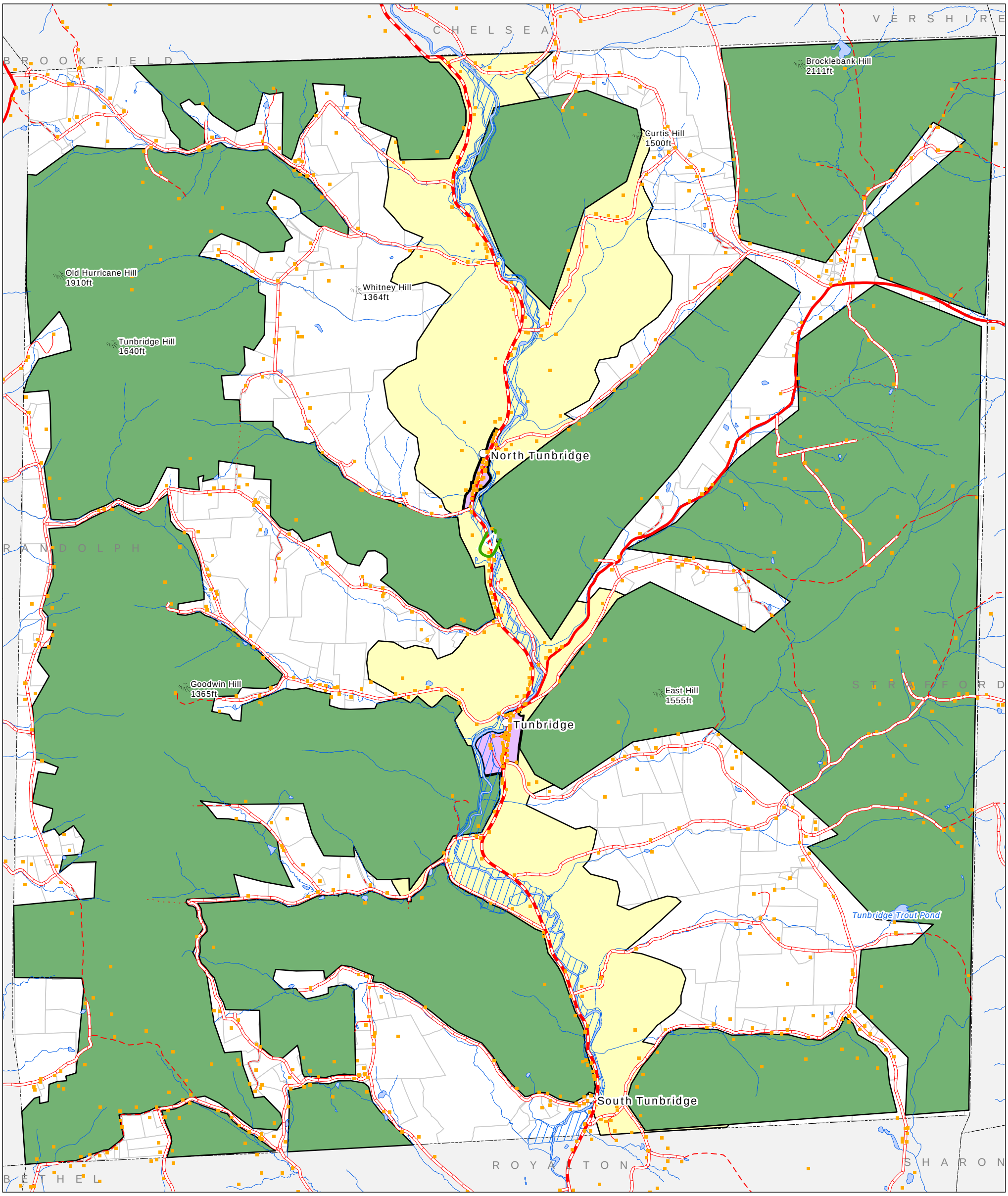
Future Land Use

Tunbridge, Vermont

Map 4 of 6



- TH cls 1 (village VT rt)
- TH cls 2
- TH cls 2 gravel
- TH cls 3
- TH cls 3 gravel
- TH cls 4 gravel
- TH cls 4 primitive
- TH cls 4 impassable
- VT forest hwy
- trail
- private
- VT route
- US route
- US interstate

- Route 110 Corridor Area
- Village Center Area/State Designated Village Area
- Residential/Agricultural Area
- Flood Hazard Area
- Working Landscape and Resource Conservation Area

N

1:39,412

1 inch = 3,284 feet

0 0.5 1

Miles

DRAFT 2020

POLITICAL BOUNDARIES: Town Parcel Boundaries, VCGI, 2003.
ROADS: 1:5000 Digital Road Centerline Project, VAOT, 1991-1994 & E911 Board GPS Updates, 2003.
SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2' quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2003.

TRORC
Two Rivers-Ottauquechee
REGIONAL COMMISSION
trorc.org

Farming in Tunbridge

Tunbridge, Vermont

Map 5 of 6

- VT route/TH cls 1
- TH cls 2
- TH cls 2 gravel
- TH cls 3
- TH cls 3 gravel
- TH cls 4
- trail
- private
- US route
- US interstate
- VT forest hwy

- Full-Time Farmer
- Part-Time Farmer
- Land in Current Use

- Beef
- Dairy
- Small Ruminants
- Grass
- Greenhouses/Vegetables
- Horses
- Syrup
- Timber

1:40,585

1 inch = 3,382 feet

0 0.5 1

Miles

DRAFT 2020

POLITICAL BOUNDARIES: Town Parcel Boundaries, VCGI, 2003.
ROADS: 1:5000 Digital Road Centerline Project, VAOT, 1991-1994 & E911 Board GPS Updates, 2003.
STRUCTURES: E911 Board GPS Updates, 2003.
SURFACE WATER: On-screen digitized from 1:5000 digital orthophotos using USGS 7 1/2' quadrangles and 1:20000 color infrared aerial photography as additional source material, VCGI for VHD-USGS, 2003.

Natural Resources

Tunbridge, Vermont

Map 6 of 6

DRAFT 2020

1 inch = 3,306 feet

- Statewide Ag Soils
- Prime Ag Soils
- Endangered Species
- Deer Wintering Areas
- Vermont State Wetlands
- Highest Priority Habitat Blocks
- Priority Connectivity Blocks
- Priority Interior Forest Blocks

0 0.5 1

Miles

Two Rivers-Ottauquechee REGIONAL COMMISSION

trorc.org

APPENDIX A
REPORT FOR THE TUNBRIDGE AGRICULTURAL AND FOREST LANDS SURVEY
APRIL 2006

Submitted by Daniel Ruddell
on behalf of the Tunbridge Planning Commission

Introduction

The Tunbridge Planning Commission, in conjunction with Two-Rivers Ottauquechee Regional Commission (TRORC), Mike Fiorillo's seventh grade students at the Tunbridge Central School, and a number of volunteers, conducted a survey of working lands in Tunbridge during 2005. Judie Lewis of the Tunbridge Listers office provided critical assistance at several stages of the project, which was greatly appreciated.

Input was strictly voluntary, and collected for informational purposes only. The hope was to have this information increase understanding of the current state of our working landscape, and to inform the updating of the Tunbridge Town Plan. The aim was to collect baseline information about working agricultural and forest lands in our town at the beginning of another century. Preliminary project materials including maps and photos were displayed at the Tunbridge Fair in September 2005, and we hope that a more full representation of the results will be similarly presented at next year's Fair. However, the primary purpose of the Survey was documentation of our relationship to the land and contributions to Tunbridge historical archives.

Methods

Based on a brief review of similar projects (which turned up surprisingly few precedents) and discussions by the Tunbridge Planning Commission and Two Rivers-Ottauquechee Regional Commission, an interview form was designed for the Tunbridge Agricultural and Forest Lands Survey 2005. Rob Howe, a dairy farmer in town, was kind enough to come for the first interview, conducted in class with the seventh grade at the Tunbridge Central School. This session gave us our initial inputs for the survey and also allowed us to revise the survey based on the interview process. A modified survey form that emerged from this process is listed as Appendix A.

The students, along with a number of adult volunteers, then traveled to a number of other farms to conduct on-site interviews. These interviews, and several others conducted by Planning Commission members and other volunteers, covered the majority of full-time farms in town. Additional interviews with part-time farmers, and people working lands in Tunbridge who do not consider themselves farmers, were conducted either in person or over the phone with the survey form as a guide.

Information from the surveys was entered into a geographic information system (GIS) utilizing both ArcView 3.2 and ArcGIS 9.0 platforms (Environmental Systems Research Institute, Redlands, CA). This permitted further analysis and display in conjunction with digital parcel maps maintained by the Town of Tunbridge (Fig. 1), as well as other "layers" of maps and information available through the Vermont Center for Geographic Information (VCGI).

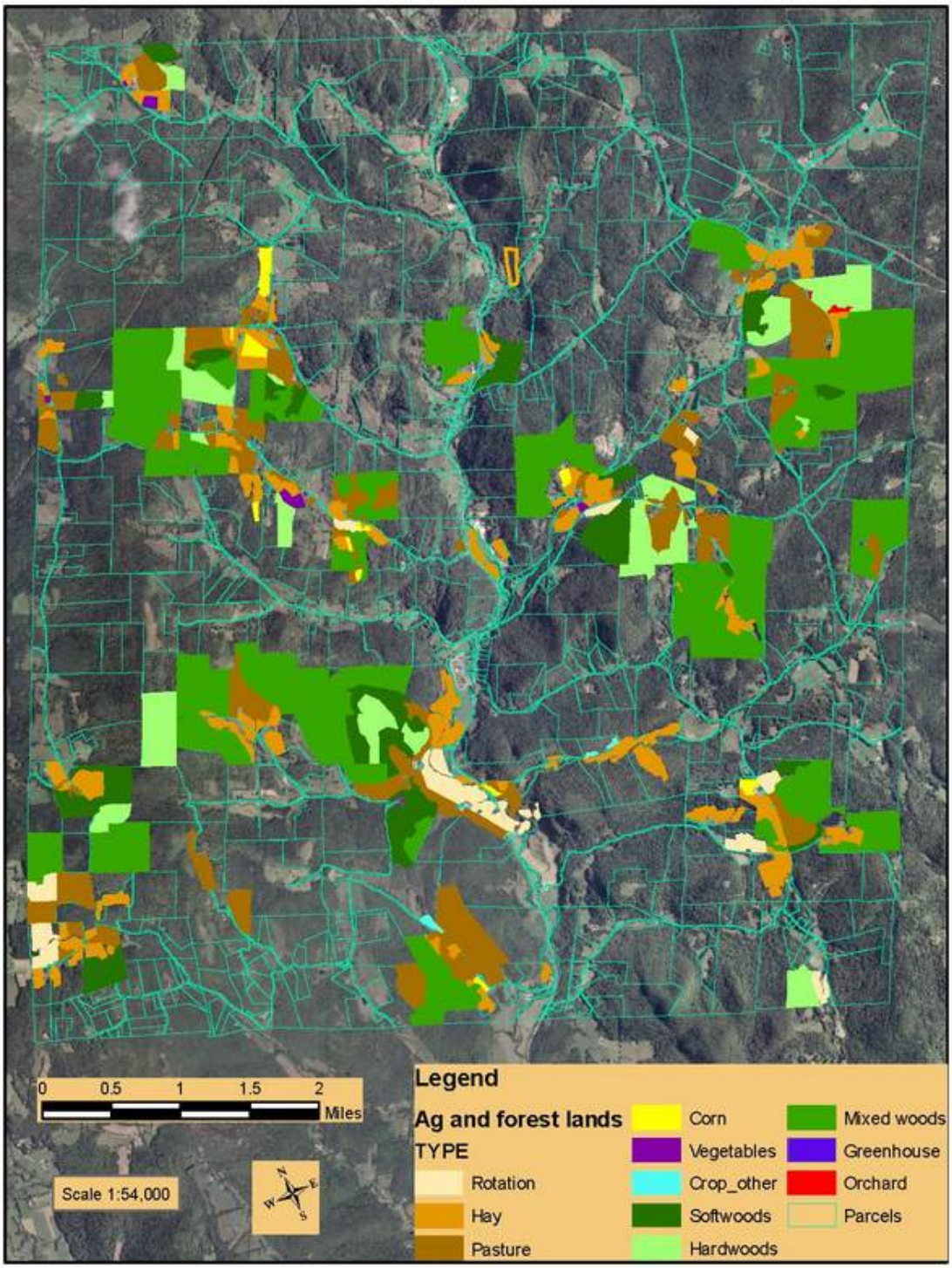


Figure 22.Preliminary field/stand-level mapping based on 2005 Tunbridge working lands survey in relation to town-maintained parcel maps (2005) and National Agricultural Imagery Program aerial photography (2003).

Results

Remotely-sensed land use information from VCGI (LCLU2002) indicates that, as of 2002, approximately 73.6% of the land in Tunbridge was forested, while roughly 14.2% was in agricultural use. In comparison, records maintained by the Tunbridge listers office indicate a lower percentage of wooded land (66.7%) and a higher percentage of agricultural lands (24.0% in combined "pasture" and "crop" categories) when broken out on a per parcel basis (Figure 2).

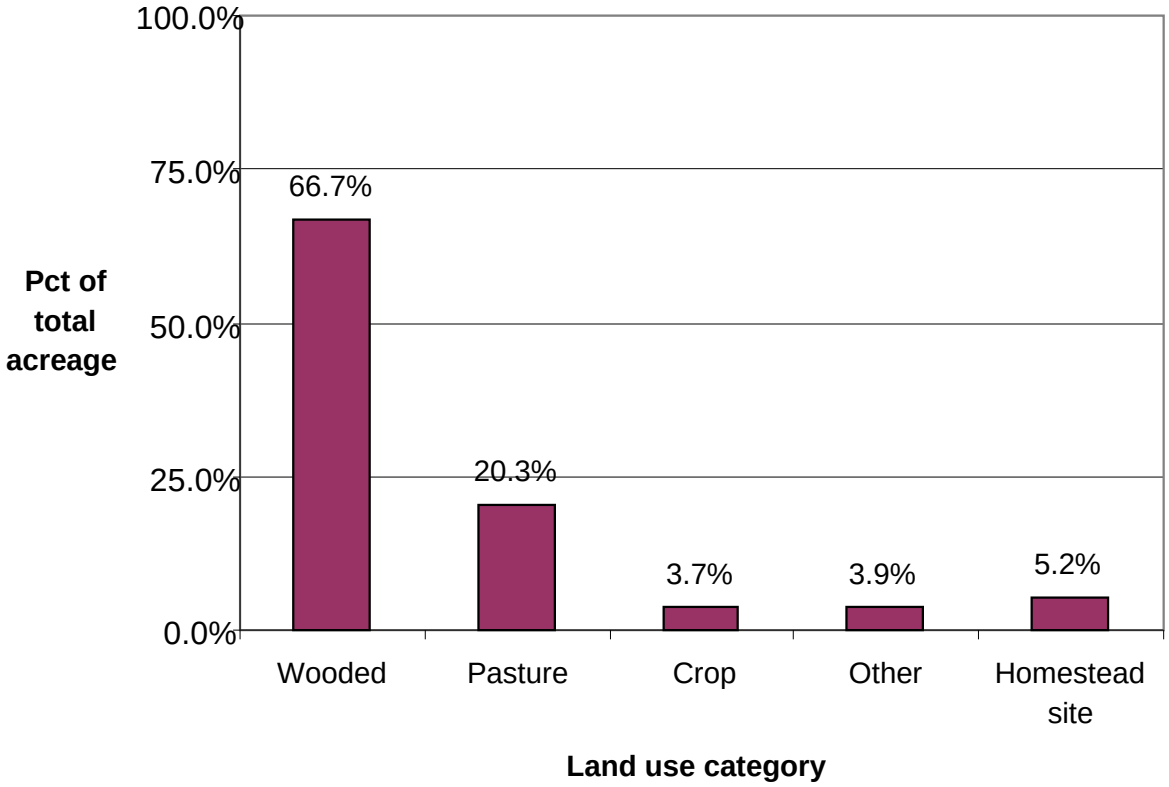


Figure 23. Lister records of land use category as percentage of total acreage, Tunbridge, VT, 2006.

It should be noted that linking of spatial information and lister records was incomplete, with acreage for this report calculated for only 812 parcels (Table 1, "Parcel count"). Records are maintained for 866 properties in Tunbridge, including utility locations, cemeteries, and unlanded properties. In total, acreages for 54 of these properties (including two wooded parcels of approximately 125 and 10 ac, plus one parcel of approximately 12 ac with roughly 10 of those in pasture) were not applicable or not obtained by the time of this report. Though acreage calculations from the lister records for 2006 had been entered, these figures had not been finalized and town parcel maps had not yet been updated to reflect property transfers, subdivisions, and other transactions. In addition, "other" or "miscellaneous" land classifications are sometimes applied to wooded and pasture lands as well as quarries, pits, and other settings. Thus, acreage calculations should be considered rough approximations only, based on best available information. Given these caveats, it is still helpful to get a rough assessment of these lands. Figure 3 offers a visual representation of wooded, crop, and pasture lands as a percentage of total parcel size throughout Tunbridge, based on 2005-2006 lister records.

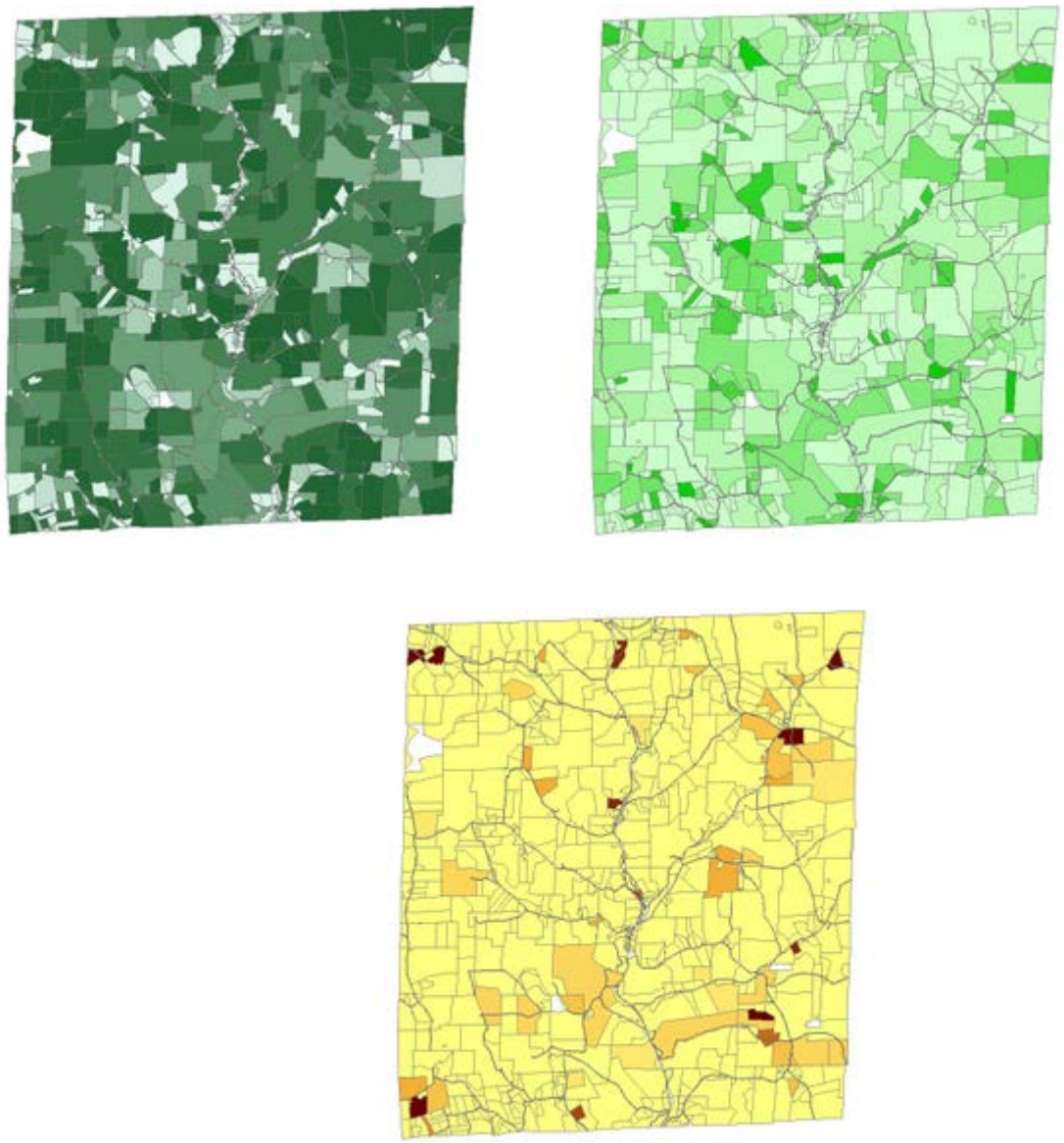


Figure 24. Wooded (top left), pasture (top right), and crop (bottom) as percentage of total parcel acreage based on lister records, Tunbridge, VT 2005-2006. Color gradation is based on 10 percent increments, with the darker colors reflecting higher percentage of land in the given category.

Public records available through the VT Department of Property Valuation and Review and maintained by the Tunbridge Listers office indicate that, as of the April 2017 annual update, there were 203 Tunbridge parcels enrolled in Use Value Appraisal (UVA). UVA, also known as “current use”, is a program designed to encourage maintenance of working lands through taxation of enrolled properties at use value rather than market value. The cumulative UVA-enrolled acreage in Tunbridge accounts for roughly half the land base of the town (Table 1)

Table 1. Land use category acreage statistics based on lister records, Tunbridge, VT, May 2006.

Statistic	Total ac	UVA ac	Wooded	Pasture	Crop	Other	Homestead site
Sum	27591.31	14360.47	18403.38	5587.58	1010.44	1087.24	1429.67
Pct. of total	100.0%	52.0%	66.7%	20.3%	3.7%	3.9%	5.2%
Parcel Count	812	156	464	282	58	167	749
Mean	33.98	92.05	39.66	19.81	17.42	6.51	1.91
Std. Dev.	55.45	79.78	51.49	23.33	15.84	5.35	0.81
Minimum	0	3	0.5	0.5	0.5	0.1	0.07
Maximum	521.1	521.1	519.1	178	93	49	10

As of May 2015, working lands survey interviews and data entry were completed for 80 landowners in Tunbridge. Twenty-four of the landowners interviewed were not enrolled in current use, and fourteen of these were engaged at least part-time in agricultural activities. The 56 interviewed that were enrolled in the Use Value Appraisal program included all landowners enrolled under the Farm (12 parcels) category. Additional interviewees participating in current use were enrolled in the Miscellaneous (6 parcels), Woodland (7 parcels), Residential 1 (1 parcel), Residential 2 (49 parcels), and Vacation 2 (3 parcels) categories. Town-wide UVA enrollment by category (not just those interviewed) is shown in Table 2.

Table 2. UVA program enrolled properties by category, Tunbridge, VT, May 2015.

Farm	12
Miscellaneous	30
Woodland	15
Residential 1 (less than 6 ac)	1
Residential 2 (more than 6 ac)	89
Vacation 2 (more than 6 ac)	9

There currently are 13 dairy farms working land in Tunbridge. Nine of the primary farm families working these lands reside in Tunbridge; this figure does not include other individuals or families employed on these farms. Generally, these farms employ one or two other individuals on a relatively full-time basis.

These farms work approximately 60-70% of the open lands in town. This is primarily for grass/legume production, both hay and pasture, with roughly 10% of Tunbridge's open land devoted to corn production (this figure includes areas in rotation, so actual corn land would be a lower figure in any given year).

The majority of the remainder goes to grass production for beef cattle, sheep, horses, and other livestock. Vegetables and other specialty items (flowers, Xmas trees, nursery stock) account for roughly one percent of the open land in agricultural use. Table 2 indicates the primary endeavor on parcels owned or worked by those interviewed, with dairying representing the leading endeavor in town and grass clearly being the dominant agricultural crop. Efforts were made to indicate when grasslands, in particular, were actually being worked by one of the 13 dairy farmers working land in Tunbridge.

Table 3. Primary endeavor on parcels owned by interviewees (90) through May 2006.
Results from Tunbridge, VT Agricultural and Forest Lands Survey 2005-2006.

Primary Endeavor	Total
Dairy	10
Grass associated with dairy (3 with timber, 1 with syrup also)	12
Rotations (crop/hay) assoc. with dairy (1 with timber also)	7
Grass (1 with syrup also)	16
Timber (1 with wildlife habitat, 7 with grass also; 3 of the grass assoc. with dairy)	14
Beef (1 with syrup also)	6
Sheep (1 with timber also)	5
Goats, llamas	4
Syrup	4
Horses	3
Vegetables	3
Horticulture (one with grass/dairy, one with vegetables also)	2
Christmas trees	1
Greenhouses - specialty	1
Mixed livestock	1
Wildlife habitat, recreation and biodiversity	1

At least 14 families in town have at least one member of the family working full-time in a farm endeavor. At least 13 more families or individuals are involved in part-time agricultural endeavors. At least 50 individuals or families in town keep animals, while no fewer than 40 keep home gardens.

Neither should we ignore our forested landscape. Euclid Farnham's wonderful books on the history of Tunbridge amply depict a change from 80% open land during the height of the sheep craze in the late 1800's to roughly 70% forested today. Vermont produces some of the finest sugar maple and other high-value hardwoods in the world and very few places see the kind of maple regeneration, in particular, that we get here in Orange County. Tunbridge sugarmakers can surely attest to the value of this resource, and survey results indicated there are at least 20 sugarmakers of varying scales in town; this does not include the folks that help in those operations. Generally, sugaring is integrated with other operations, with only 4 sugarmakers in town listing this as their primary endeavor.

Conclusion

The working landscape of the town should not be taken for granted. Repeatedly, interviewees emphasized that if we want our relationship to this land to remain strong, we have to figure out ways to make it profitable. Deputy Agriculture Commissioner David Lane, speaking at an ag issues forum hosted by the Planning Commission, emphasized that the economics of farming require ingenuity, creativity, and perseverance. The fact that there are as many active farms as there are in Tunbridge, where the landscape to some extent dictates a small-scale approach, is testament to these qualities in the hard-working folk who maintain that landscape. The ensuing discussion at the ag issues forum also clarified that farmers farm; land doesn't farm itself. Efforts to conserve working lands are most successful when those efforts are tied to capitalization of viable operations and fostering the creativity and efficiency of the people involved in them. Several speakers noted that efforts focused solely on protection of land can actually work to divert capital away from working lands if careful attention is not paid to these connections.

Agriculture in Tunbridge at the beginning of the twenty-first century presents a microcosm of transitions in agriculture throughout Vermont and the region. The number of active dairy operations in town has declined to a current level of nine actually located in Tunbridge, with four others in neighboring towns working lands in Tunbridge. David Lane noted that average dairy herd size in Vermont is approximately 120 milkers, while Tunbridge herds are primarily in the 40-50 cow range. These operations are representative of long-standing traditions in the area, where efficient operations, careful economies of scale, sales of breeding stock, diversification strategies and creative business practices have maintained the viability of dairying as a central component of Tunbridge's agricultural economy even given the challenges of the local topography and relatively low amount of "prime" agricultural lands. The steady decline of dairies in town, however, is also indicative of the pressures exerted by rising, development-based land values in the area and the vagaries of regional and national markets. The high level of participation in Use Value Appraisal programs by Tunbridge landowners is indicative of the success of that program in helping to maintain the natural resource base underlying our working landscape. We should remain aware, however, that this system is subject to the dictates of the political process and dependent on funding generated from taxes raised elsewhere.

Agricultural sector services require the maintenance of a critical mass to support related industries, and we are lucky to be in an area that still maintains many of these services. Local sugarmakers felt the impacts of another local equipment supplier closing up shop in the last year, and it doesn't take many half-to-full days fetching supplies and equipment to begin to appreciate having an intact agricultural economy in all its facets. The small stream-based mills of our past have largely gone by the wayside, and agricultural infrastructure is largely invisible to much of our population.

There are several thriving vegetable operations in town, and a strong tradition of home gardens continues to flourish. Small-scale Christmas trees, specialty greenhouses, a thriving horticultural enterprise (which provides the basis for the bulk of annual fundraising for the town Library), and a strong barter economy indicate just some of the more intensive uses of Tunbridge lands that comprise a less visible but no less vibrant face of Tunbridge agriculture. As noted frequently at community-wide meetings, however, the pastoral qualities of the Tunbridge landscape are strongly tied to the open land-base of animal-based agriculture. Tunbridge farmers have diversified operations to involve beef cattle, horses, sheep, llamas, goats, and poultry, primarily at a small scale and utilizing local and creative marketing opportunities. However, one dairy farmer interviewed noted that, with the transition of another farm out of dairying in Tunbridge in the last year, it was the first time in his memory that there appeared to be more hay land available in town than farmers to hay it. Additionally, it was noted at one of the 2005 Tunbridge community –wide planning input meetings that a common scenario in town is that marginal pasture lands are reverting to forest, while marginal haylands are now being pastured.

As is common in Tunbridge, this scenario has been perceived as both challenge and opportunity. It is notable that several voluntary efforts have been initiated to re-establish riparian buffers along the First Branch of the White River, contributing to farsighted and difficult decisions to help stabilize stream banks, provide cover to help lower elevated water temperatures, and improve water quality by reducing sedimentation. These are much less visible water quality issues, and thus require more foresight, understanding, and commitment, than some of the more obvious land use and sewage impacts to fisheries and stream health that presented an easier starting point for remediation efforts in the past. Several farms in town have undertaken organic growing and marketing practices. Farmer's markets currently operate in Chelsea on Wednesday afternoons and in South Royalton on Thursday afternoons. Cooperative markets in South Royalton and White River, in particular, have begun to emphasize and strengthen efforts to support local agriculture by "putting our money where our mouths are" and keep

money circulating within the local economy. Surrounding communities have embarked on efforts to increase connections between school lunch programs and local growers. Many of these efforts dovetail well with current discussions being initiated within Tunbridge to assess the implications and opportunities associated with coming changes in global oil production and energy supply shifts.

One farm family working lands in Tunbridge has recently purchased a local sawmill, helping diversify their operation and create value-added products from their lands as well as providing opportunities for others to do the same. Several other farmers similarly operate or maintain access to mills that have added to self-sufficiency over the years. Maple pest outbreaks and residual stress effects of drought years in the early 2000s saw some sugarmakers choose to rest their trees in the past couple years, indicating the kind of flexibility and wide vision that has kept Tunbridge working lands viable. While "prime" agricultural land may appear to be a precious commodity in Tunbridge, there is an understanding that the rich soils, ample water, and favorable bedrock that Tunbridge is founded upon offer sufficient opportunities for providing sustenance and well-guided enterprise.

It is clear that a working landscape embodies the character of Tunbridge that we hold dear. The maintenance of that character will require the same qualities of ingenuity, creativity and perseverance at a community level as David Lane noted is required at an individual level, and the best encouragement we can offer to all engaged in the continuation of these traditions. We hope that this survey might contribute in some small way to those efforts.

"There is a sufficiency in the world for man's need but not for man's greed."

~ Mohandas K. Gandhi

APPENDIX A.1
SURVEY FORM, TUNBRIDGE AG AND FOREST LANDS SURVEY
2005

Owner/Interviewee(s):
Interviewers:
Date:

How many acres of working lands do you have or use?

A. Land that you own:

B. Land that someone else owns:

Other landowners whose land you work (Please indicate rent, lease, other arrangement and approximate acreage):

Do you farm? FT (full time) PT (part time) N (no)

Any off-farm income? Y N

Do you plan to farm? Y N

Anyone in line to farm? Y N

Any plans to keep working lands in use? (Please specify)

Primary farm/woodlands endeavor(s) (e.g., dairy, vegetables, sheep, timber, Xmas trees)

Animals---type, how many

Agricultural lands. Please circle any that apply.

Row crops: Corn Vegetables Other Hay Pasture

Crop, other (please specify) Rotations (Please specify)

Value added products? (e.g., yogurt, cheese, bottled milk, salsa, tinctures, vinegar, juice)

Any markets? (Please specify)

Estimated annual sales (use an appropriate scale, e.g., lbs. of milk, no. of CSA customers, lbs. of meat or vegetables):

Is your land owner-worked? Y N

If not: Rented Leased

Other arrangement (please specify)

Worked by who?

Organic? Y N

Home garden? Y N

Forest lands

Do you have a forest management plan? Y N

Forester:

Primary management objective(s): Timber Wildlife habitat

Recreation Biodiversity Other (please specify)

Sugaring? How many taps?

Value-added products (e.g., sawn lumber, furniture, birdhouses, bowls, etc.)

Forest types: Please circle any that apply.

White pine Red pine Spruce/fir Northern hardwoods

Hemlock Oak Cedar

Mixed (please specify) Other (please specify)

Crop trees. Please indicate if the owner has (had), apples, butternuts, chestnuts, or other fruit or crop trees that are utilized (please specify).

THANK YOU!

Please feel free to record additional comments on the reverse side of this sheet.

APPENDIX B
FURTHER RESOURCES

Agriculture:

Agriview
Vermont Agency of Agriculture, Food and Markets
116 State St., Drawer 20
Montpelier, Vermont 05620
www.vermontagriculture.com/agriviewonline.htm

Consulting Foresters of Vermont
www.cfavt.org

Country Folks newspaper
www.countryfolks.com

Farm Journal
www.farmjournal.com

Miner Agriculture Research Institute
1034 Miner Farm Road, PO Box 90
Chazy, New York 12921
518-846-7121
518-846-8445 (fax)
www.whminer.com

Northeast Farmer Magazine
www.northeastfarmer.com

Northeast Organic Farming Association – Vermont
PO Box 697
Richmond, VT 05477
802-434-4122
802-434-4154 (fax)
www.nofavt.org

Northeast Organic Dairy Producers Alliance
30 Keets Rd
Deerfield, MA 01342
www.organicmilk.org

Orange County Forester - David Paganelli
5 Perry Street
Barre, VT 05641-4265
802-476-0173
david.paganelli@state.vt.us

Small Farmer's Journal
www.smallfarmersjournal.com

Smartwood
65 Millet Street, Suite 201
Richmond, Vermont 05477
802-434-5491
802-434-3116 (fax)
info@ra.org

USDA Natural Resources Conservation Service
28 FarmVu Drive
White River Junction, VT 05001-6001
802-295-7942
802-296-3654 fax

UVM Agricultural and Environmental Testing Lab (soil testing)
219 Hills Building
Burlington, VT 05405
802-656-3030

UVM Center for Sustainable Agriculture
63 Carrigan Drive
Burlington, VT 05405
802-656-5459
802-656-8874 (fax)
Sustainable.agriculture@uvm.edu

Vermont Agency of Agriculture
116 State Street
Montpelier, VT 05620
802-828-2416
www.vermontagriculture.com

Vermont Agency of Natural Resources
Division of Forests, Park and Recreation
www.vtfpr.org/htm/forestry.cfm

Vermont Beef Producer's Association
http://www.vermontbeefproducers.org/

Vermont Farm Bureau
2083 East Main Street
Richmond, VT 05477
802-434-5646
www.vtfb.org

Vermont Farm Service Agency
356 Mountain View Drive Suite 104
Colchester, VT 05446
802-658-2803
802-660-0953 (fax)

Vermont Land Trust
8 Bailey Ave
Montpelier, VT 05602
802-223-5234
info@vlt.org

Vermont Pasture Network/Vermont Grass Farmers Association
UVM Center for Sustainable Agriculture
63 Carrigan Drive
Burlington, VT 05405
802-656-5459
802-656-8874 (fax)
pasture@uvm.edu

Vermont Vegetable and Berry Growers Association
University of Vermont Extension
11 University Way
Brattleboro, VT 05301-3669
802-257-7967 ext. 13

Vital Communities
104 Railroad Row
White River Junction, VT 05001
802-291-9100
802-291-9107 (fax)

WDEV, 96.1 FM and 550 AM
Across the Fence

Women's Agricultural Network
617 Comstock Road, Suite 5
Berlin, VT 05602
802-223-2389
802-223-6500 (fax)
wagn@zoo.uvm.edu

Demographics:
Center for Rural Studies
University of Vermont
207 Morrill Hall
Burlington, VT 05405
Home page - http://crs.uvm.edu/
Agriculture - http://crs.uvm.edu/agriculture.htm
Human Services and Education - http://crs.uvm.edu/education/
Rural Community and Economic Dev. - http://crs.uvm.edu/economic.htm
U.S., State, Regional, & Local Gov. Sites - http://crs.uvm.edu/links.htm
VT State Data Center (U.S. Census Bureau info. and data - http://crs.uvm.edu/census/estimates/town/

Efficient Building/Housing:
BuildingGreen
http://www.buildinggreen.com/

EPA's Green Building Workgroup
http://www.epa.gov/greenbuilding/

Energy Star
http://www.energystar.gov/

Green Building Resource Center
http://www.globalgreen.org/gbrc/index.htm

Green Building Resource Guide
http://www.greenguide.com/

Greenhomebuilding
http://www.greenhomebuilding.comHousing resources
http://www.centralvtplanning.com/CVHRG.pdf

SustainableABC.com
http://www.sustainableabc.com/

What's Working Inc.
http://www.greenbuilding.com/

Energy:
Efficiency Vermont
http://ww.efficiencyvermont.org/pages/

Institute for Energy and the Environment, Vermont Law School
P.O. Box 96
South Royalton, VT 05068
802-831-1217
Michael Dworkin, Director; Jane D'Antonio, Institute Administrator

Sustainable Energy Resource Group
432 Ulman Rd., Thetford Center, VT 05075
802-785-4126
www.SERG-info.org

Land:
Act 250 Statutes, Title 10, Chapter 151: State Land Use and Development Plans
http://www.nrb.state.vt.us/lup/statute.htm

Land Use Institute, Vermont Law School
P.O. Box 96
South Royalton, VT 05068
802-831-1217
Kinvin Wroth, Director; Jane D'Antonio, Institute Administrator

Upper Valley Land Trust
19 Buck Road
Hanover, NH 03755
603-643-6626
www.uvlt.org

Use Value Appraisal (UVA, also known as Current Use) Program
802-828-5869
vttaxdept@tax.state.vt.us (e-mail)

Vermont Land Trust
8 Bailey Avenue
Montpelier, VT 05602
802-223-5234 or 800-639-1709
www.vlt.org

Natural Resources:
Conservation Reserve Enhancement Program
802-828-1289
http://www.vermontagriculture.com/CREPwebsite/Home/Home.htm
Laura Hanrahan, Statewide CREP Coordinator - laura@agr.state.vt.us
Brochure - http://www.vermontagriculture.com/CREPwebsite/Home/documents/CREPBrochure2.pdf

Consulting Foresters Association of Vermont
http://www.cfavt.org/

Vermont Agency of Natural Resources
http://www.anr.state.vt.us/index.cfm
River Corridor Planning - http://www.anr.state.vt.us/dec/waterq/rivers/docs/rv_mngmntalternatives.pdf
Vermont Wetlands Section Homepage - http://www.anr.state.vt.us/dec/waterq/wetlands.htm
Vermont River Corridors Management - http://www.anr.state.vt.us/dec/waterq/rivers.htm
(River Corridor Management, Flood Hazard Management, Geomorphic Assessment)

Vermont Department of Environmental Conservation
103 South Main Street
Waterbury, VT 05671-0401
802-241-3808
802-244-5141 (fax)
http://www.anr.state.vt.us/dec/dec.htm

Vermont Department of Environmental Conservation
Water Quality Division
103 South Main Street, Building 10 North
Waterbury, VT 05671-0408
802-241-3770 or 802-241-3777
802-241-3287 (fax)

Vermont Fish & Wildlife Department
103 South Main Street
Waterbury, VT 05671-0501
802-241-3700
http://www.vtfishandwildlife.com/

Vermont Department of Forests, Parks & Recreation
103 South Main Street
Waterbury, Vermont 05671-0601
802-244-1481 (fax)
http://www.vtfpr.org/

The Vermont Geological Survey
103 South Main St., Logue Cottage
Waterbury, VT 05671-2420
802-241-3608
802-241-4585 (fax)
http://www.anr.state.vt.us/dec/geo/vgs.htm

Vermont Rural Water Association
20 Susie Wilson Road, Suite B
Essex Junction, VT 05452-2827
802-660-4988 or 800-556-3792
866-378-7213 (fax)
http://www.vtruralwater.org

Vermont State Department Divisions & Offices
Business Office - 802-241-3650
Commissioner's Office - 802-241-3670
Conservation Education - 802-241-3651
Forestry - 802-241-3678
Lands - 802-241-3693
State Parks - 802-241-3655

White River Basin Plan
http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_wrbplan.pdf
Executive summary - http://www.anr.state.vt.us/dec/waterq/planning/docs/pl_wrbplan-execsum.pdf

The White River Partnership
99 Ranger Road
Rochester, VT 05767
(802) 767-4600
http://www.whiteriverpartnership.org/

Transportation:
National Center for Safe Routes to School
One National Life Drive, Drawer 33
Montpelier, VT 05633-5001
1-866-610-SRTS / 802-828-0059
http://www.saferoutesinfo.org/
John Kaplan, VT Safe Routes to School Coordinator, e-mail: jon.kaplan@state.vt.us

Stagecoach Transportation Services, Inc.
P.O. Box 356
Randolph, VT 05060
802-728-3773
http://www.stagecoach-rides.org

Statewide Transportation Improvement Plan
One National Life Drive, Drawer 33
Montpelier, VT 05633-5001
http://www.aot.state.vt.us/planning/STIPgeneral.htm
802-828-5578 Matthew Langham, Improvement Program Coord., e-mail:
matthew.langham@state.vt.us

Upper Valley Rideshare
P.O. Box 1027
Wilder, VT 05088
802-295-1824
http://www.uppervalleyrideshare.com/

Vermont Agency of Transportation
221 Beswick Drive
White River Junction, VT 05001
http://www.aot.state.vt.us/
802-295-8888 David E. Lathrop, AOT Manager District #4, e-mail: dave.lathrop@state.vt.us
802-828-9959 Tom Urell, Rte. 110 District Mgr, e-mail: tom.urell@state.vt.us

Vermont Park and Ride
One National Life Drive, Drawer 33
Montpelier, VT 05633-5001
http://www.aot.state.vt.us/parknride/
802-828-5609 Wayne Davis, Project Supervisor, e-mail: Wayne.Davis@state.vt.us

Vermont Public Transportation Association
212 Holiday Drive, Suite 1
White River Junction, VT 05001-2097
802-296-2143 / 877 5 RIDEVT
http://www.vpta.net/

Vermont State Rail Program
One National Life Drive, Drawer 33
Montpelier, VT 05633-5001
http://www.vermontrailroads.com/
802-828-1331 Dick Hosking, Operations Rail Program Manager, e-mail: Dick.Hosking@state.vt.us

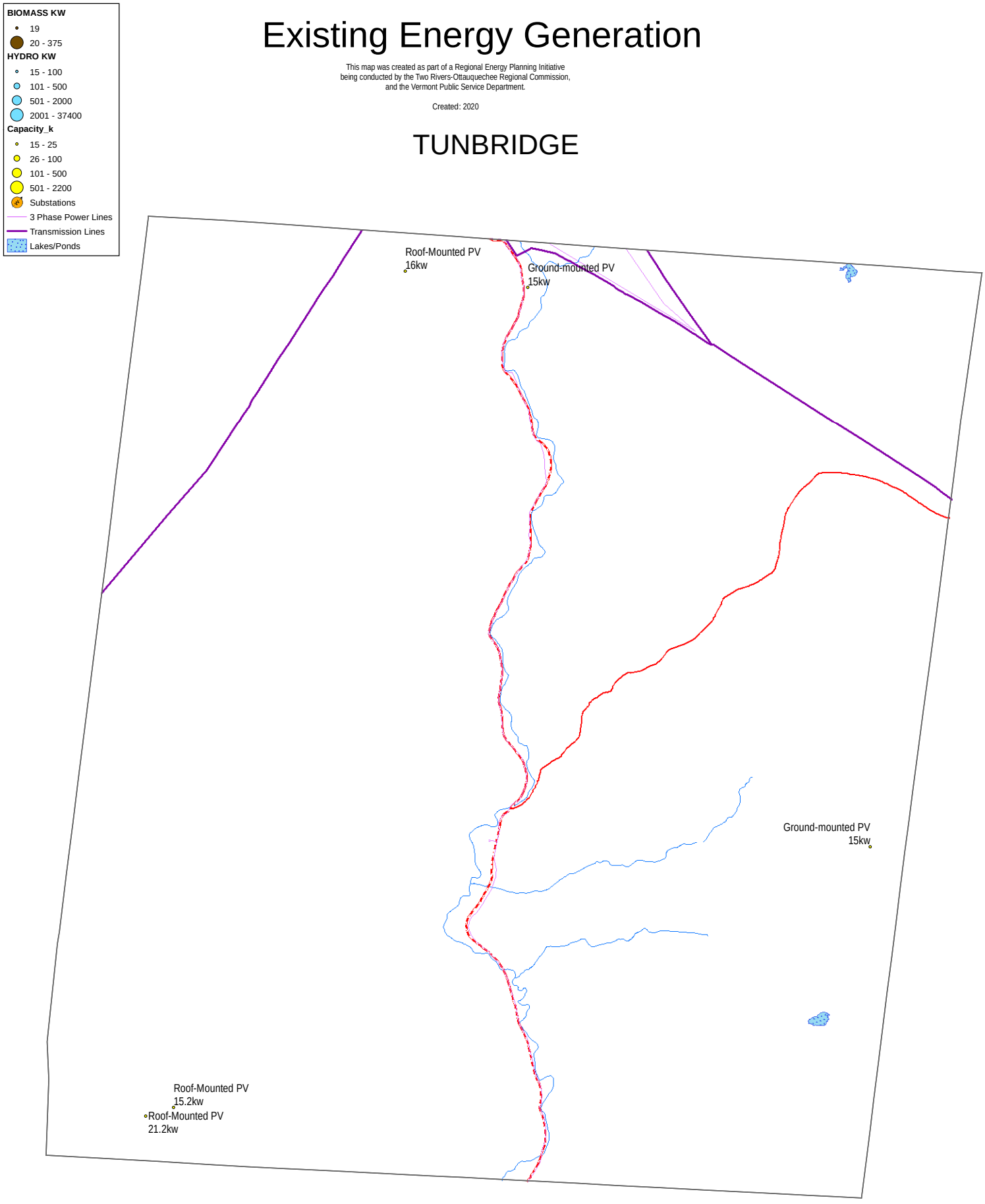
VTrans Public Transit
http://www.aot.state.vt.us/publictrans/transit.htm
802-864-0211 Charles Gallagher, Public Transit Administrator, e-mail: Charles.Gallagher@state.vt.us

Existing Energy Generation

This map was created as part of a Regional Energy Planning Initiative being conducted by the Two Rivers-Ottauquechee Regional Commission, and the Vermont Public Service Department.

Created: 2020

TUNBRIDGE



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Solar Energy Potential

This map was created as part of a Regional Energy Planning Initiative.
Created: 2020

TUNBRIDGE

- Substations
- 3 Phase Power Lines
- Structures w/1ac buffer

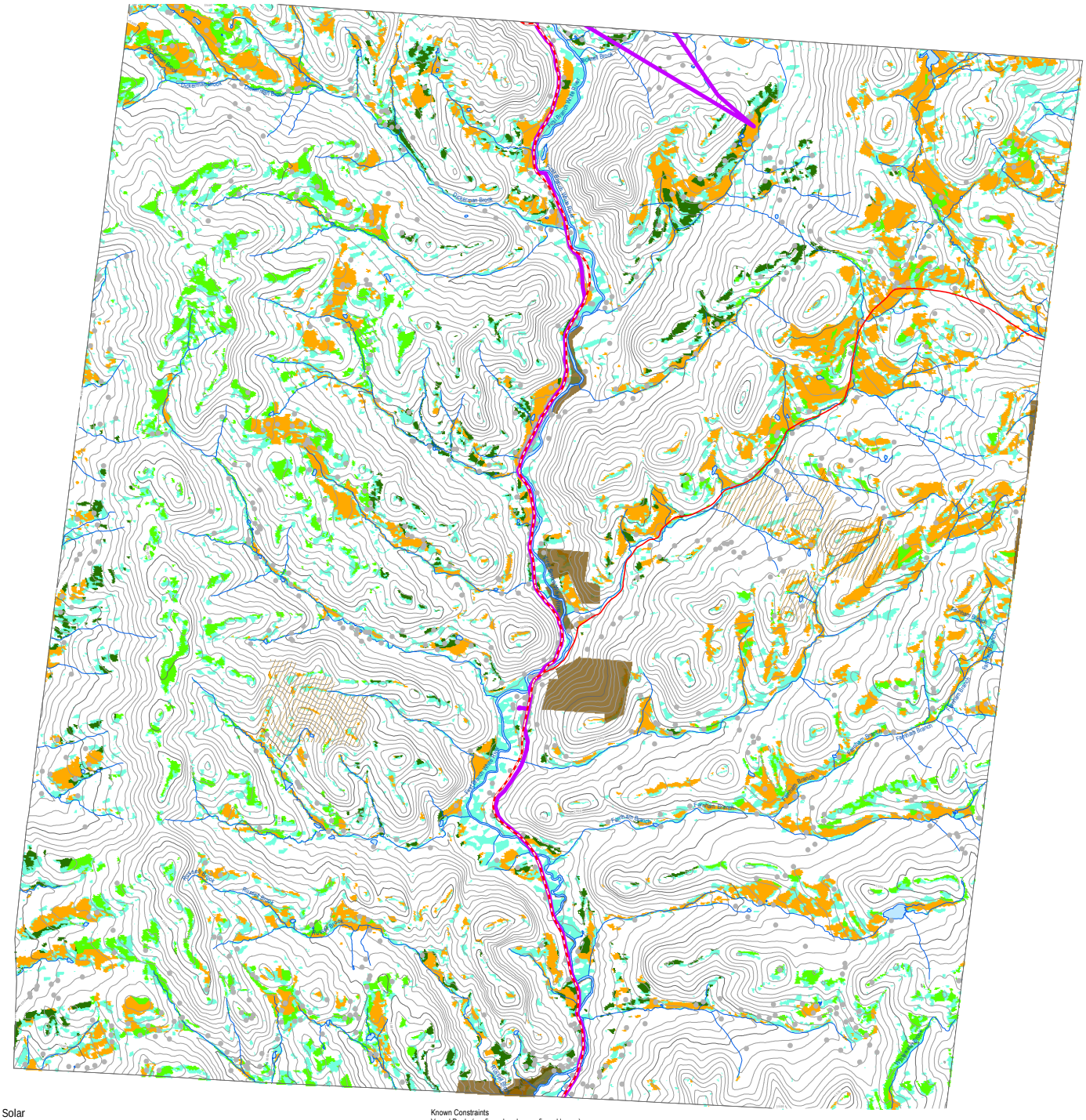
Conserved

- Public Cons
- Private Cons

SOLAR POTENTIAL

Suitability

- Prime
- Constraints
- Prime 1m 3phase
- RAW solar



Solar
This map shows areas of potential electricity generation from solar energy. It includes areas with good access to solar radiation and also considers other conditions that may limit the feasibility of solar energy development. These limiting factors are referred to as constraints. Areas of prime solar potential exist where the natural conditions make development feasible and no constraints are present.

These maps are designed to initially identify areas and follow-up on-site work is required to verify the areas are feasible for projects. They are subject to revision and are NOT intended to green-light or fast-track projects.

DARK GREEN Prime: No Constraints within 1 mile 3 phase power
GREEN Prime: No Constraints no known or possible constraints present
ORANGE Constraints no known but at least one or more possible constraints
BLUE GREEN Raw potential with constraints

Known Constraints
Vernal Pools (confirmed and unconfirmed layers)
DEC River Corridors
FEMA Floodways
State-significant Natural Communities and Rare, Threatened, and Endangered Species
Wilderness Areas, including National Wilderness Areas
Class 1 and Class 2 Wetlands (VSWI and advisory layers)

Possible Constraints
Agricultural Soils (VT Agriculturally Important Soil Units)
FEMA Special Flood Hazard Areas
Protected Lands (Updated 07/26/2016.)
Act 250 Agricultural Soil Mitigation areas
Deer Wintering Areas
ANR's Vermont Conservation Design Highest Priority Forest Block Datasets
Forest Blocks - Connectivity
Forest Blocks - Interior
Forest Blocks - Physical Land Division
Hydric Soils

TRORC Unsuitable areas (included in known constraints)
FEMA Floodways
Wilderness Areas, including National Wilderness Areas
Class 1 Wetland

N

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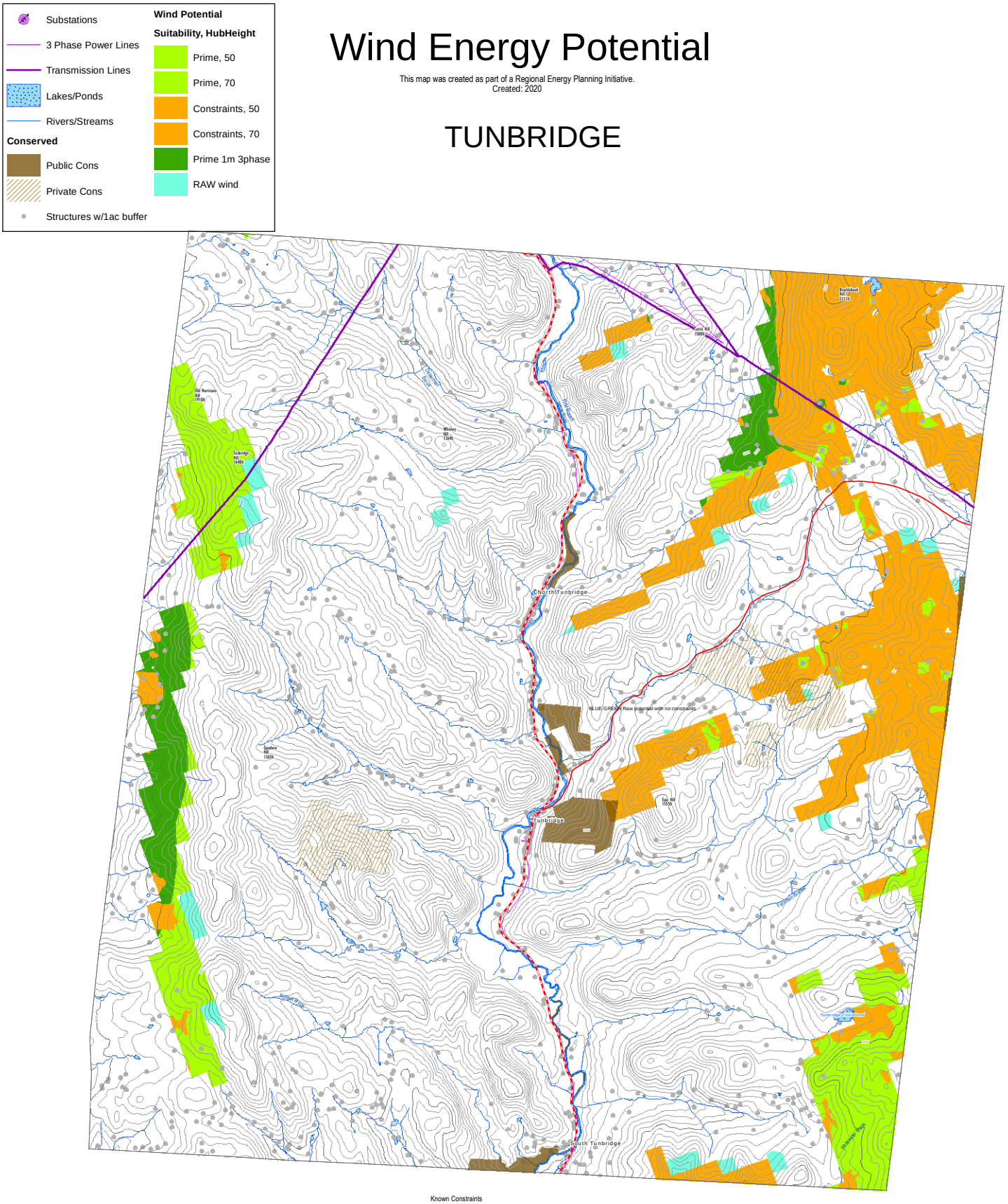
0 0.475 0.95 1.9
Miles

Wind Energy Potential

This map was created as part of a Regional Energy Planning Initiative.
Created: 2020

TUNBRIDGE



Wind
This map shows areas of potential wind energy development. It includes areas with good access to wind resources and also considers other conditions that may limit the feasibility of wind energy development. These limiting factors are referred to as constraints. Areas of prime wind potential exist where the natural conditions make development feasible and no constraints are present.

These maps are designed to initially identify areas and follow-up on-site work is required to verify the areas are feasible for projects. They are subject to revision and are NOT intended to green-light or fast-track projects.

DARK GREEN Prime: No Constraints within 1 mile 3 phase power
GREEN Prime: No Constraints no known or possible constraints present
ORANGE Constraints no known but at least one or more possible constraints
BLUE GREEN Raw potential with constraints

Known Constraints
Vernal Pools (confirmed and unconfirmed layers)
DEC River Corridors
FEMA Floodways
State-significant Natural Communities and Rare, Threatened, and Endangered Species
Wilderness Areas, including National Wilderness Areas
Class 1 and Class 2 Wetlands (VSWI and advisory layers)

Possible Constraints
Agricultural Soils (VT Agriculturally Important Soil Units)
FEMA Special Flood Hazard Areas
Protected Lands (Updated 07/26/2016.)
Act 250 Agricultural Soil Mitigation areas
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Hydric Soils

TRORC Unsuitable areas (included in known constraints)
FEMA Floodways
Wilderness Areas, including National Wilderness Areas
Class 1 Wetland

N

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0 0.5 1 2
Miles

Municipal Template - Energy Data

The following is an explanation of the information displayed in the Municipal Template for Tunbridge.

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.

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)

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 on 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.

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 2011-2015)	988
Average Miles per Vehicle (VTrans)	11,356
Total Miles Traveled	11,219,728
Realized MPG (VTrans)	18.6
Total Gallons Use per Year	603,211
Transportation BTUs (Billion)	73
Average Cost per Gallon of Gasoline (RPC)	2
Gasoline Cost per Year	1,393,418

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 2011-2015)**	**Municipal % of Households**	**Municipal Square Footage Heated**	**Municipal BTU (in Billions)**
Natural Gas	10	1.8%	1,070,400,000	1
Propane	119	21.6%	11,943,180,000	12
Electricity	0	0.0%	0	0
Fuel Oil	124	22.5%	12,384,900,000	12
Coal	3	0.5%	321,120,000	0
Wood	289	52.5%	28,924,740,000	29
Solar	0	0.0%	0	0
Other	6	1.1%	642,240,000	1
No Fuel	0	0.0%	0	0
Total	**551**	**100.0%**	**55,286,580,000**	**55**

This table displays data from the ACS that estimates current 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	16	0.725	12

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)	4,448,085
Commercial and Industrial (kWh)	2,433,716
Total (kWh)	6,881,801

*This table displays current electricity use within the municipality with data from the ACS, DPS, and VT DOL. More accurate data will be available soon from Efficiency Vermont (EVT).

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)	56	147	310

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	49.3%	61.8%	92.9%

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)	7,209- 8,811

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	92	648	1,349

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	161	303	511

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	0.11	135
Wind	0.00	-
Hydro	0.00	-
Biomass	0.00	-
Other	0.00	-
Total Existing Generation	**0.11**	**135**

Table 1O shows existing renewable generation in the municipality as of 2015, in MW and MWh, based on information available from the Vermont Department of Public Service.

1P. Renewable Generation Potential

Renewable Type	MW	MWh
Rooftop Solar	1	774
Ground-mounted Solar	432	530,265
Wind	1,177	3,607,916
Hydro	0	1,272
Biomass and Methane	0	0
Other	0	0
Total Renewable Generation Potential	**1,610**	**4,140,226**

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)	7,209- 8,811

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	51588%

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.