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Restorative Streetscapes: Promoting Positive Mental Health Outcomes through Urban Landscape Design in Winooski, Vermont

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Restorative Streetscapes:

Promoting Positive Mental Health Outcomes
Through Urban Landscape Design
in Winooski, Vermont



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Masters of Landscape Architecture Final Project
By Sean Fitzsimmons
May 13, 2022

Restorative Streetscapes:

Promoting Positive Mental Health Outcomes
Through Urban Landscape Design
in Winooski, Vermont

**A Masters Project Presented by
Sean Fitzsimmons**

**Master of Landscape Architecture
May 13, 2022**

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Abstract

The global health burden of mental health disorders is immense. The World Health Organization ranks depression as the single largest contributor to global disability; anxiety disorders alone rank sixth. One in four people will have a diagnosable mental illness in their lifetime and mental health conditions are increasing worldwide, rising 13% in the last decade. The economic implications are also immense, costing the global economy US \$1 trillion each year. Mental health is more than the absence of disorders or disabilities, however. It is defined by the WHO as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community.” Determinants of mental health include social, cultural, psychological, biological, economic, political, and environmental factors. Despite the complex interaction of contributing factors that determine an individual’s mental health condition, a growing body of research has found the built environment to be an important determinant (Evans 2003; Firdaus 2017; Satcher, Okafor, and Dill 2012). Streets are, in turn, the most prominent element of the urban public realm, and they represent an important opportunity to implement landscape-based features that may improve a community’s mental health and well-being. This project will generate a landscape design plan for streetscapes in Winooski, VT that strives to promote improved well-being and mental health for local residents. The city of Winooski was selected because it is the most ethnically diverse and one of the poorest towns in the state of Vermont (of towns with more than 2,000 people) according to the American Community Survey. Even though community mental health data is hard to access, low socio-economic status and ethnic minority neighborhoods are risk factors for poor mental health.

KEYWORDS: mental health well-being urban design landscape design streets streetscapes Winooski Vermont

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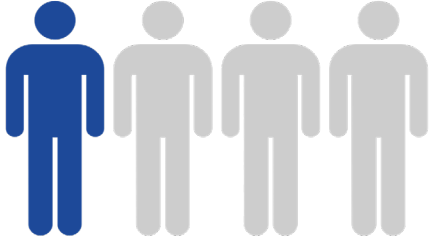
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Introduction

The global health burden of mental health disorders is immense. The World Health Organization ranks depression as the single largest contributor to global disability; anxiety disorders alone rank sixth (“Depression and Other Common Mental Disorders: Global Health Estimates” 2017). One in four people will have a diagnosable mental illness in their lifetime and mental health conditions are increasing

1 in 4

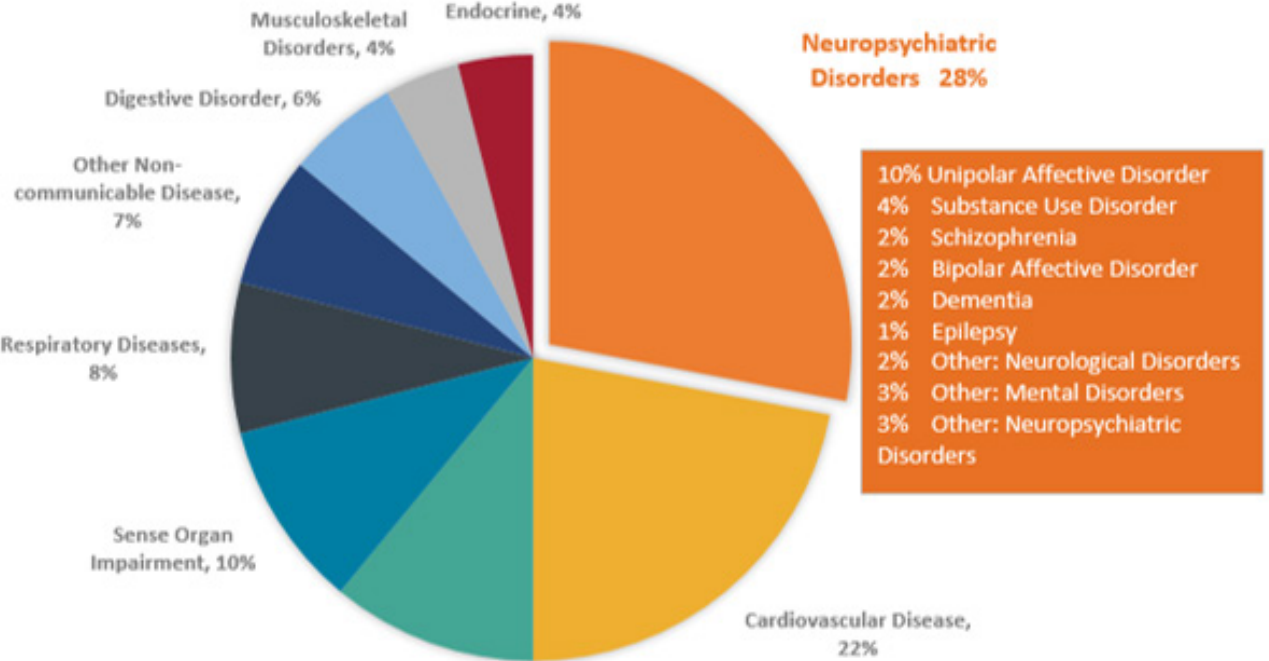
diagnosable mental illness in their lifetime



worldwide, rising 13% in the last decade (“What Is Mental Health?” n.d.; “Mental Health” n.d.). The economic implications are also immense, costing the global economy US \$1 trillion each year (“Mental Health” n.d.).

Mental health is more than the absence of disorders or disabilities,

GLOBAL YEARS LIVED WITH DISABILITY (YLDs)



- 10% Unipolar Affective Disorder
- 4% Substance Use Disorder
- 2% Schizophrenia
- 2% Bipolar Affective Disorder
- 2% Dementia
- 1% Epilepsy
- 2% Other: Neurological Disorders
- 3% Other: Mental Disorders
- 3% Other: Neuropsychiatric Disorders

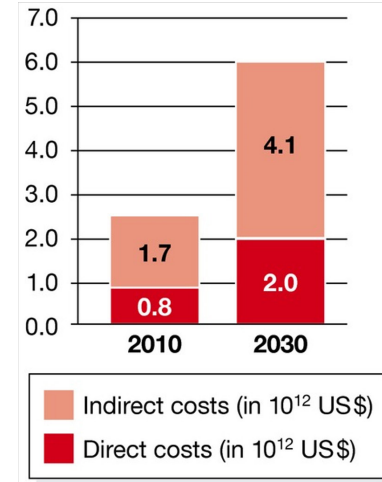
however. It is defined by the WHO as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community” (“Mental Health:

ECONOMIC BURDEN OF MENTAL HEALTH:

4% of GDP

\$ 1 Trillion =

global cost of depression and anxiety alone



Strengthening Our Response” n.d.). Determinants of mental health include social, cultural, psychological, biological, economic, political, and environmental factors (“Mental Health | Healthy People 2020” n.d.; “Mental Disorders” n.d.). Despite the complex interaction of contributing factors that determine an individual’s mental health condition, a growing body of research has found the built environment to be an important determinant (Evans 2003; Firdaus 2017; Satcher, Okafor, and Dill 2012; Francis et al. 2012). Streets are, in turn, the most prominent element of the urban public realm, and they represent an important opportunity to implement landscape-based features that may improve a community’s mental health and well-being.

This project will generate a landscape design plan for streetscapes in Winooski, Vermont that strives to promote improved well-being and mental health for local residents. The city of Winooski was selected because it is the most ethnically diverse and one of the poorest towns in the state of Vermont (of towns with more than 2,000 people) according to the American Community Survey. Even

though community mental health data is hard to access, low socio-economic status and ethnic minority neighborhoods are risk factors for poor mental health. Winooski is a former mill town that struggled economically and with how to identify or reinvent itself after the mills closed in the 1950s. By the end of the twentieth century Winooski was mostly viewed as Burlington’s poor cousin. However,

in the last two decades public investment and demographic trends have reinvigorated the city. Winooski’s character is now, perhaps, best encapsulated in the phrase “the Brooklyn of Burlington”. The population trends much younger and much more diverse than the rest of Vermont. These trends support the

SOCIAL DETERMINANTS OF HEALTH



city's inclusive vision but the city is not without its difficulties, including high housing costs, lower than state average incomes, and aging infrastructure.

Of the city's nearly 8,000 population nearly twenty percent are New Americans and refugees, but the city is still predominantly white. The city has grown by a rate of ten percent per decade since 2000. As a result of the influx of a younger population and immigrant population new businesses and restaurants have repopulated formerly vacant downtown spaces. As the downtown revitalized and new housing complexes developed housing costs rose. The city is now focused on investing in existing housing (through preservation and rehabilitation) as opposed to focusing on creating new affordable housing. The city is concerned about gentrification due to its low rental vacancy rate and other indicators but is carefully monitoring its efforts to improve the quality of its housing to ensure it maintains its reputation as a welcoming community. The city has the highest rate of renter households in the state and more affordable housing per capita than any other community. However, average monthly rents in Winooski are far

higher than what people should be paying based on the incomes of existing renters in the community. In addition to trying to manage issues related to population growth and affordable housing, the city is also trying to manage issues related to poverty and drug use. However, the city continues to present itself as a welcoming place for young Vermonters and New Americans.



RESEARCH QUESTIONS:

How do we design urban landscapes to improve mental health?

And what would implementation of those practices look like in Winooski, Vermont?

OBJECTIVES:

1. Explore what design and planning strategies are supported by evidence to improve mental health outcomes in a given population.
2. Apply these design strategies to a case study site.
3. Develop a set of design options for the town of Winooski.

METHODS:

1. Review peer reviewed literature on community landscape design and mental health.
2. Interview 2 stakeholders in the Winooski community to understand Winooski's unique needs.
3. Review municipal and historical documents to understand the social and environmental context of Winooski.
4. Research through the design process: discover solutions to the design problem by engaging creatively with the case study site.
5. Synthesize evidence-based design principles and the unique needs of the Winooski community into a rendered landscape design product through application of hand and digital design tools.

Literature Review

Impact of the built environment on mental health

There have been many studies focused on the built environment's impact on physical health. Fewer studies have focused on the built environment's impact on mental health, but this area of research is growing (Francis et al. 2012). "As a health determinant, the term built environment refers to a material, spatial, and cultural product of human labor, including the places in which people work, live, play, and socialize" (Firdaus 2017, 63). Research by Evans (2003) shows that the built environment has both direct and indirect effects on mental health. Environmental characteristics with direct effects include housing, crowding, noise pollution, indoor air quality, light, and fear of crime (Evans 2003; Firdaus 2017). The built environment also affects psychosocial processes such as personal control, social support, and restoration from stress and fatigue. These processes

indirectly influence mental health outcomes (Evans 2003). A systematic review by Clark et al. reveals four possible ways that the built environment can influence mental health: (i) as a source of stress leading to physiological changes stimulated by increased secretion of stress-related hormones, (ii) as an influence over social networks and support, (iii) through symbolic effects and social labelling, and (iv) through the action of the planning process (2007). Increasing evidence from both cross-sectional and longitudinal studies suggest that both structural and social attributes of the local built environment can affect the mental health of its residents (Ram et al. 2017; Mair, Roux, and Galea 2008).

Compared to rural living, the physical and social environments of urban living can contribute both positively and negatively to mental health and wellbeing ("How the City Affects Mental Health" n.d.). Research by Peen et al. shows that urban living is associated with an increase in mood disorders by up to 39%, an increase in anxiety disorders by up to 21%, and double the risk of schizophrenia (2010). However, urban living is also associated with a decrease in suicide risk by almost half ("QuickStats: Age-Adjusted

Rates for Suicide,* by Urbanization of County of Residence† — United States, 2004 and 2013" 2015), a decrease in dementia by 10% (Russ et al. 2012), and half the risk of Alzheimer's disease (Nunes et al. 2010). Urban living is also associated with an increase in rate of cocaine and heroin addiction, but a decrease in alcohol, marijuana, methamphetamine, and prescription drug abuse (SAMHSA 2012). Although many built environment mental health studies try to account for confounding factors, it is infeasible to consider them all (Litman 2021).

Though the issues surrounding the relationship between the built environment and mental health are complex, there is literature that suggests four main landscape-based interventions for promoting better mental health outcomes in a community. These four planning and design strategies are (i) providing accessible green spaces, (ii) providing physical activity spaces, (iii) providing pro-social spaces, and (iv) providing a sense of safety and security (Litman

2021; "How Urban Design Can Impact Mental Health" n.d.).

Green spaces and mental health

Although green space is an area of extensive research, the term itself has been poorly defined across disciplines (Taylor and Hochuli 2017). Taylor and Hochuli provide two interpretations of green space. First, as a reference to "bodies of water or areas of vegetation in a landscape, such as forests and wilderness areas, street trees and parks, gardens and backyards, geological formations, farmland, coastal areas and food crops" and, secondly, as a subset of that definition, a reference to "urban vegetation, including parks, gardens, yards, urban forests and urban farms – usually relating to a vegetated variant of open space" (2017, 29). In the discussion of green space and mental health that follows the second definition is more applicable. For policy considerations it is important to focus on green space that is open to the public, particularly when considering universal green space access for all residents, regardless of socioeconomic status ("Urban Green Spaces and Health" 2016).

Urban green space is recognized

as an important environmental determinant of health, with the potential to protect mental health by regulating stress and relieving the symptom severity of specific psychiatric disorders such as schizophrenia, post-traumatic stress disorder, dementia, attention deficit/hyperactivity disorder, and mood disorders such as depression and anxiety (Roe 2016). The World Health Organization report on Urban Green Spaces and Health (2016) documents several pathways in which access to green space can improve mental health: enhanced physical activity, stress reduction, and social contact. All three pathways share a reciprocal relationship wherein one promotes or leads to another (Roe 2016).

Active living spaces and mental health

Active living is a way of life that integrates physical activity into daily routines such as walking to the store or biking to work (Edwards and Tsouros 2006). Associations between physical activity and mental well-being have been documented repeatedly over the last several decades. Numerous population-based studies provide evidence for an association between aerobic exercise and mental health. Individuals who exercise at least twice a week experience significantly less depression, anger, stress, and cynical distrust than those who exercise less

frequently or not at all. Research has shown a negative association between regular physical activity and major depression as well as anxiety disorders. In addition to consistent findings in correlational studies, experimental studies have also confirmed that aerobic exercise has consistent effects on promoting mental well-being (Stathopoulou et al. 2006).

Built environment attributes are related to physical activity (Heath et al. 2006) and therefore to either the promotion of or impediment to mental well-being. Features of the built environment related to physical activity include macroscale features such as mixed land use, street connectivity, residential density, and proximity to recreation facilities, and microscale features such as pedestrian and bicycle facilities, intersection characteristics, and aesthetics (Sallis et al. 2015). Access to physical activity facilities such as parks and gyms, access to public transportation, and mixed land use have been shown to increase active transport (walking and biking) (Heath et al. 2006; Edwards and Tsouros 2006). Microscale features as environmental details have a more direct impact on the experience of being active in a place (Cain et al.

2014). A critical advantage of many microscale environmental features is that they are modifiable at a lower cost and in a shorter time-frame than reconfiguring the macroscale design (Sallis et al. 2015; Cain et al. 2014).

A study by Sallis et al. (2015) shows significant associations between 14 different microscale features and active transport amongst all age groups.

Pro-social spaces and mental health

The link between social isolation and reduced mental well-being is well established (Hare Duke 2017; Kawachi 2001; Teo and Chum 2020). Smaller social networks, fewer close relationships, and lower perceived adequacy of social support have all been linked to depressive symptoms. Most researchers agree that social ties have a beneficial effect on mental health and psychological well-being (Kawachi 2001). Individuals' closest social networks and social support are embedded within a broader set of macrosocial exchanges. The broadest layer of social ties includes those consisting of involvement in the community and although these ties do not necessarily impose

“intense” interactions, they do provide “a sense of belongingness and general social identity, which sociological theorists have argued as being relevant for the promotion of psychological well-being” (Kawachi 2001, 463).

Research that has examined the relationship between the built environment and social well-being has found associations between urban form with social capital and sense of community, both of which are determinants of mental health (Mouratidis 2018). Elements of the built environment that promote social well-being include shorter distances to a city center, higher density, mixed land uses, access to “third places” such as community centers, parks and cafes, access to public transport, sidewalks, and fine-grain street fronts (Mouratidis 2018; Litman 2021). Communities built to encourage multiple modes of transportation may also bring people together in shared public places (Leyden, Goldberg, and Michelbach 2011). Compact, walkable neighborhoods provide opportunity for daily, informal social interactions which can lead to ongoing relationships (Litman 2021). These relationships can lead to social support, community belonging, and trust in others which are significantly associated with positive mental health outcomes. Perceived family and friend network size are protective

factors against common mental health disorders, personality dysfunction, and psychotic experiences (Alegría et al. 2018). Research by Leyden, Goldberg, and Michelbach (2011) suggests that self-reported happiness of city residents is associated with aspects of the built environment that affect social connections.

Safe spaces and mental health

Neighborhood safety has emerged as an important predictor of mental health outcomes, with satisfaction with neighborhood safety linked to lower levels of depression (Alegría et al. 2018). Neighborhood dangers include traffic, getting lost, environmental pollutants, and risks posed by other people (“How Urban Design Can Impact Mental Health” n.d.). A longitudinal study of adult victims of property crime or violent crime were found to have poorer mental health for 15 months after the crime occurred. Cross-sectional studies of children found that being a witness or victim of crime was associated with poorer mental health (Clark et al. 2007). Clark et al.'s systematic review (2007) found that

all of the cross-sectional studies of neighborhood crime and vandalism showed an association between greater neighborhood disorder and poorer mental health. “Feeling unsafe increases chronic stress and anxiety levels and instills negative feelings about a person’s neighborhood. Furthermore, in places that have higher levels of crime, people are less likely to walk around, or engage in other physical activity and pro-social interactions” (“How Urban Design Can Impact Mental Health” n.d.).

Neighborhood safety is about more than crime prevention. It also includes environmental and traffic safety. Exposure to some toxins may increase mental illness. For example, fine particulate exposure is associated with increased anxiety, impaired cognition, and depressive behaviors. These impacts can increase mental illness directly, and indirectly by increasing crime rates (Litman 2021). Local transport conditions also affect mental health. Traffic safety involves creating safe active transport routes to increase walking and cycling. Increased walking activity can increase community cohesion and community security, both buffers against mental

stress. Reduced vehicle travel also reduces per capita traffic casualty and crime risks, which can cause mental stress to victims and their families (Litman 2021; Liu et al. 2015).

SES, the built environment, and mental health

Social and physical aspects of a neighborhood are important determinants of mental health. Low socio-economic status (SES) as a risk factor for poor mental health has been well studied and the findings have been consistent. Living in poor or deprived neighborhoods is associated with greater risk of poor mental health than living in richer neighborhoods (Gruebner et al. 2017). Empirical evidence suggests that low SES influences health through the activation of the chronic social stress response, linked to a variety of diseases including depression. Several decades of research have repeatedly identified control over one’s life and social capital as important mediators of the physiological impact of chronic stress (Houle et al. 2017).

Exposure to poor environmental conditions is not randomly distributed and tends to concentrate among the poor and ethnic minorities (Evans 2003). Consistently, studies have shown that poor neighborhood quality, as an aggregate of multiple social and physical attributes, contributes to

greater psychological distress and poorer cognitive development in children (Evans 2003). People with low SES generally live in lower quality neighborhoods that are characterized by lower perceived safety, access to fewer shops and leisure facilities, and higher levels of crime (Ram et al. 2017). In addition, access to good-quality urban green space is not equally distributed. While people living in deprived urban communities often experience poorer mental well-being and greater exposure to chronic stress, these are also the populations most likely to have less access to quality green space for stress regulation compared with those of higher socio-economic status (Roe 2016). Lastly, minority and low-income neighborhoods were found to be three to eight times more likely to lack high-quality recreational facilities than predominantly white or wealthier neighborhoods (“Environmental Barriers to Activity” 2012).

Design implications

The four attributes of the built environment discussed above and their relationships to mental health suggest certain design and planning strategies

for promoting positive mental health outcomes in a community. Green space should be integrated into all designs because the overall greenness of an urban neighborhood is associated with better mental health. The outcome to be prioritized is to provide residents with consistent, regular exposure to nature in the course of their daily routines (“How Urban Design Can Impact Mental Health” n.d.; Roe 2016). Strategies for accomplishing this outcome include parks, both small and large, street trees, and other types of vegetative buffers between roads and sidewalks. Green space should be within walkable distance of all residences and views of nature should be visible from within residences (Roe and Aspinall 2011; Francis et al. 2012). Quantity of green space is important but research shows that quality is also important. In fact, quality may be as, if not more, important than quantity in mediating green space and mental health associations (Roe 2018). If green space is not well-managed and falls into disorder, it may become a place to fear, dislike, or avoid (“How Urban Design Can Impact Mental Health” n.d.). Therefore, successful implementation of green space

includes both accessible, inclusive design and planning for how the spaces will be maintained.

Another important design implication suggested by this research is providing opportunities for active transport (walking and biking) into people’s everyday routines. At the macro-level, residents from communities with higher density, greater connectivity, and more land use mix report higher rates of walking and cycling (Saelens, Sallis, and Frank 2003). People walk and cycle more when streets and pedestrian facilities connect key destinations (Edwards and Tsouros 2006). Neighborhood parks that are within walking or cycling distance of a person’s home can also promote greater physical activity. Access to public transportation also promotes physical activity since many trips involve walking or cycling links. Facilitating pedestrian access to public transportation may have the greatest health benefits for people with low incomes since they are more likely to use public transportation and to walk to the access points (Edwards and Tsouros 2006). In addition to density and connectivity, research shows that the micro-level design of walking and cycling infrastructure is also important. The presence of sidewalks and bike paths increase the number of walking and cycling trips. In one study, better pedestrian infrastructure (sidewalks, street

lighting) was related to higher rates of walking even when density and land use mix were constant (Saelens, Sallis, and Frank 2003). Lastly, the success of pedestrian infrastructure also depends on its safety, both perceived and actual accident numbers (World Health Organization and Gehl Institute 2017). Design implications include wider sidewalks, protected bicycle lanes, bicycle parking, reduced vehicle speeds, and aesthetics (“How Urban Design Can Impact Mental Health” n.d.).

Neighborhoods should also have places that facilitate positive social interaction into peoples’ daily routines. Compact, walkable neighborhoods provide opportunities for natural, daily social interaction, especially when neighborhoods include destinations and amenities other than residences (“How Urban Design Can Impact Mental Health” n.d.). In addition to walkability, quality public open space includes gathering spaces where people can sit and linger, buildings that face and are close to the street, diversity of architecture, amenities, and aesthetics (“How Urban Design Can Impact Mental Health” n.d.; Francis et al. 2012). Once again, the quality of public open space appears to be more

important for mental health than the quantity of public open space (Francis et al. 2012).

Creating public spaces that are safe also has design implications. The Gehl Institute (Gehl Institute 2017) has identified several design interventions for preventing crime based on three principles: territorial definition, access control, and surveillance. Territorial definition is achieved through design that clearly demarcates public and private spaces. Access control means design that makes public routes clear and includes features that discourage access to private spaces. And surveillance means design that increases visibility of the location so that people feel like they can be seen and crime victims would be able to call for help (Gehl Institute 2017; “How Urban Design Can Impact Mental Health” n.d.). In addition to crime prevention, traffic safety also has design implications, outlined well in a report by the World Resources Institute (Liu et al. 2015). At the macro-level compact and connected urban design with an emphasis on walking, bicycling, and mass transit reduces the need for driving. Less cars on the street is safer for vulnerable road users such

as pedestrians and bicyclists. Lastly, traffic calming measures such as speed humps, curb extensions, and raised pedestrian crossings are important design considerations (Liu et al. 2015).

4 INTERVENTIONS FOR PROMOTING BETTER MENTAL HEALTH



ACCESSIBLE GREEN SPACES



ACTIVE LIVING SPACES



PRO-SOCIAL SPACES



SAFETY and SECURITY

Winooski History and Context

Pre-European Settlement

Archaeological research found that a single family band came to what is now the city of Winooski 5000 years ago. Their prehistoric campground has become one of Vermont's most significant archaeological sites. As early as 400 A.D. the Abenaki people began settling along the Winooski River. Winooski comes from the Abenaki word "winoskitegw" meaning "land of the wild onion". In the spring and summer the Abenaki farmed corn, beans, squash, and tobacco in the rich soil along the river and fished for salmon and eel in the Winooski River. In late autumn they moved to higher ground in search of moose and deer, moving back to their homes along the river when winter came. Historically, Abenaki families traveled widely across the Lake Champlain region in birchbark canoes in the summer and on snowshoes in the winter, sustaining themselves for generations by hunting, fishing, and growing crops. Abenaki people mostly lived and traveled in family groups. In times of conflict they

allied with other Algonquian peoples living to the east and north. The Abenaki village at Winooski was abandoned by 1700 due to disease and almost constant war between the English and French.

Early European Settlement

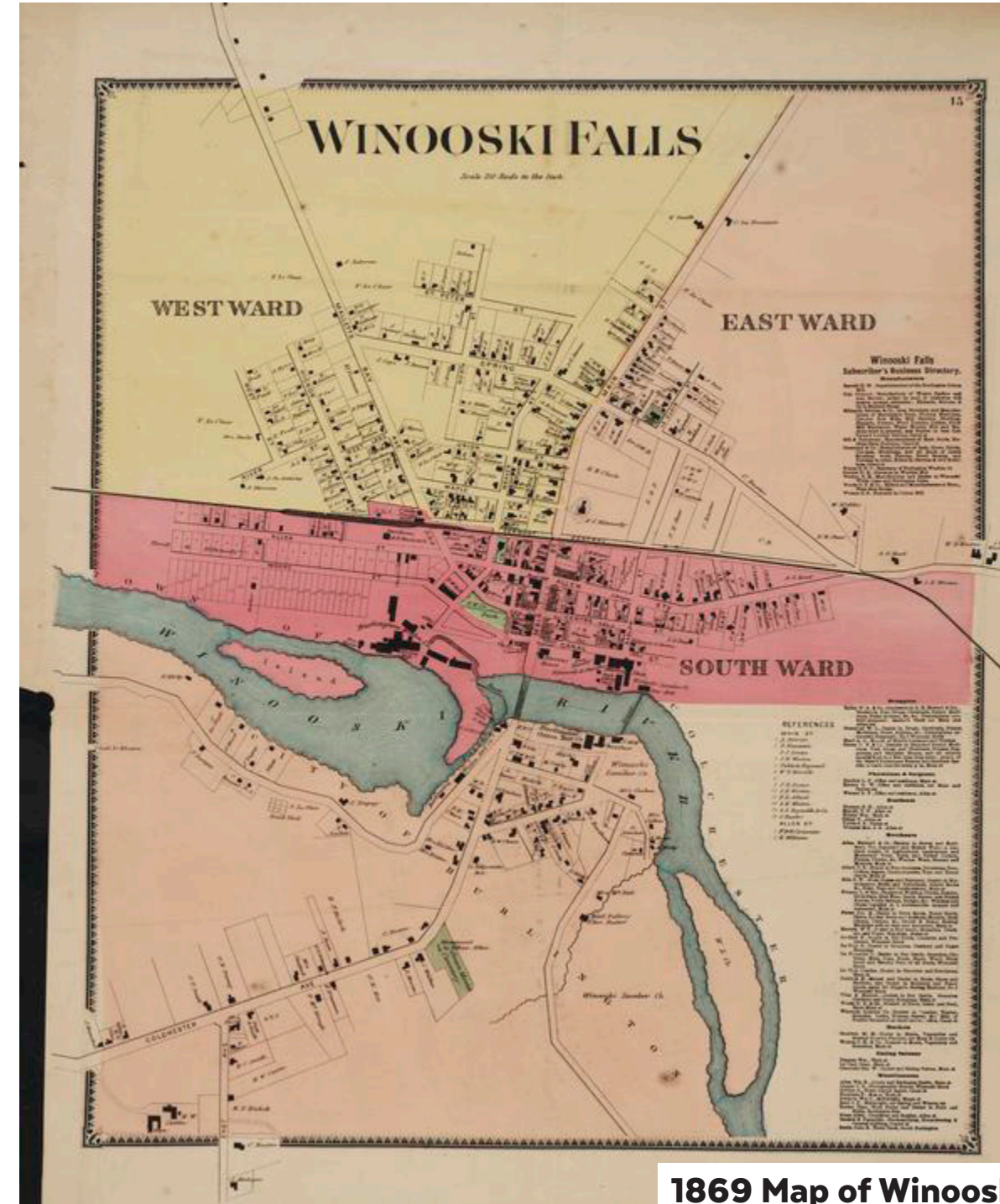
Europeans first arrived in the Champlain Valley in the seventeenth century. European settlement of the area quickly resulted in the dispersal and expulsion of the native inhabitants as well as introduced them to diseases such as smallpox. Sometimes the Abenaki allied with the French and raided British frontier settlements. Most, however, fled north to other native communities in Canada or west to the Adirondack mountains. Some remained on their territory but by 1700 their settlement in Winooski was mostly abandoned. The French were the first Europeans to reach the Champlain Valley. They focused primarily on exploration and fur trading. English settlers were committed to permanent agricultural communities.

On June 7, 1763 Benning Wentworth, governor of the province of New Hampshire, signed a charter for the town of Colchester which included the land that is now the city of

Winooski. Ira Allen arrived in 1772 and settled in the Winooski Falls area of present day Winooski. He was drawn to this area by the partially overgrown corn and squash fields left unattended by the Abenaki as well as the "Great Falls" of Winooski which he intended to use to power mills. Ira Allen and his brothers formed the Onion River Land Company in 1773, building a blockhouse on the Winooski River that served as an office for the company as well as a general store and fort. This building and its protective presence increased the value of surrounding property and advanced local settlement. After the Revolutionary War, Ira Allen returned to Winooski and built a dam across the river and put sawmills at each end. The use of the Winooski falls to generate energy had begun.

Consequences of Commercial and Industrial Growth

Winooski developed as an industrial community beginning with the establishment of a woolen mill in



1869 Map of Winooski

1835, becoming known as "Mill City". Textile manufacturing became a major industry. Winooski Village incorporated in 1866 and a town clerk's office was established. The city's focal point became the new Winooski Block, built in 1867, and served as a community center and business block. The Burlington Mills company having operated since 1835 began to fail by 1900 and was purchased in 1901 by the American Woolen Company which restored a measure of economic growth to the area. Due to this success, in 1921 Winooski Village requested a charter change allowing it to separate itself from Colchester and become a city, and this request was granted by the Vermont legislature on March 7, 1922. The Winooski Mills were the biggest private employer in the area, at times employing 2,000-3,000 people. The mills especially flourished during war times when textile products were in higher demand. During peacetime the mills would suffer from a lack of demand. American Woolen Company closed in 1954 which was disastrous for the city of Winooski. Not only did people lose their jobs, but the company had also been the city's biggest taxpayer. This led to two decades of economic problems for the city. Local businesses went out of business; home values plummeted.

The federally funded Model Cities program, Community Development Block Grants, Urban

Development Action Grants, and other public and private investment enabled to city of Winooski to economically rebound in the 1980's. The deserted mill buildings were rehabilitated and the city's downtown was revitalized. The Woolen Mill building which had been vacant was transformed into a combination of living and working space. The Champlain Mill building was renovated into retail and office space. The arrival of a new, large employer, IBM, to the nearby town of Essex also helped revive Winooski.

The population of Winooski fell slightly in the 1990's but has grown by over 20% between 2000 and 2020. Around 2010 the downtown underwent another big transformation with a large traffic circle being installed. Winooski is now a culinary destination and home to internet companies as well as a new campus of the Community College of Vermont.

Consequences of Migration

The city of Winooski had periods of huge population growth in the late nineteenth and early twentieth century, growing by 29% between 1880 and 1890 and by 23% between 1900 and 1910. This population growth mirrored

periods of economic growth for the city. However, because of the city's dependence on one major employer it was left devastated when that employer closed in the 1950's. Population declined by 15% between 1960 and 1980. There was modest decline in the 1990's but since 2000 the city has been growing by a rate of 10% per decade. Part of this growth was due to a younger population moving to Winooski because of lower housing costs compared to the city of Burlington. As a result, new businesses and restaurants began to repopulate vacant downtown spaces. This growth also led to the development of new condominium complexes. This commercial growth led to housing costs rising.

The refugee and immigrant population has grown in Winooski over the past decade making the city significantly more ethnically diverse than the rest of the state. In Winooski schools more than 20 languages are spoken. Nearly a quarter of Winooski residents are below the poverty line and more than 80% of students qualify for free and reduced school lunch. City officials are taking the issue of affordability into account while writing new zoning code. They do not want to lose the city's diverse populations in terms of race, ethnicity, and class. Not only is the city currently trying to manage issues related to population and commercial growth but issues related to poverty and drug use as well.

However, the city presents itself as a welcoming place for young Vermonters and New Americans.

Current Character

Winooski's Abenaki heritage is evident in the town name and the names of a few streets but does not extend much farther. The current character of Winooski is more impacted by its economic past and recent migration of New Americans. Its legacy as a mill town is evident in its historical mill buildings that still serve as important landmarks. Because the city struggled economically for many years after the mills closed it gained a reputation as the poor, "rough and tumble" neighbor to Burlington. Because rent and housing costs were significantly lower than Burlington this led to an influx of young people and a "creative" class beginning in the late 1990's, giving Winooski the nickname "the Brooklyn of Burlington". After Winooski became trendy a growing restaurant and brewery scene followed and Winooski is now a destination for "foodies". Winooski continues to skew much younger than the rest of Vermont and much more diverse due to the presence of New Americans.

Nearly twenty percent of the city's population is refugees, mostly from countries such as Bhutan, Bosnia, Burma, Burundi, Congo Brazzaville, Democratic Republic of Congo, Iraq, Kosovo, Sudan, Somalia, Syria, and Vietnam. There are several restaurants and small grocery stores in Winooski owned by New Americans. Winooski's character as young, hip, and diverse results from both its deep-rooted and more recent histories.



'100 Faces of Winooski'
Heritage Winooski Mill Museum and Daniel Schechner

Review of Municipal Plans

Master Plan (2019)

In 2019 Winooski adopted a master plan which “presents a vision for land use and development in the present and for the future.” The plan is organized by the City’s four part vision statement addressing economic vitality, municipal infrastructure, safe, healthy, connected people, and housing. Both the municipal infrastructure and the safe, healthy, connected people vision statements directly relate to this restorative streetscapes project. “Invest in the City’s municipal infrastructure, including energy resources, facilities and technology; roads and sidewalks; and water, sewer and storm water lines and facilities. Infrastructure investment will make our City safe and accessible to residents and visitors while recognizing the critical role that we play in the region’s system.” “Foster relationships across generations and cultures by providing a safe and healthy environment and providing opportunities to connect and engage with other residents of the City.”

Winooski’s brand as “Vermont’s Opportunity City” and brand statement also apply to this project: “For almost 100 years, Winooski has welcomed strivers- people looking to build a better life for themselves and their families. We’re a small city where neighbors know each other. We’re a city where all of our kids learn together, play together, grow together. We’re a community where everyone can participate in city government, in neighborhood gatherings and in our lively downtown. We’re always striving to improve our city and to welcome our next new neighbors.”

Winooski has been involved with the Vermont Refugee Resettlement Program for several decades. 20% of Winooski’s population is foreign born. The City is Vermont’s most racially and ethnically diverse community. It also has a significantly younger population than the rest of the state though the growth of the over 65 population is still a factor for consideration in planning for the City’s future. Overall, the population is expected to grow 10% between 2020 and 2050. “While there is no certainty in a specific amount of growth, it is likely that Winooski will continue to grow based on it being an

attractive place from environmental, economic, and social perspectives.” Winooski is one of the most densely populated municipalities in northern New England (Maine, New Hampshire, and Vermont) at 6,055 people per square mile. Despite recent income growth the City’s median household income remains below those of Chittenden County and Vermont. Also, Winooski’s 25% rate of poverty is significantly higher than the County and the State.

Demographic changes have mirrored land use changes. “Winooski has undergone substantial physical changes in the last decade, marking its second and more successful revitalization since the close of the mills in the 1950’s. This success can be seen in the City’s rich ethnic diversity and associated businesses and the high percentage of young professionals in the City- an age cohort looking for an urban environment with strong community bonds.” The City intends to infill and increase development within the same land use categories

and boundaries that currently exist. One new land use change is the introduction of form based code for the “Gateway Districts” along Main Street, East Allen Street, and Mallets Bay Avenue. The purpose of these districts is “to create a walkable, mixed-use development dependent on three factors: density, diversity of users, and design.” Form based code places greatest emphasis on design, or physical form, because of its importance in defining neighborhood and corridor character. Winooski has three residential districts whose purpose is to “accommodate safe, livable, and pedestrian friendly residential neighborhoods with inviting streetscapes.” The last point concerning land use is that 22% of Winooski’s land area is natural/open space and parks, well above national averages. The master plan identifies 16 land use related goals and objectives.

Of the nine economic vitality goals and objectives described in the master plan several are related to this project including- (3) “Maintain, manage, and reinvigorate the city’s built and natural environment through implementation of high priority multi-modal projects, coordination of utility

upgrades with private investment on the Gateways (such as utility and streetscape improvements on Main Street), and work to utilize the recreation potential of publicly owned lands”; (4) “Support initiatives that enhance residents’ quality of life, including aspects of housing, health, accessibility and community spirit”; (8) “Establish and implement a wayfinding plan to encourage those driving through to stay and visit the City’s restaurants, bars, parks, and cultural offerings”; and (9) “Pursue an Arts/Cultural District”.

The municipal infrastructure section of the master plan identifies Winooski’s current strengths: walkability, transit access, a thriving downtown, and infrastructure to support it; and states that the City’s infrastructure is foundational to the success of the other elements of the master plan. “Looking forward, there are excellent opportunities to enhance the existing transportation system, making connections fully multimodal, and ensuring a safe and efficient system overall.” Many of the 12 municipal infrastructure goals and objectives are related to this project including: (2) “Increase opportunities for stormwater treatment through low impact development and green stormwater infrastructure practices”; (4) “Improve and maintain streets and sidewalks for safety and convenience for all users at all times of

the year. Every street in the City will have at least one sidewalk starting with the priority segments identified in the Transportation Master Plan”; (6) Maintain a healthy and diverse urban forest”; (7) “Maintain safe, connected, and accessible natural areas as an asset for wildlife, flood resiliency, recreation, and community connection to the environment”; (8) “Enhance pedestrian, bicycle, and vehicular connectivity with Winooski and to adjacent towns, starting with priorities identified in the Transportation Master Plan. Improve transit access, frequency, and reliability”; (9) “Work to implement high priority programs of the parking plan and the Transportation Master Plan related to parking and parking management to mitigate parking demand by promoting alternative modes of transportation and initiatives to better manage public parking assets”; and (10) “Coordinate utility improvements in conjunction with municipal infrastructure improvement projects to add green spaces and underground utilities when possible”.

The “safe, healthy, and connected people” section of the master plan is also directly related to this project. “Winooski strives to

protect the health of its people and natural environment; nurture safe and healthy services and places; and foster community connections.” In fact, the introduction to this section is worth quoting at length- “The health and overall well-being of people significantly determines a city’s resiliency. The concept of community is fundamental to people’s overall quality of life and sense of belonging. Strong communities have fewer social problems, are more adaptable in the face of change and when they do experience difficulty, they have internal resources to draw upon. There is no greater resource to invest in than a community’s people.” The City wishes to “develop and maintain infrastructure to create a healthy built environment.”

Although focused on physical health the plan acknowledges that public health is linked to the design of the community in which a population lives, works, and recreates. “The design of a community can support positive health behaviors, food access, impact social circumstances, and access to healthcare.” The plan also identifies parks and access to arts, culture, and recreational opportunities as particularly important. “Both

structured and unstructured recreational activities, especially outdoors, provide opportunities for physical activity, social development, and appreciation of the natural environment. In addition to enriching residents lives personally, arts and cultural experiences- in the form of public events, performances, exhibitions, and classes- provide community connections as residents learn and have fun together.” This section states that “the culture of Winooski is steeped in caring for each other and creating opportunities for community connections.” Physical spaces need to be provided where residents can be social, communicate, and care for each other. Recreation programs are important to “community identity and cohesion, to quality of life, and to the local economy.”

Many of the goals and objectives of the “safe, healthy, connected people” section of the master plan are related to this project: (1) “Maintain and establish safe and inviting walkable connections throughout the City and to neighboring communities with sidewalks, crosswalks, greenways and streetscape amenities (wayfinding, street trees, sitting areas, lighting);” (2) “Maintain a vibrant, healthy urban forest in all parts of the City”; (3) “Maintain and improve the City’s parks, natural areas and facilities for exercise and recreation opportunities for all ages and

to achieve a goal of having all Winooski residents within an easily accessible 10 minute walk of a high quality park or natural area through development of a Parks and Open Space Master Plan of current and future facilities (including wayfinding, locations for dog owners, programs, etc.);” (5) “WSD students will lead healthy, productive, and successful lives and engage with their local and global community”; (7) “Winooski will partner with local healthcare providers to support improved access to healthcare services, while also supporting health promotion and education initiatives that promote improved well-being for Winooski residents (i.e. “complete streets”, smoke free zones), and support for local health resources”; (8) “Winooski residents (and their loved ones) who are struggling with mental health issues, substance use or abuse will have access to the comprehensive supports necessary to address their use, and will be able to access those services with dignity. Our community will also focus on substance use prevention efforts”; (13) “Winooski seniors will have access to programs, resources, and places to gather that empower them for personal independence, healthy aging, social connection, and

life-long learning”; (14) “Improve transportation services for all to enable independence, social connection, and access to necessary services”; and (21) “Foster the development of neighborhood identities”.

The last section of the master plan, housing, identifies this goal in the introduction- “through revitalization of the Gateways and associated infrastructure improvements; stormwater, utilities, walking and biking infrastructure, trees and placemaking elements will be addressed ensuring a more active and vibrant streetscape.” The following goals and objectives in this section relate to this project: (4) “Preserve and sustain the scale, character and settlement patterns of our neighborhoods”; (8) “Encourage low impact development practices to infiltrate stormwater and to reduce the volume of stormwater runoff from new and existing development”; and (9) “Ensure housing areas include healthy, diverse trees”.

Parks and Open Space Master Plan (2020)

In 2020 Winooski produced a “community-driven master plan”

for the city’s parks and open spaces. From this process four themes were defined: (1) A connected and defined trail network (2) Multi-seasonal programming, recreation, and sports (3) More public amenities and (4) More places to play. The document outlines site specific recommendations and future considerations for ten natural areas and urban parks in Winooski related to those four themes. Another main aspiration of this plan is to establish park space within a minimum 10-minute walk of every Winooski resident and to promote walkability in general. Other goals include “establishment of spaces with multi-cultural inclusion; places for engagement in a safe and healthy environment; and celebrating the striving heritage of the City and its people.”

The plan notes that “Winooski has an abundance of park spaces, which is exceptional for such a dense, urban city.” 24% of the total land use in the city is public open space, well above the national average. The plan also notes that Winooski is already a relatively walkable city due to its dense urban grid and centrally located downtown. In fact, 93% of residents are already within a 10-minute walk of a park. However, some steep topography, gaps in the sidewalk network, and winters that cause snow-piled walkways can prevent the city from being perceived as walkable. Gaps in the sidewalk

network force pedestrians to enter streets or cross multiple times to reach their destination. “This presents multi-modal safety challenges, and is not fitting of the dense, urban character of Winooski.”

The plan also notes Winooski’s recent adoption of form-based code for several “gateway” corridors as an opportunity to use streetscape improvements as a means to integrate civic space and thus improve economic and social outcomes for residents. General recommendations presented in the plan include creating an urban forestry plan, establishing a cultural district, the importance of inclusivity and equitable access, walkability strategies, and maintenance strategies. “To promote safe, walkable, and healthy communities in Winooski, maintenance and operations are critical.” Regarding inclusivity, “the master plan and its subsequent projects should emphasize the participation of all communities in its programming, embracing cultural nuances in public space.”

When residents were asked ‘What kind of parks and open space does Winooski need most?’ the number one answer, with 55% of

respondents, was “natural areas for walks and biking.” The number two answer, with 28% of respondents, was “bike trails.” 21% of residents said they would use Winooski’s park system more if it had “trails and hiking”, the number one response. And lastly, 20% of residents said they wish the park nearest to my house had more “trails and connections to nature”. Number one with 21% was “play space.” The plan also proposes creating walking loops and bicycle network improvements “to provide enhanced park access and recreation amenities.” Specific walkability strategies discussed in the plan include sidewalks on every street, safe lighting, safe crosswalks, signage and wayfinding, salted and shoveled walks, and lanes for pedestrians/bicyclists.

Transportation Master Plan (2017)

In 2017 Winooski prepared a Transportation Master Plan which because of Winooski’s dense land use pattern and mature transportation network “focuses not so much on building large, new infrastructure, but identifying opportunities to enhance

the existing transportation system, making connections fully multimodal, and ensuring a safe and efficient system overall.” The plan’s vision statement is worth quoting at length- “Winooski recognizes the significance of the transportation system in sustaining a vibrant, livable City by fostering a healthy community and strong local economy. Winooski’s transportation system will meet the needs of the City’s diverse population and will provide for safe, efficient, and convenient transportation choices for all users- including pedestrians, bicyclists, motorists and public transit riders. The City will invest in safe and regionally connected bicycle and pedestrian facilities to promote active transportation and increase the number of people that walk and bike in and through the City.”

The plan identifies four main goals: (1) Promote a vibrant downtown with safe and connected sidewalks, efficient bicycle network, adequate parking to support local businesses, and attractive public spaces for the community to gather; (2) Support thriving, well connected neighborhoods where slow vehicle speeds allow for safe walking and biking with access to neighborhood activity centers and local businesses; (3) Reduce commuter vehicle traffic in residential areas of the City; and (4) Promote visually pleasing gateway corridors and neighborhood spaces that accommodate the safe and efficient

multimodal movement of all people of all ages and abilities.

In the plan’s analysis of existing conditions it identifies Mallet’s Bay Avenue, Main Street, and East Allen Street as “gateway” streets and Weaver Street, Spring Street, LaFountain Street, and Dion Street as “connector” streets. There are two public transportation routes and a total of 30 transit stops within Winooski serving approximately 585 passengers a day. The plan identifies 15 recommendations for bicycle network enhancements, 11 recommendations for pedestrian network enhancements, 3 recommendations for gateway enhancements, and 10 policy and general recommendations.

Public engagement for the production of the transportation plan included public meetings and online surveys. When asked, “In general, what top three transportation issues or needs do you think the City should address in the next 5-10 years?” the number one response was “bike lanes/paths” followed by “sidewalks/crosswalks”. Public comments included the following: “Need (safe) access to the park.” “The bike lanes that are here dump bicyclists into

unsafe situations.” When asked “What keeps you from walking and biking more often for your travel needs?” 24% of respondents said “inadequate bike lanes/paths”. When asked “Which areas in the City do you wish to have better/improved bicycle and pedestrian access to?” the number one answer was “downtown” with 68% of respondents followed by “residential neighborhoods” with 50% of respondents.

Conclusion

As noted, many of the goals, objectives, and vision statements of these three documents directly relate to the goals and objectives of this restorative streetscapes project including multi-modal access connecting neighborhoods, the fostering of social connections of residents, the promotion of aesthetically pleasing corridors and neighborhood spaces, and support for safe and healthy environments.



Downtown Winooski











the Winooski Block, built in 1867



Urban Landscape Design for Mental Health Toolkit

The literature review identified four main interventions for promoting better mental health outcomes in a community: accessible green spaces; pro-social spaces; active living spaces; and safety and security. Derived from the literature review this toolkit identifies the various macro-scale and micro-scale strategies that can promote the existence and viability of these four types of spaces. Some tools are repeated and there are multiple reciprocal relationships between these four types of spaces. This toolkit can be used for both evaluation of a city's existing mental health infrastructure and inspiration for proposed mental health interventions.




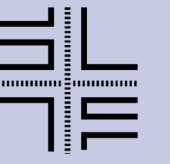

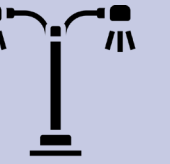






Accessible Green Spaces

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| Parks | Gardens | Yards | Forests | Street Trees | Farms | Vegetative Buffers | Views from buildings |

Pro-Social Spaces

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| Short distances to city center | Higher residential density | Mixed land-use | Access to "third" spaces | Access to public transport | Multi-modal transportation network | Compact, walkable neighborhoods | Fine-grain street fronts |
|  |  |  |  |  |  |  | |
| Diversity of architecture | Buildings that face the street | Gathering spaces | Amenities | Resting places | Sidewalks | Aesthetics | |

Active Living Spaces

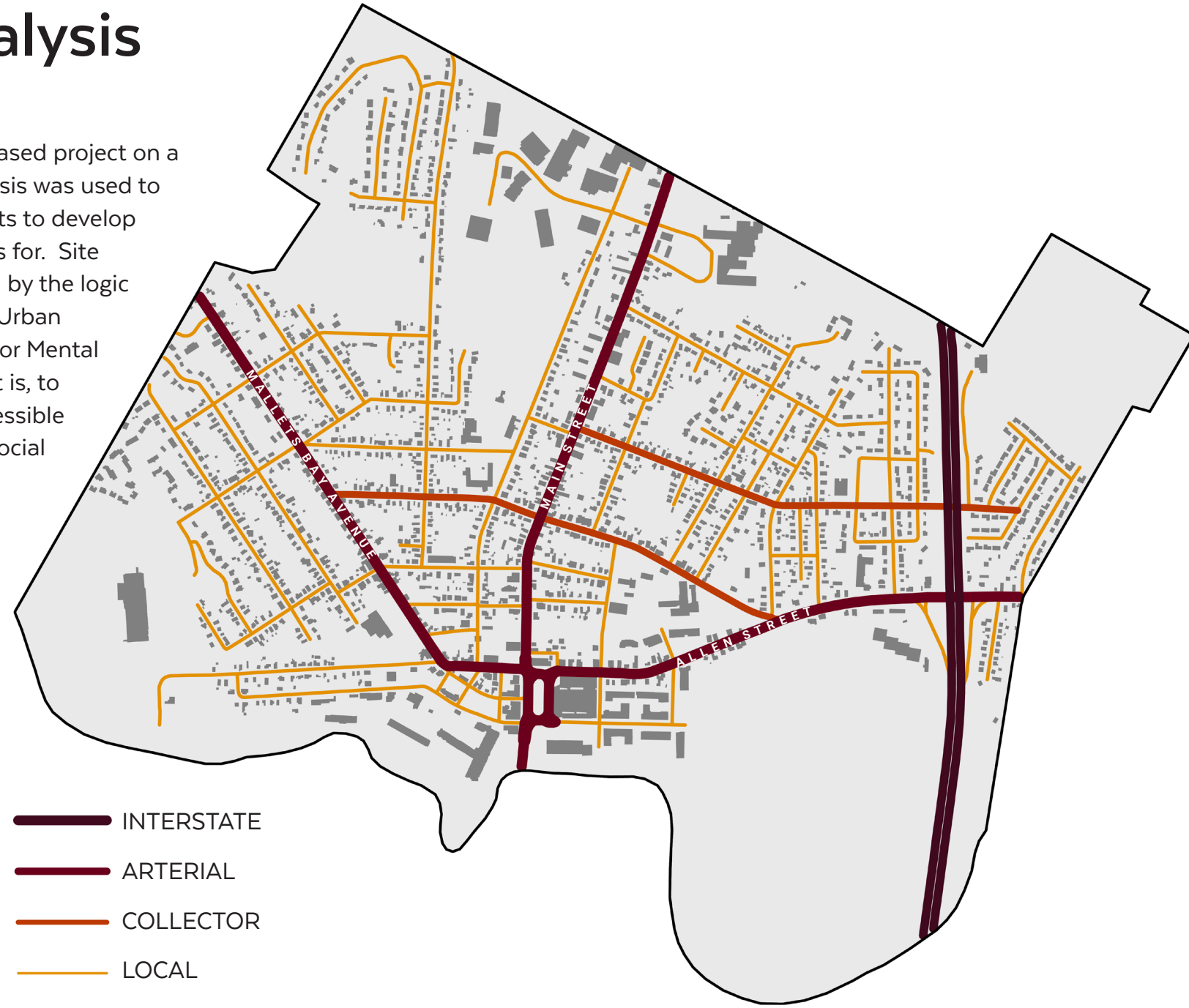
| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| Access to recreation centers | Bike lanes and paths | Bicycle amenities | Street connectivity | Intersection characteristics | Street Lighting | Mixed land-use | Higher residential density |
|  |  |  |  | | | | |
| Access to public transport | Sidewalks | Resting places | Aesthetics | | | | |

Safety and Security

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| Building maintenance | Clear public routes | Clear demarcation between public and private spaces | Clear landmarks | Reduced vehicle speeds and overall traffic | Design that increases visibility | Crossing signals | Raised pedestrian crossings |
|  |  |  |  |  |  |  |  |
| Curb extensions | Protected bike lanes | Speed humps | Absence of trip hazards | Wider sidewalks | Aesthetics | Street Lighting | Safe active transport routes |

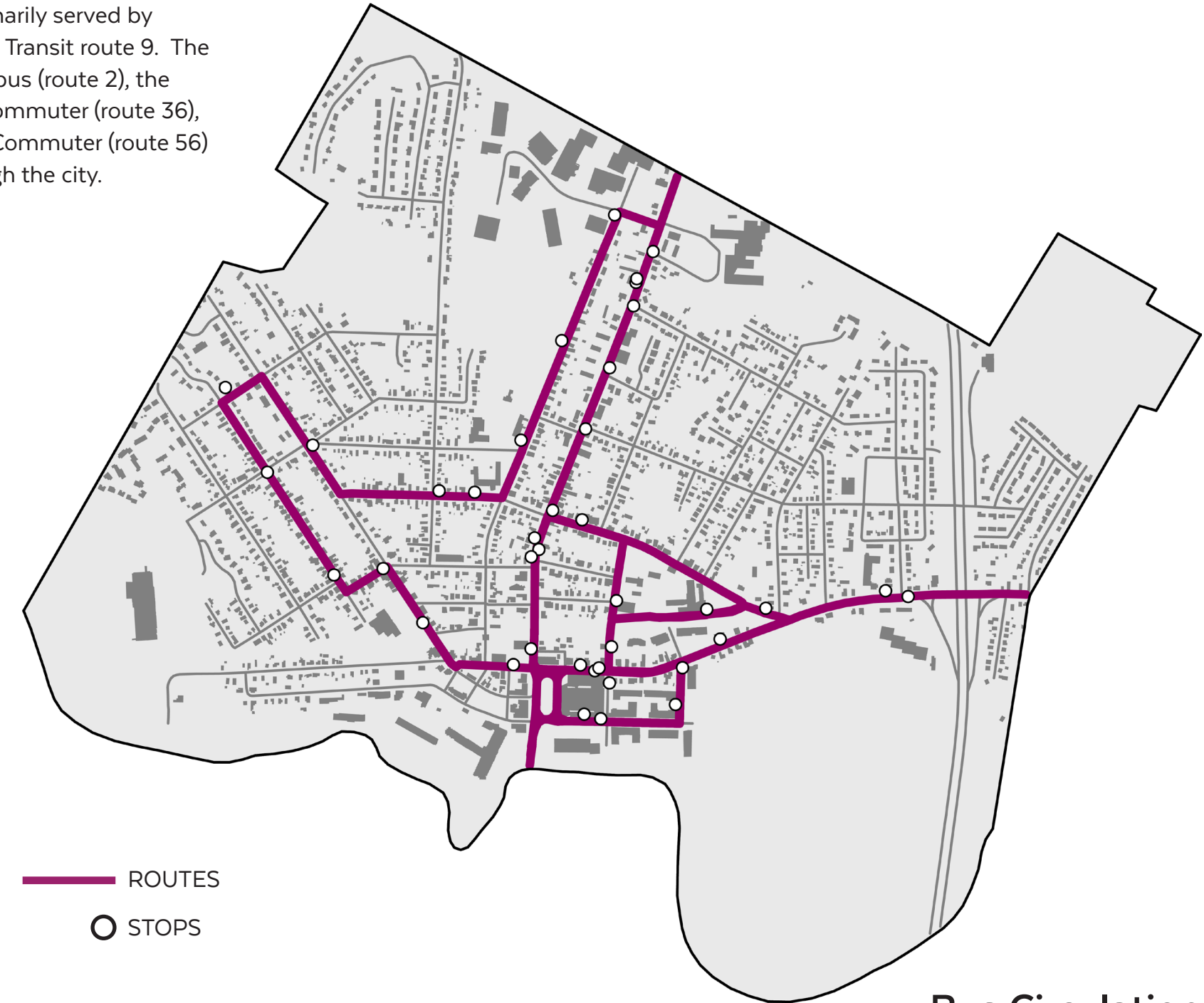
Site Analysis

As a streetscapes based project on a city scale, site analysis was used to identify which streets to develop design interventions for. Site analysis was guided by the logic represented by the Urban Landscape Design for Mental Health Toolkit. That is, to what extent do accessible green spaces, pro-social spaces, active living spaces, and safety exist in Winooski? Where are people going? How are they getting there? And what are conditions on the ground?



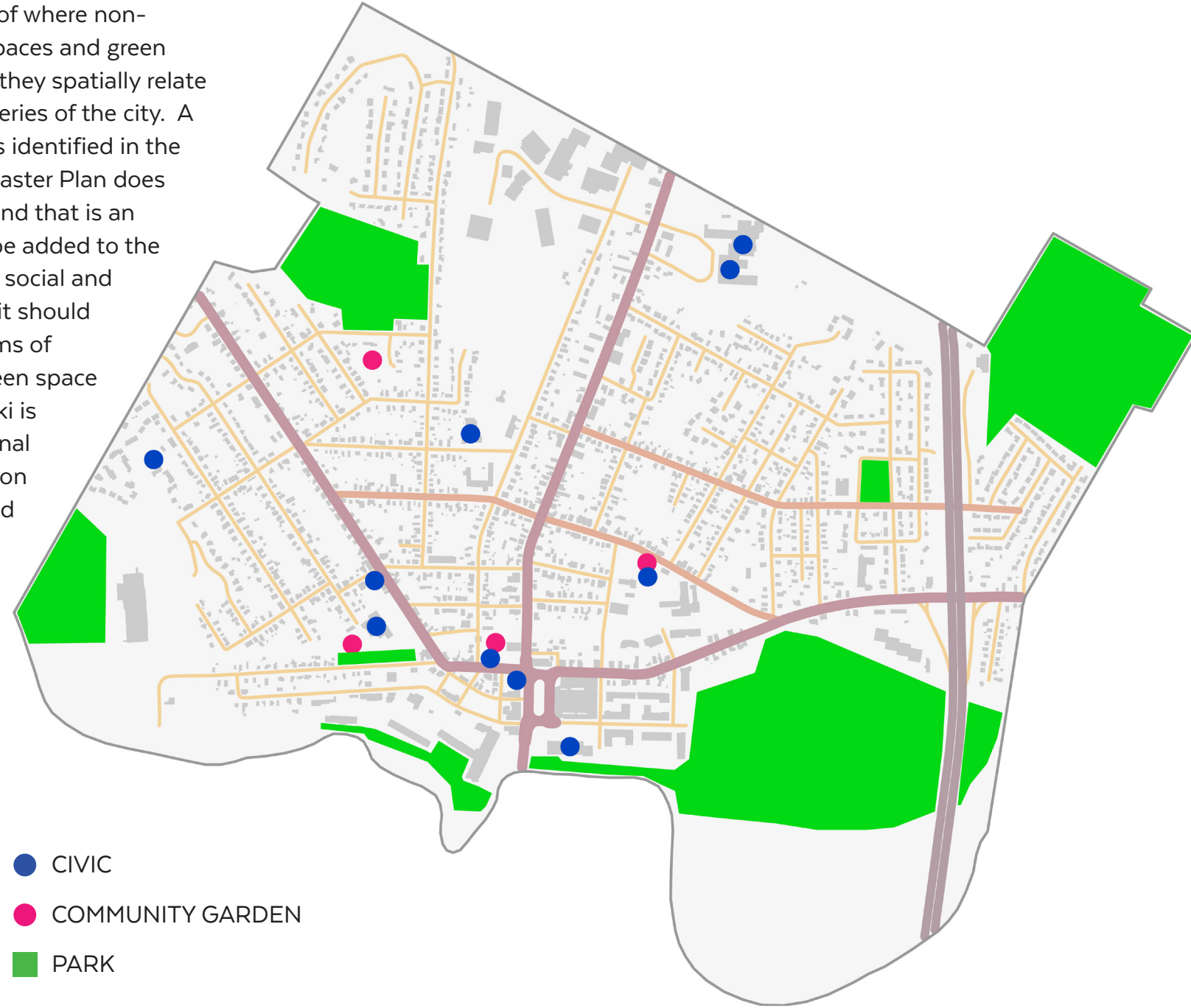
Street Hierarchy

Winooski is primarily served by Green Mountain Transit route 9. The Essex Junction bus (route 2), the Jeffersonville Commuter (route 36), and the Milton Commuter (route 56) also pass through the city.



Bus Circulation

This is an inventory of where non-commercial social spaces and green spaces are and how they spatially relate to the circulation arteries of the city. A map of social spaces identified in the city's Open Space Master Plan does not include streets and that is an aspect that should be added to the logic when mapping social and green spaces. Also, it should be noted that in terms of acreage of public green space per resident Winooski is well above the national average, so connection seems to be the need above creation.



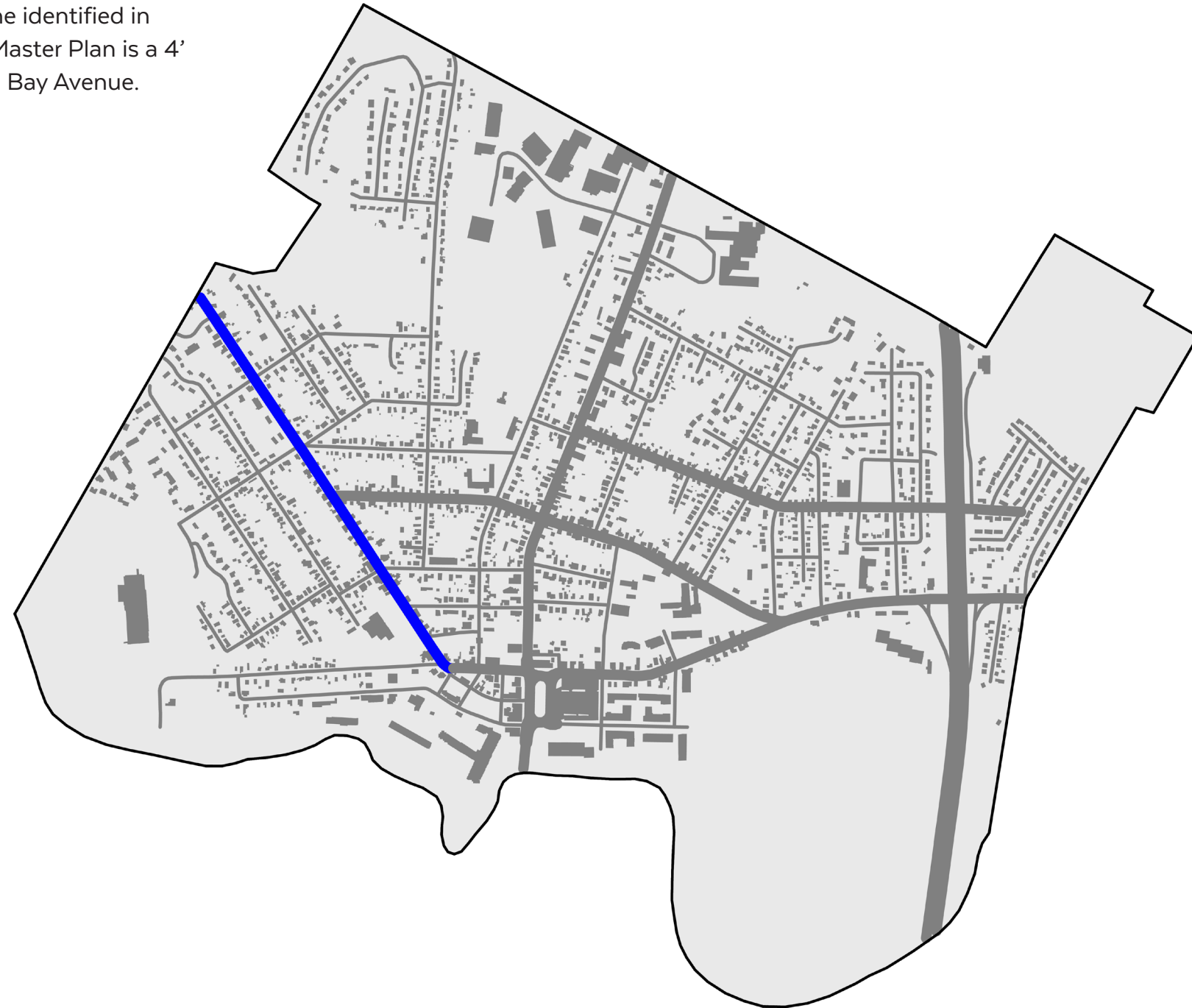
Social and Green Spaces

These blue lines represent the only streets identified in the Winooski Transportation Master Plan as having bike lanes. No other streets even have markings indicating shared use. There is not enough bicycle infrastructure to begin to address needs of connectivity between most destinations in the city.



Existing Bicycle Lanes

The primary bike lane identified in the Transportation Master Plan is a 4' shoulder on Mallet's Bay Avenue.



Mallet's Bay Avenue



This image shows the 4' shoulder classified in the Transportation Master Plan as a bike lane.



There are no intersection markings indicating a bike lane and the bike lane includes storm drains.

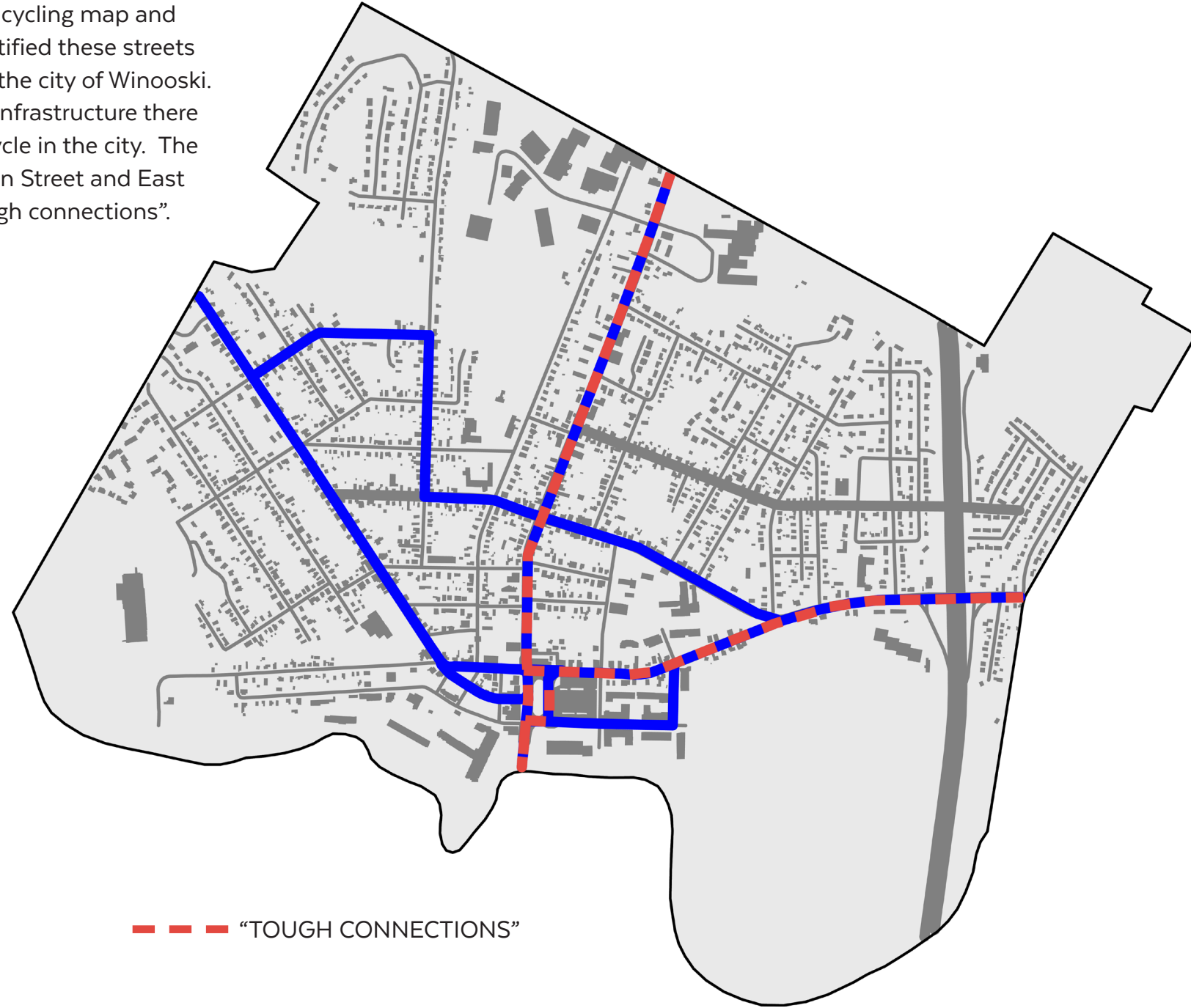


The painted stripe separating the shoulder/bike lane is not well maintained as seen in this image.



In this image the bike lane is being used for traffic cones forcing cyclists into the driving lane.

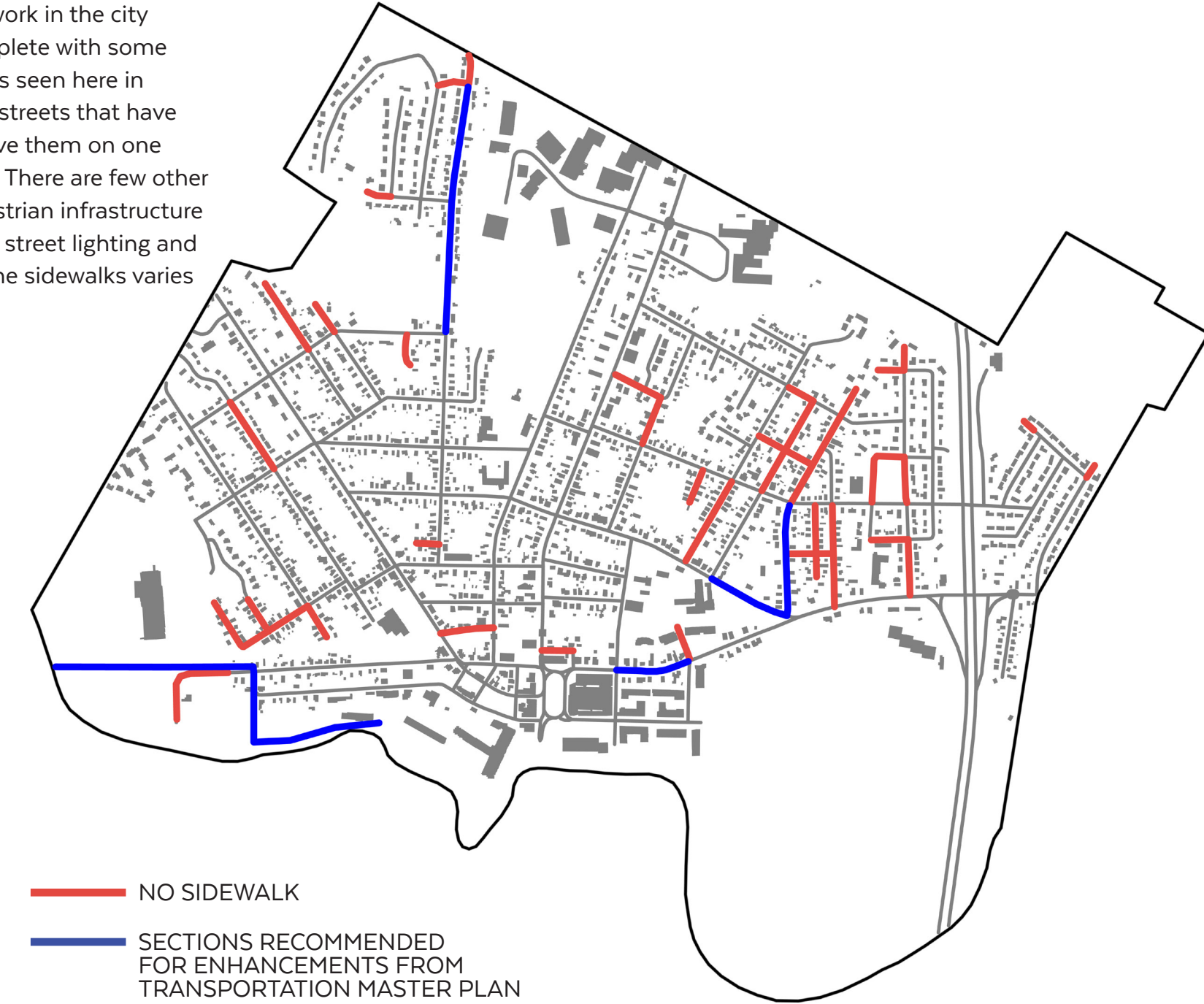
A Burlington area bicycling map and resource guide identified these streets as bicycle routes in the city of Winooski. Despite the lack of infrastructure there are people who bicycle in the city. The guide identified Main Street and East Allen Street as “tough connections”.



--- "TOUGH CONNECTIONS"

Bicycle Routes

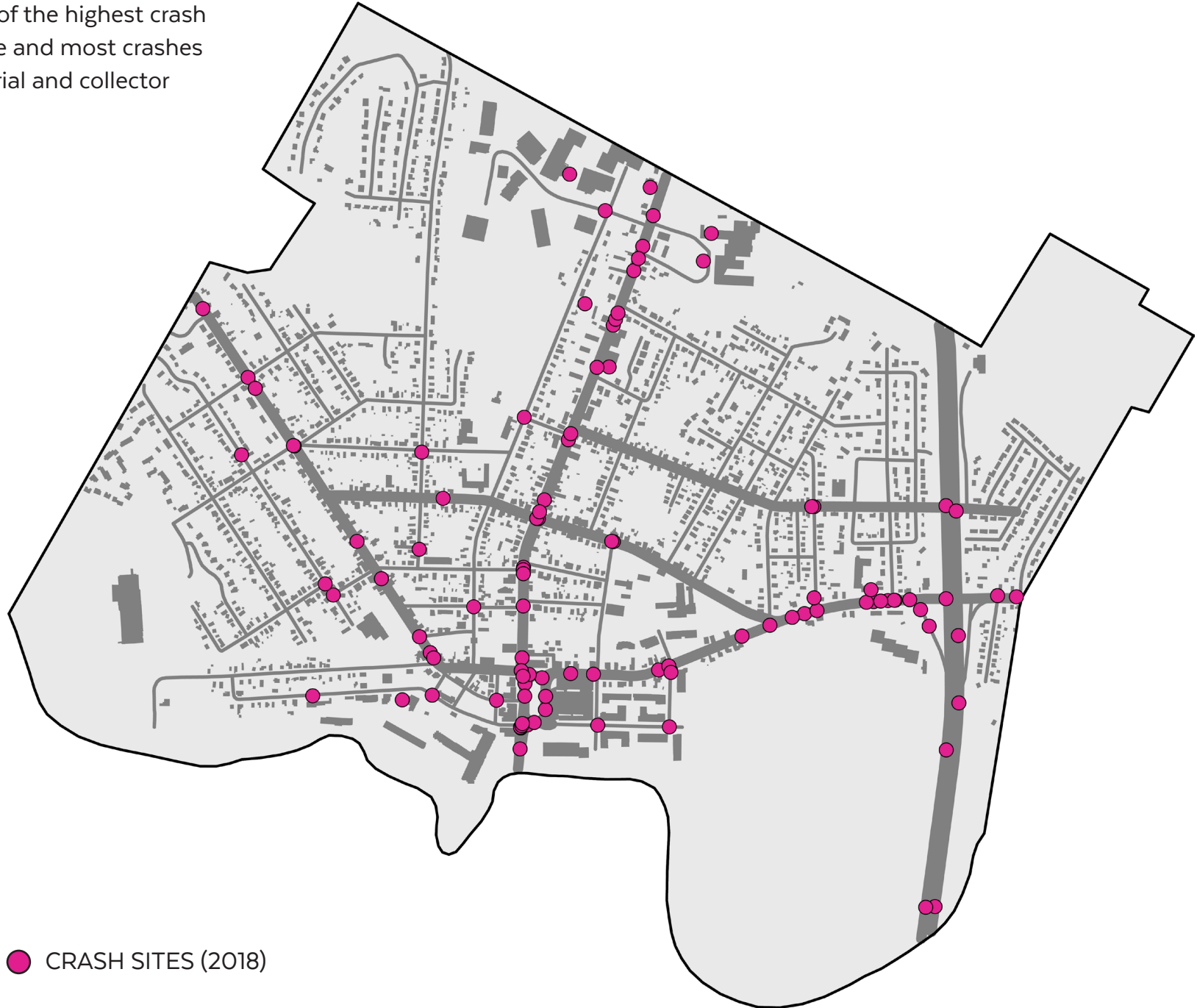
The sidewalk network in the city is somewhat complete with some notable exceptions seen here in red, though most streets that have sidewalks only have them on one side of the street. There are few other elements of pedestrian infrastructure such as seating or street lighting and the condition of the sidewalks varies widely.



— NO SIDEWALK
 — SECTIONS RECOMMENDED FOR ENHANCEMENTS FROM TRANSPORTATION MASTER PLAN

Pedestrian Infrastructure

Downtown has one of the highest crash locations in the state and most crashes occur along the arterial and collector streets.



● CRASH SITES (2018)

Traffic Crashes

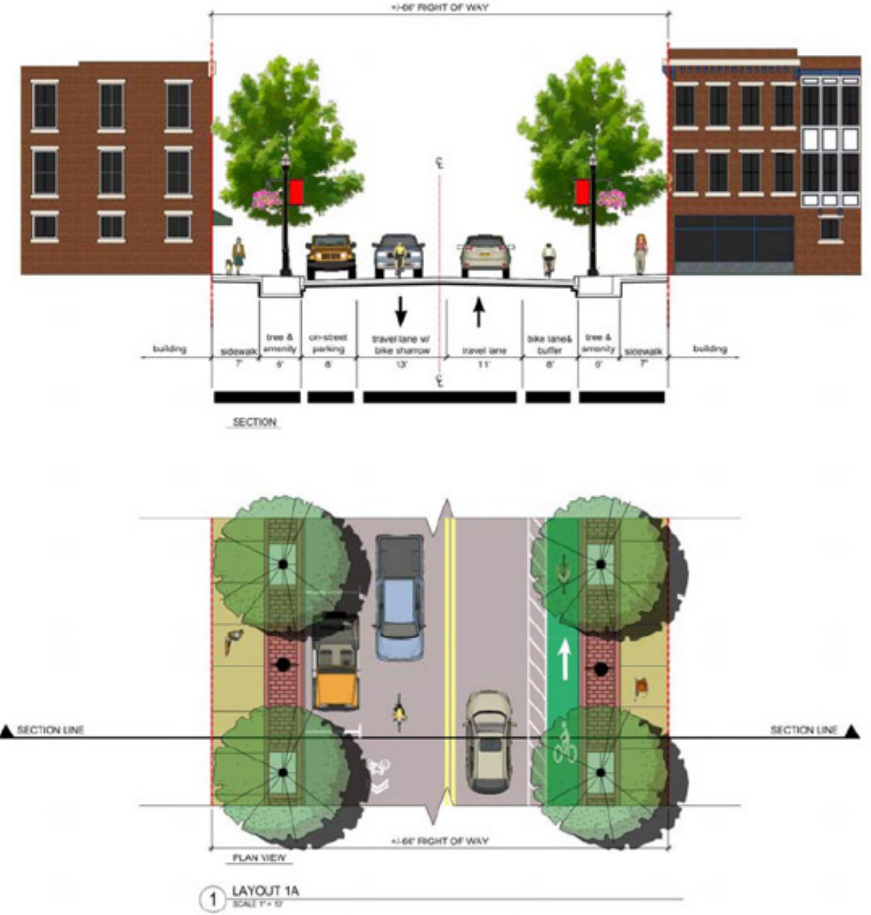
Construction on a redesign of Main Street begins spring 2022. Therefore, this restorative streetscapes project will not include Main Street as a focus for proposed design recommendations.



PROPOSED STREET DESIGN

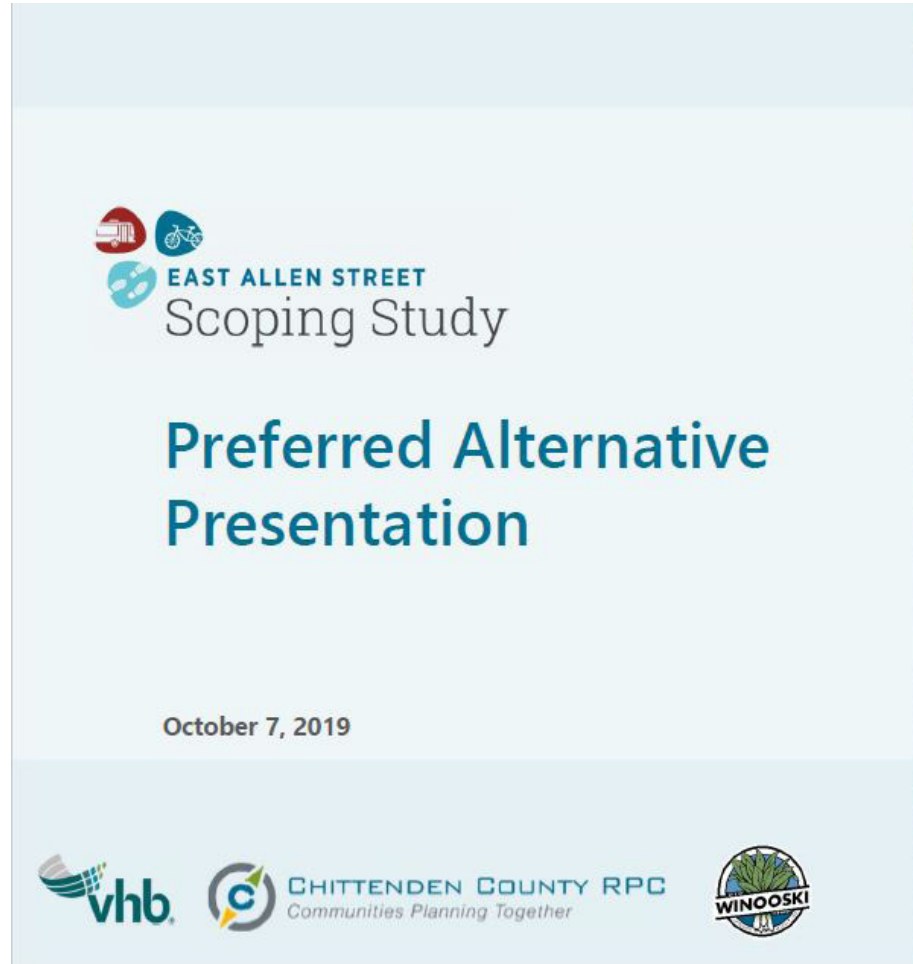
- The proposed roadway design includes:
 - Utility Upgrades
 - Green Stormwater Infrastructure
 - On-Street Parking
 - One-Way Uphill Protected Bike Lane
 - Shared Use Lane Downhill
 - Expanded Pedestrian Accommodations
 - Streetscape Amenities

Presentation to the Winooski City Council 3.19.2018



Main Street

The city conducted an extensive scoping study of East Allen Street in 2019 that produced multiple redesign alternatives. Therefore, this restorative streetscapes project will also not include Allen Street as a focus for proposed design recommendations.



Allen Street

Site analysis led to the following four streets to be the focus of the design recommendations in this project. However, an overall logic applies to all streets. This means that the design for one arterial can be adapted for other arterials; the design for one local street can be adapted for other local streets; the design for one collector can be adapted for other collector streets.



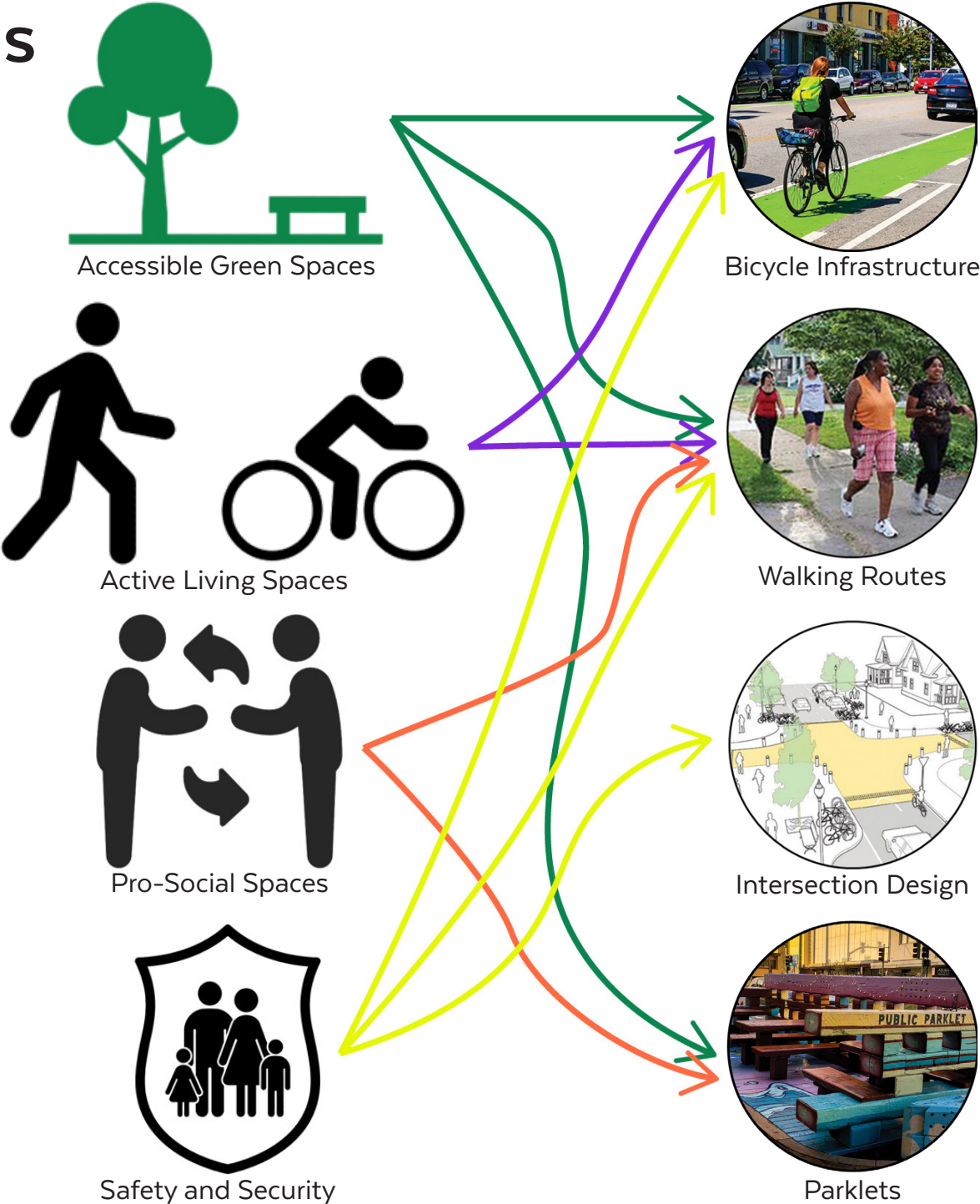
- 1. MALLET'S BAY AVENUE **arterial**
- 2. WEAVER STREET **local**
- 3. LAFOUNTAIN STREET **collector**
- 4. SPRING STREET **collector**

Intervention Streets

Design Interventions

In recognition of the four strategies for promoting better mental health this project proposes the following design interventions based on Winooski's needs: bicycle infrastructure, established neighborhood walking routes, intersection design or redesign, and the creation of permanent small pocket parks within the neighborhoods and along important routes. This project proposes to the city of Winooski the need for public engagement in the design and planning process, but hopes to provide some inspiration by designing some examples of each.

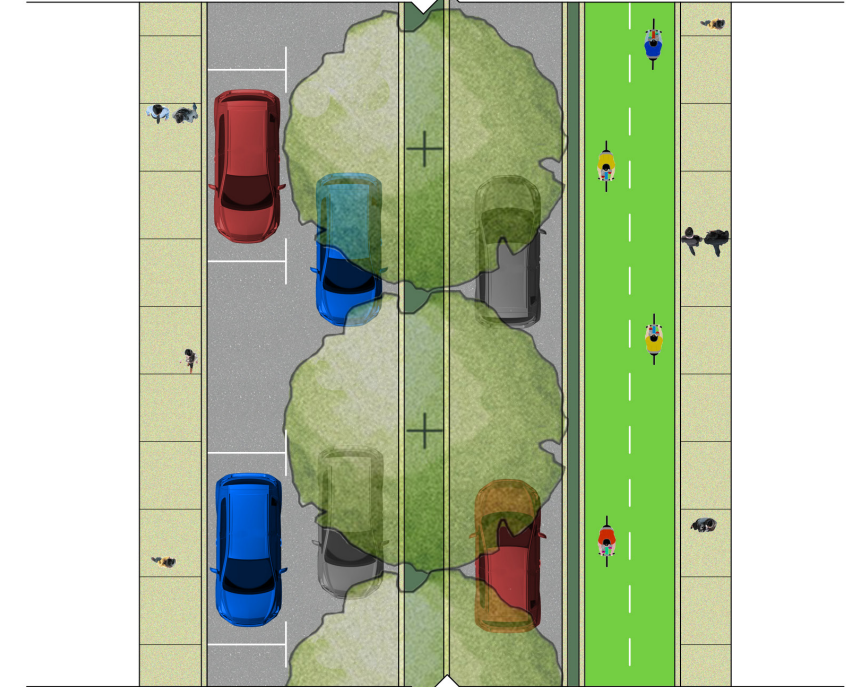
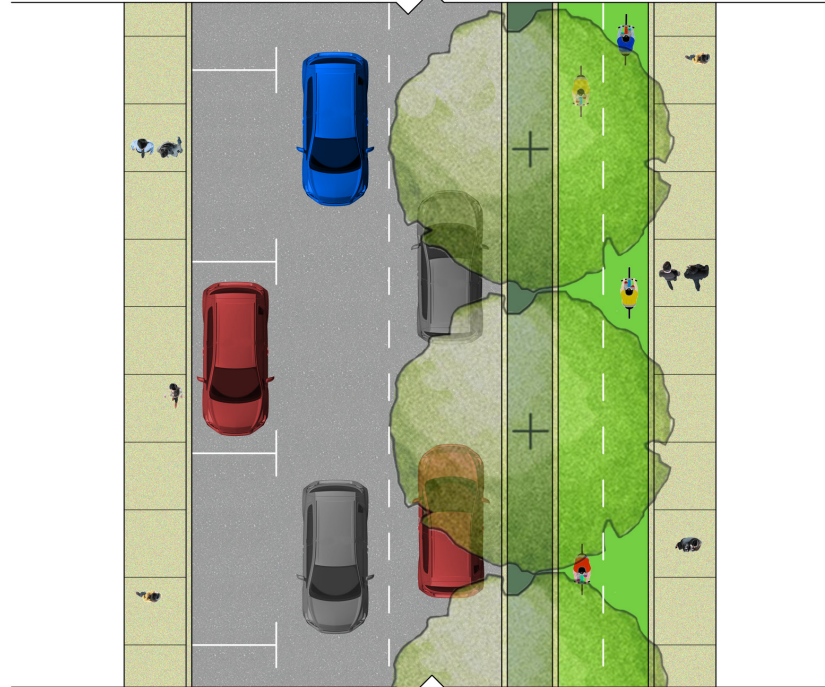
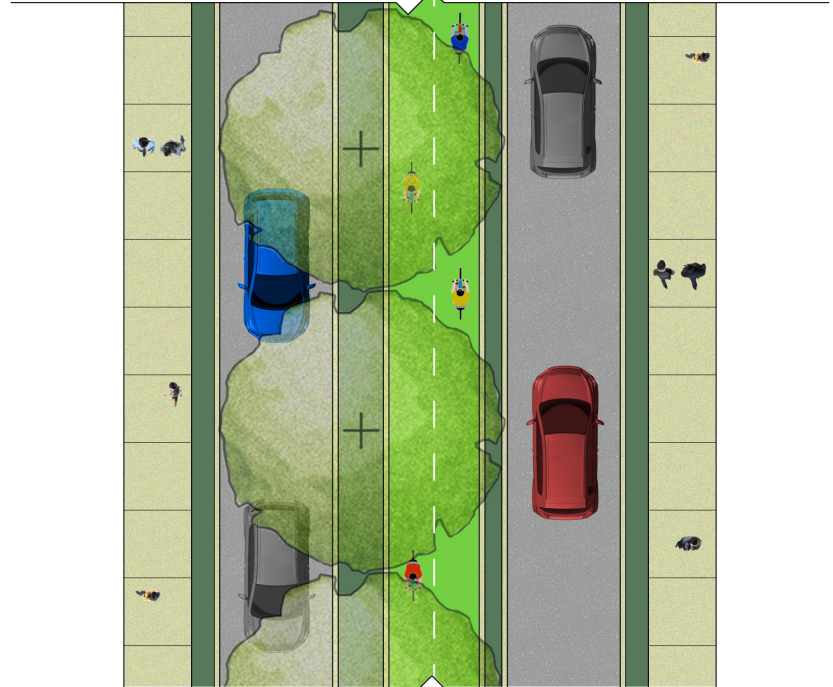
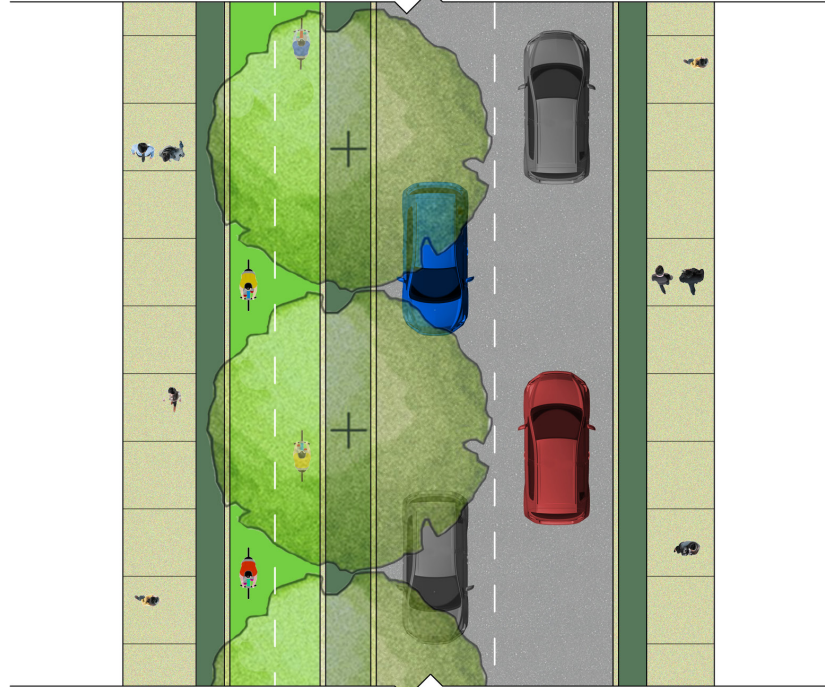
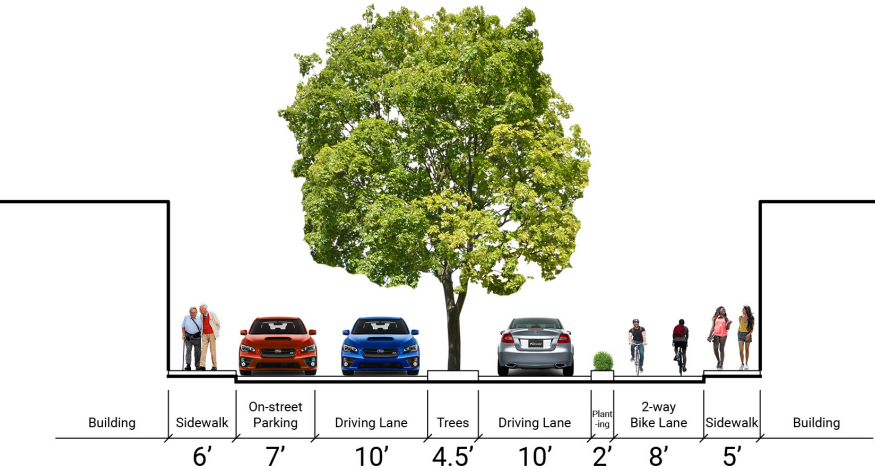
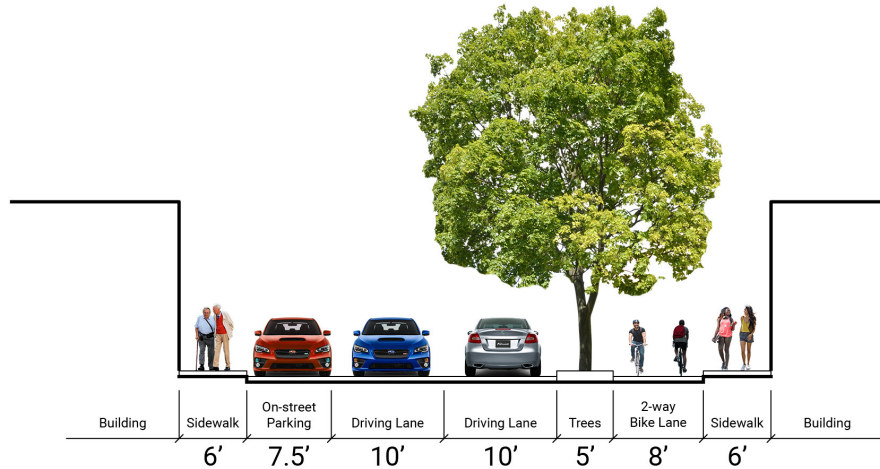
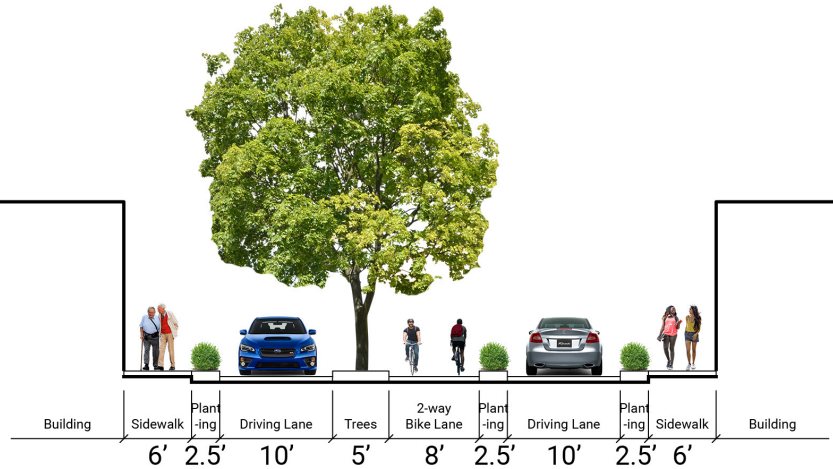
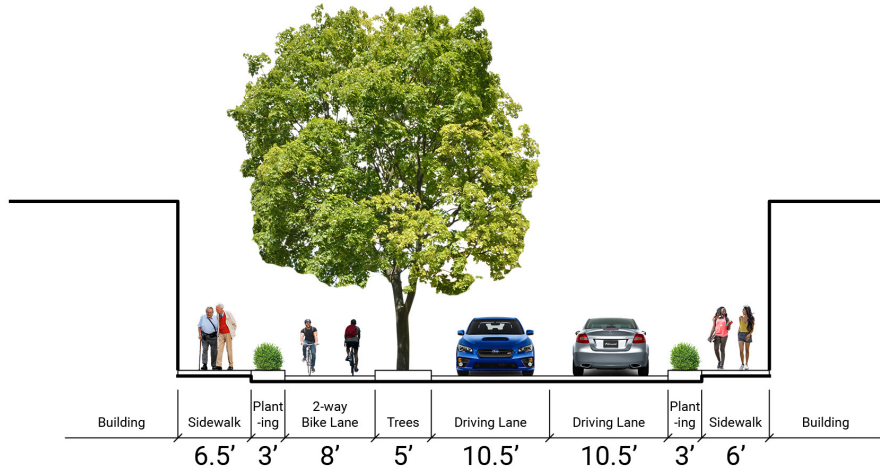
These four interventions are not always cleanly divided, especially the first section on bicycle infrastructure which necessarily includes pedestrian infrastructure. After consulting literature on street design this project set two goals: 2-way, separated bike lanes and sidewalks on both sides of the street.



Bicycle Infrastructure
pages 37-58

Mallet's Bay Avenue

is a main arterial in the City with a 52.5' right of way. This project proposes option 1 with no street parking to be the most ideal and the rendering on page 40 reflects that option.



No street parking 1

No street parking 2

With street parking 1

With street parking 2

Mallet's Bay Avenue



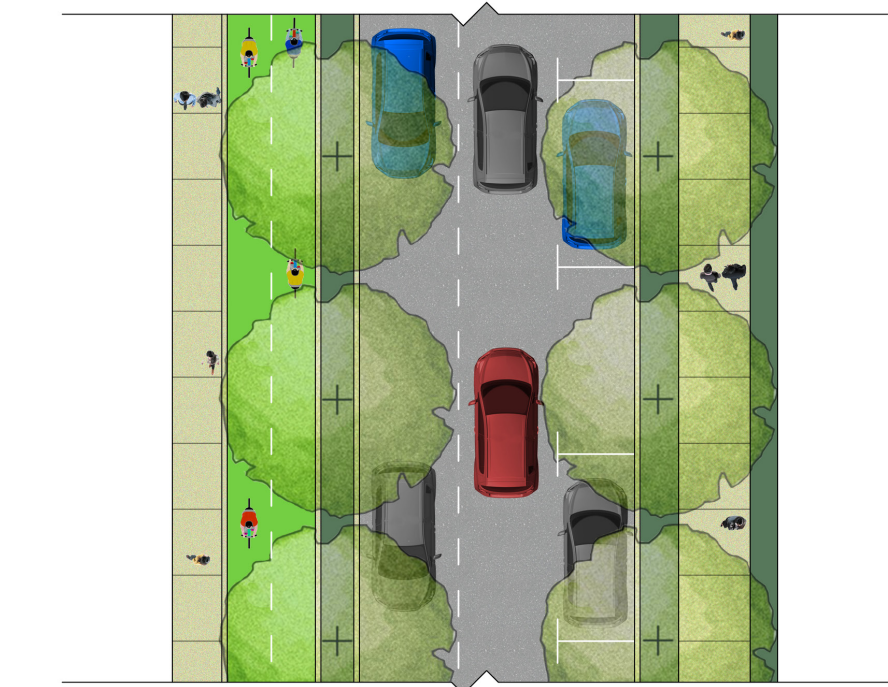
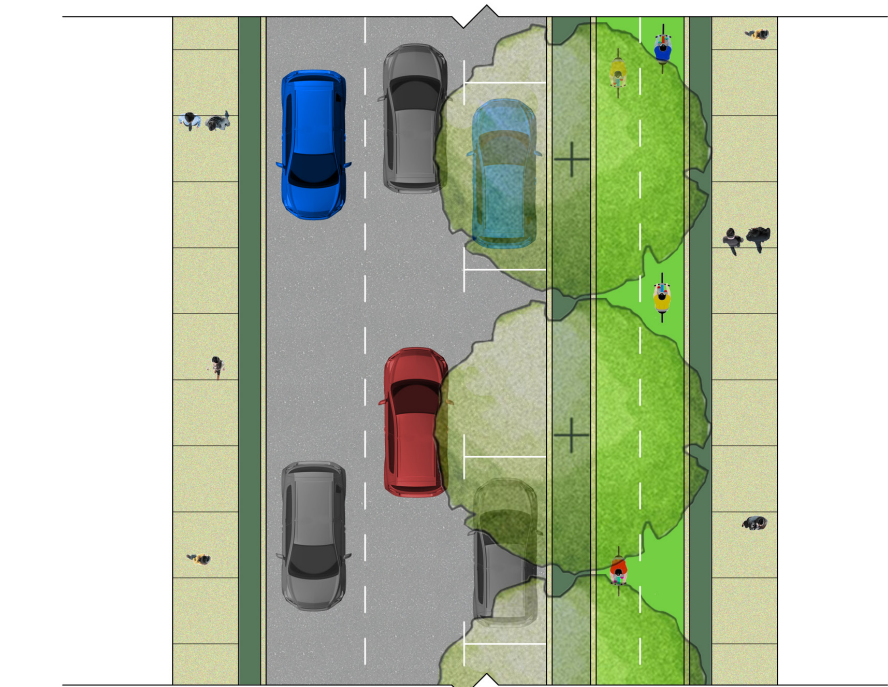
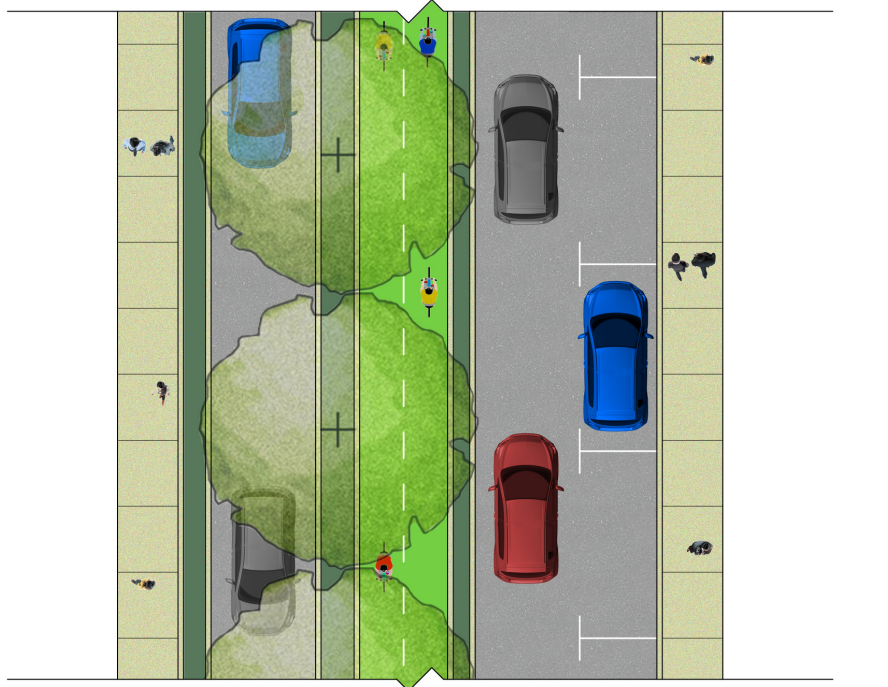
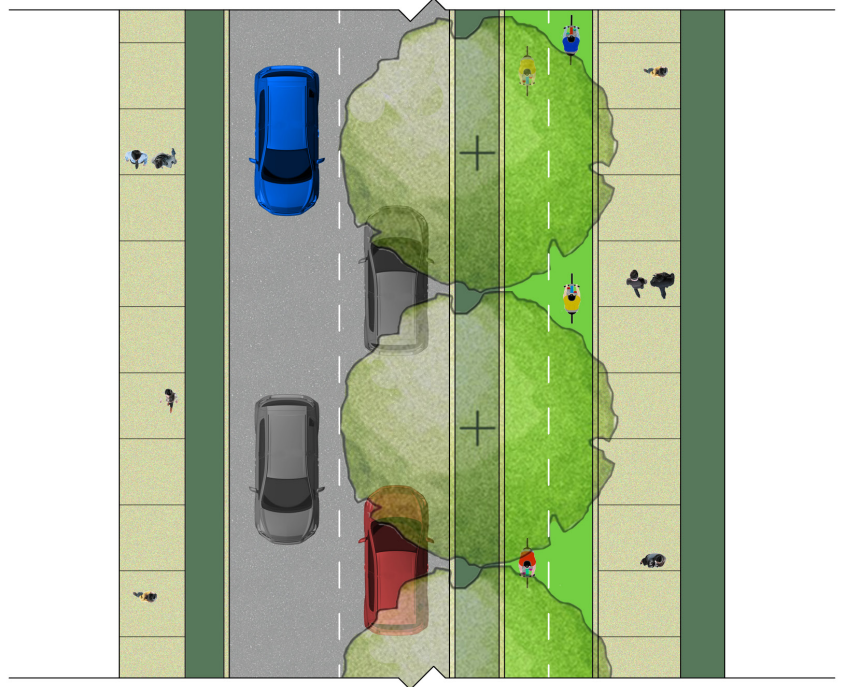
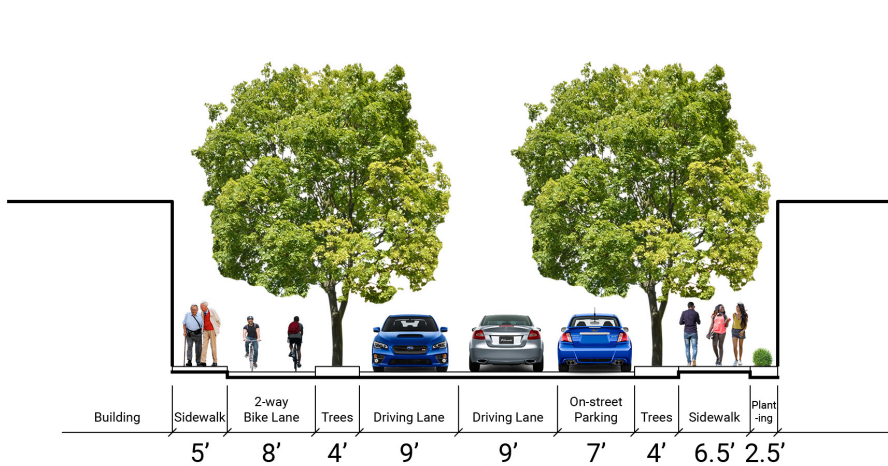
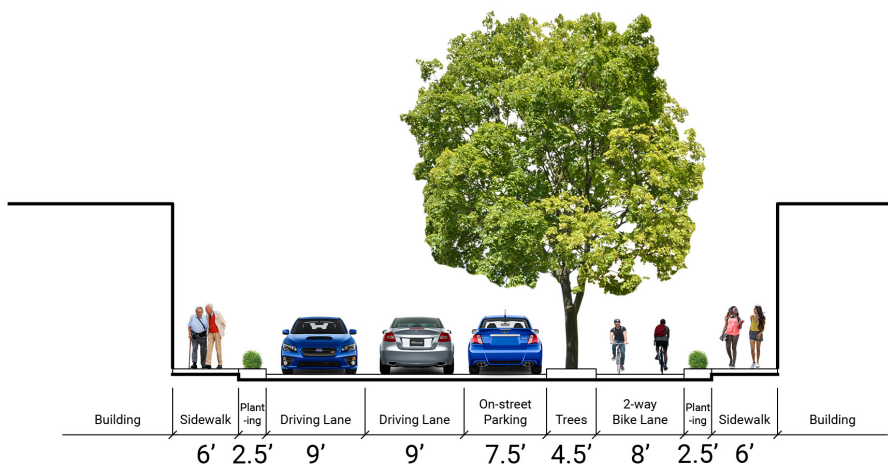
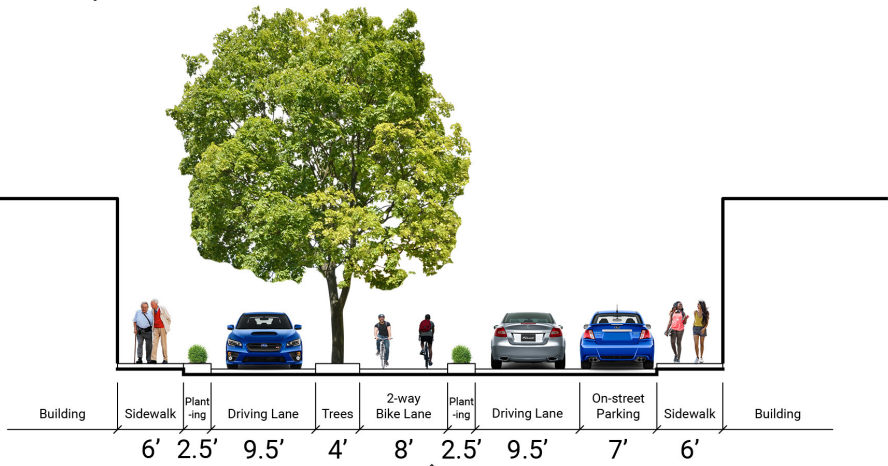
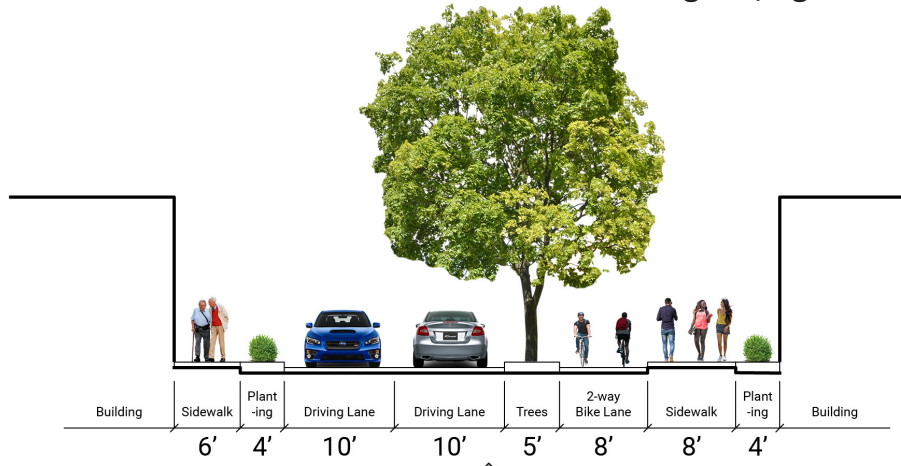
EXISTING



PROPOSED

Weaver Street

is a local street with a 55' right of way. It is a unique local street in that it receives a lot of traffic that diverts off of Main Street and a lot of people walk and bike on it to get to and from the Winooski School Complex. This report proposes option 4 as the most ideal and the rendering on page 44 represents that option.



No street parking 1

With street parking 1

With street parking 2

With street parking 3

Weaver Street



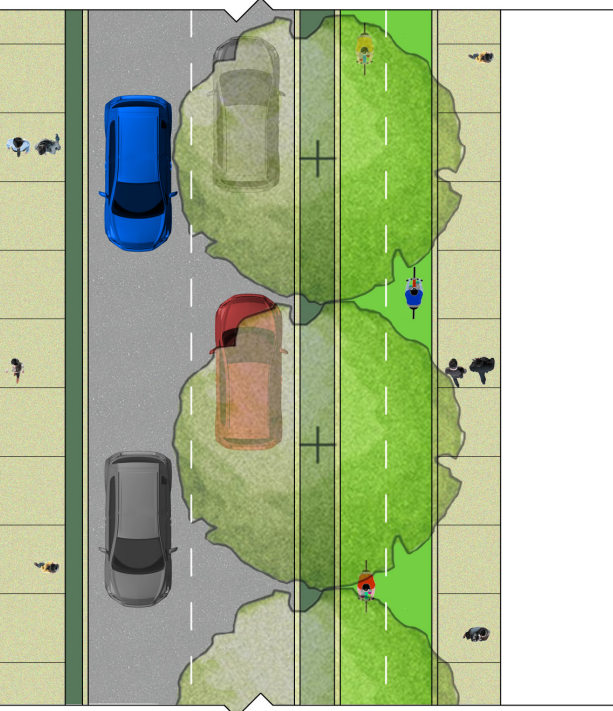
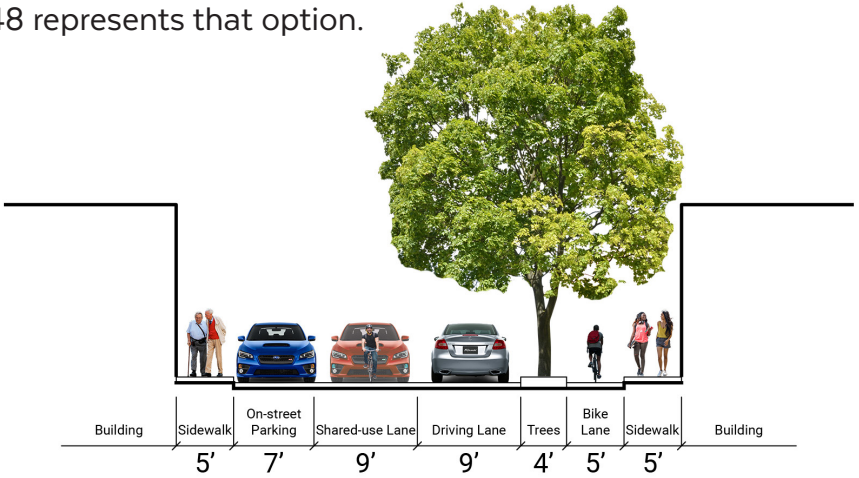
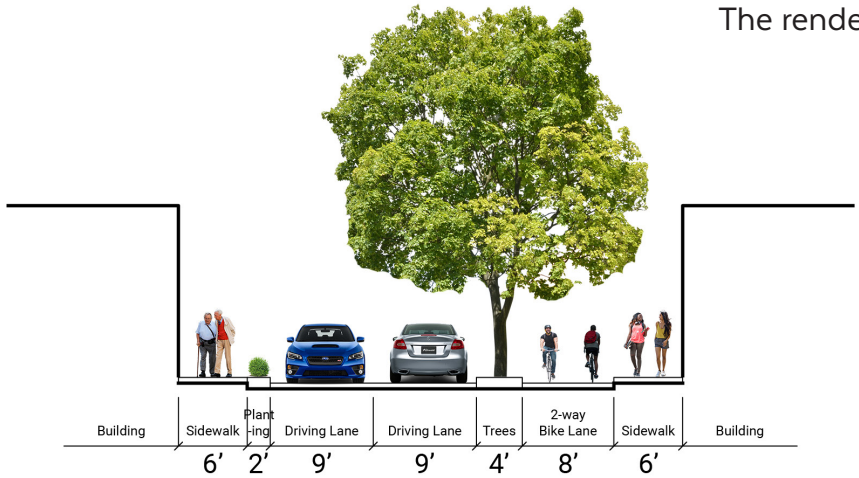
EXISTING



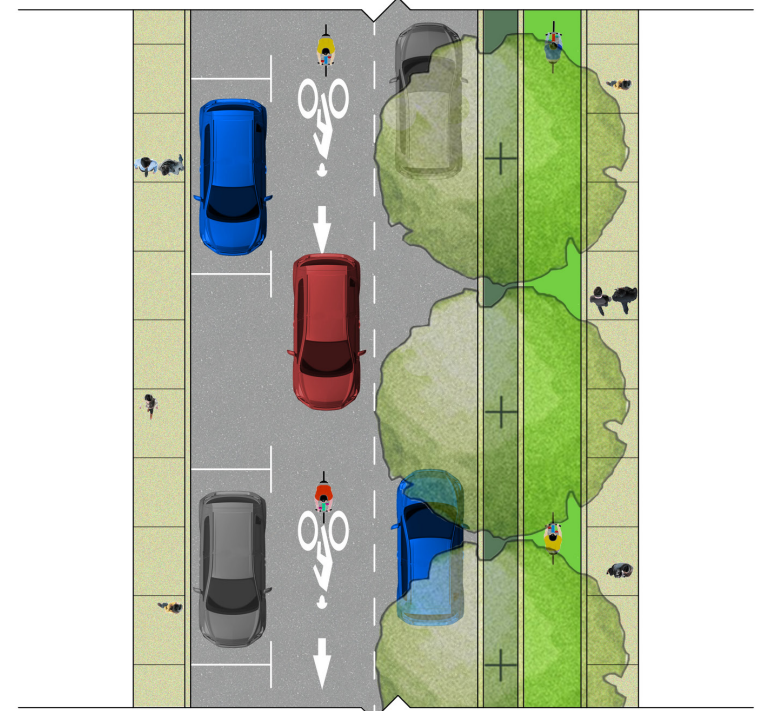
PROPOSED

LaFountain Street

is a main east-west collector street in the City with a 44' right of way. Two options were developed and the option without street parking is proposed as the more ideal due to it allowing both lanes of bicycle traffic to be separated from the driving lanes. The rendering on page 48 represents that option.



No street parking 1



With street parking 1

LaFountain Street



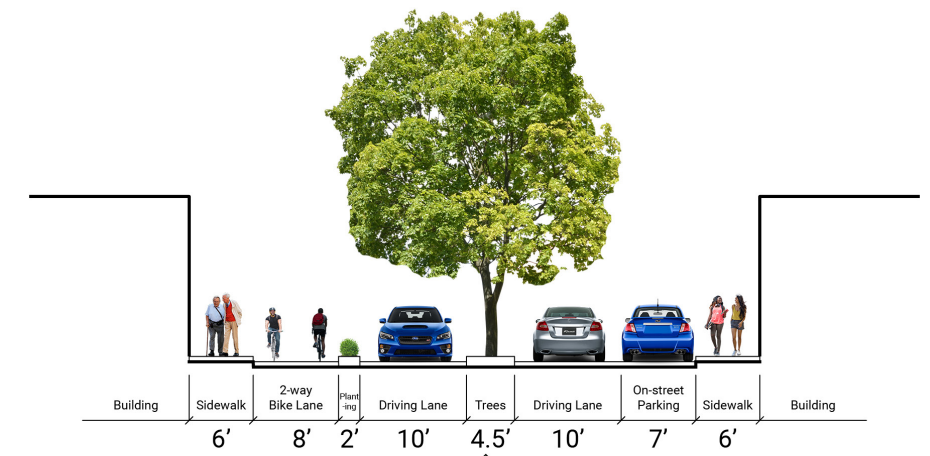
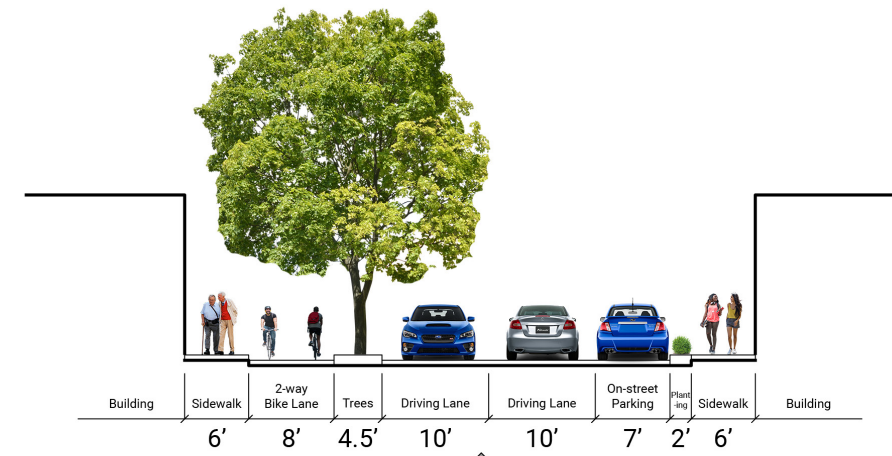
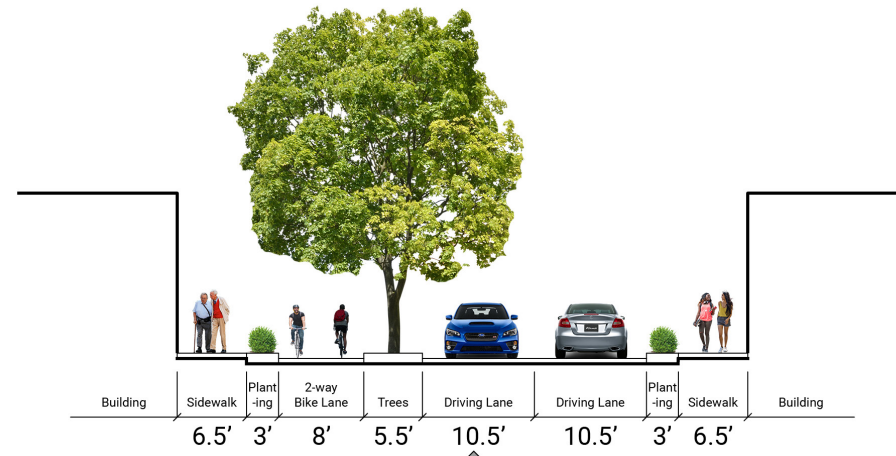
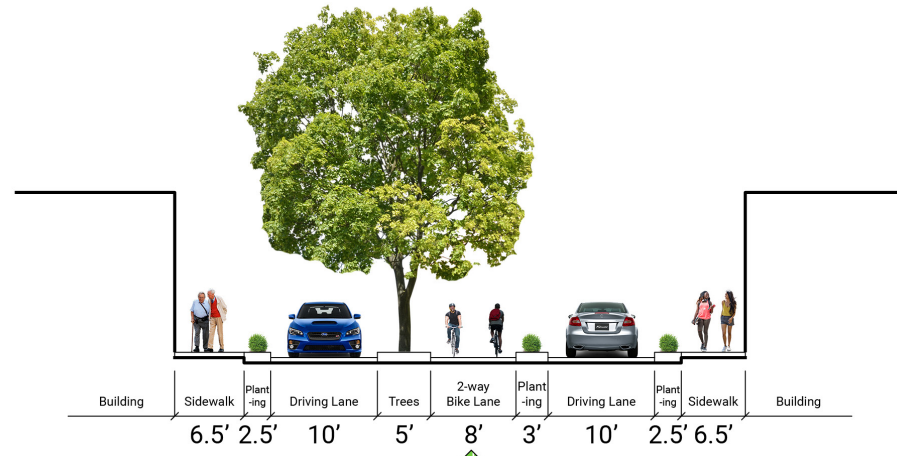
EXISTING



PROPOSED

West Spring Street

is a collector street with a 53.5' right of way. This project proposes option 2 without street parking to be the most ideal. The rendering on page 52 represents this option.



No street parking 1

No street parking 2

With street parking 1

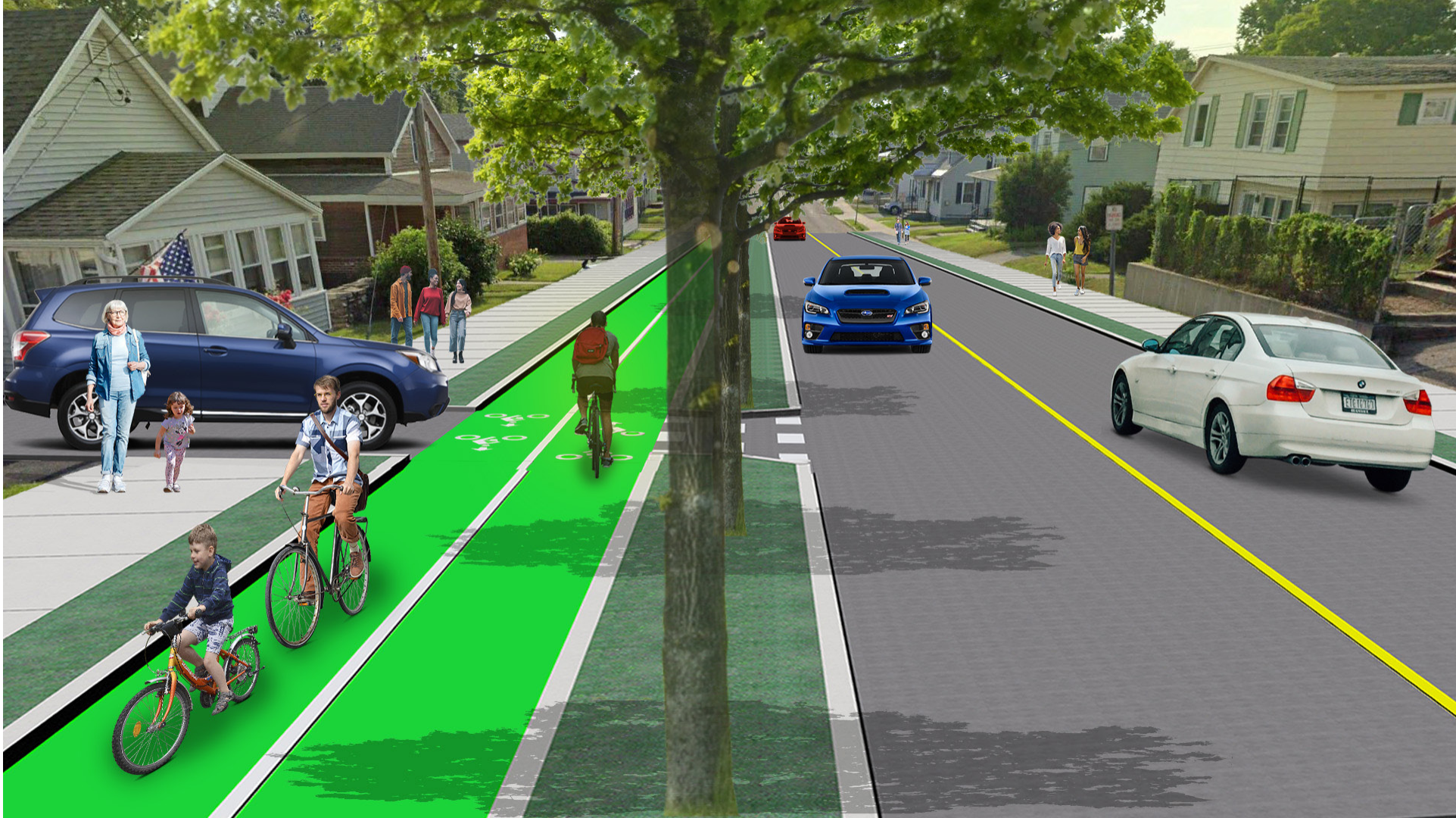
With street parking 2

West Spring Street



Google Earth
© 2022 Google

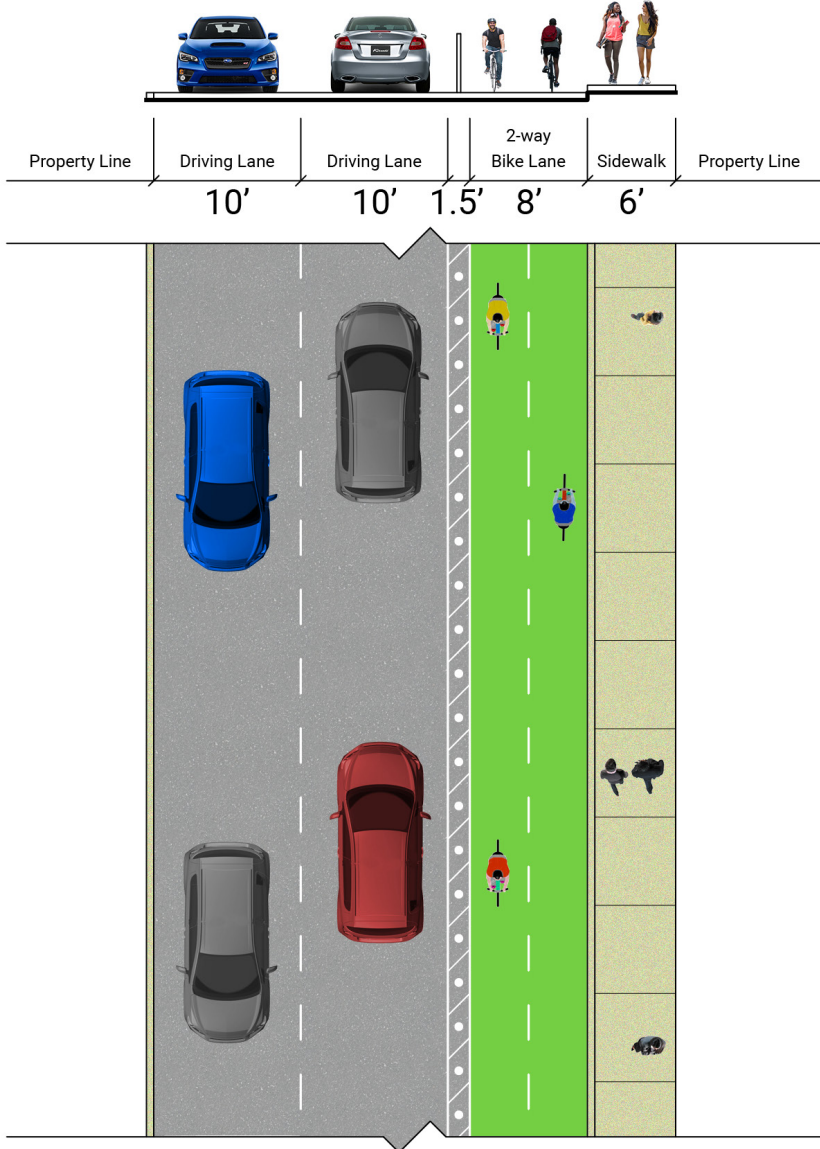
EXISTING



PROPOSED

East Spring Street

is a collector street with a 35.5' right of way. This design proposes a 2-way bike lane separated by bollards and a sidewalk on one side of the street.



East Spring Street



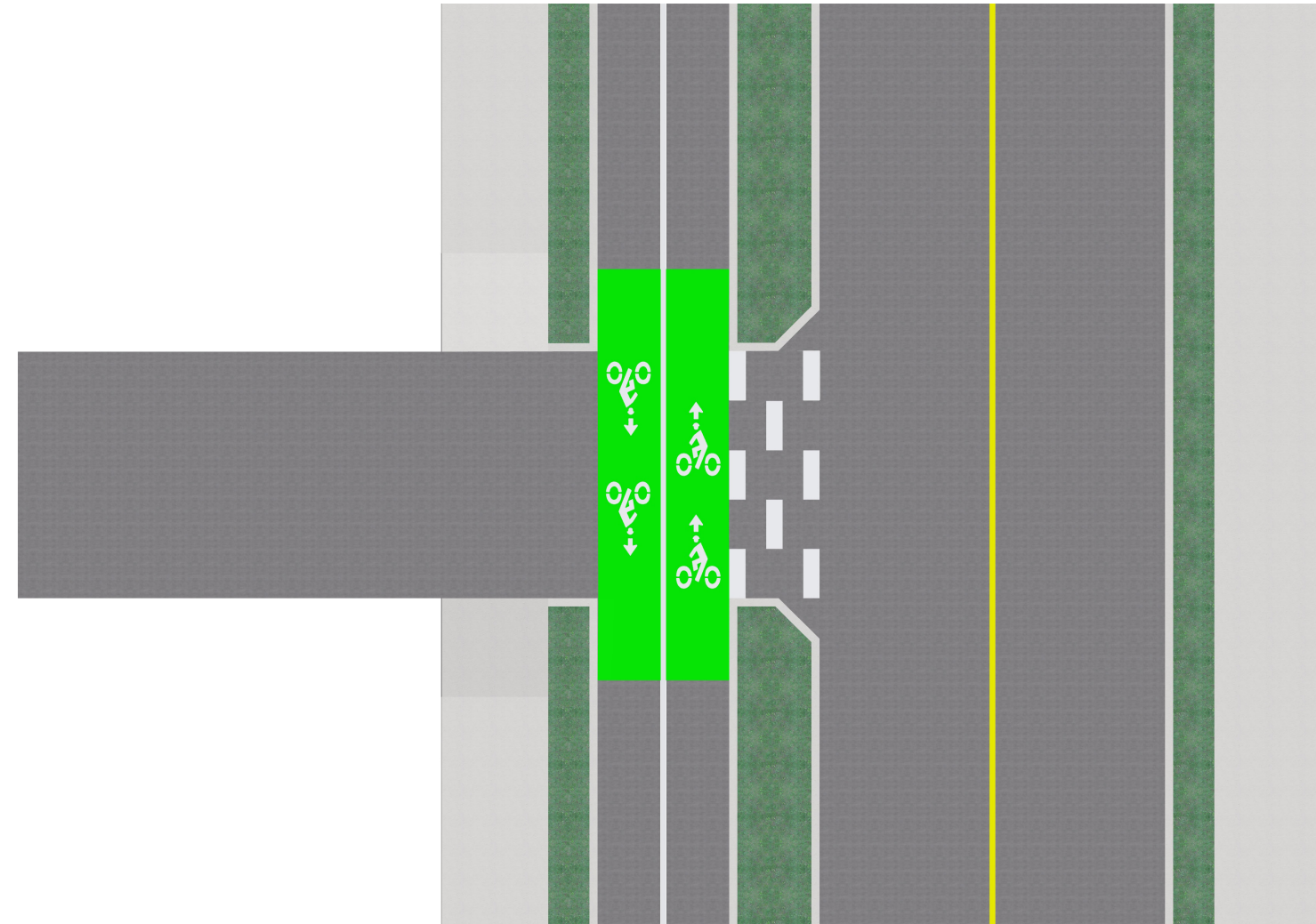
EXISTING



PROPOSED

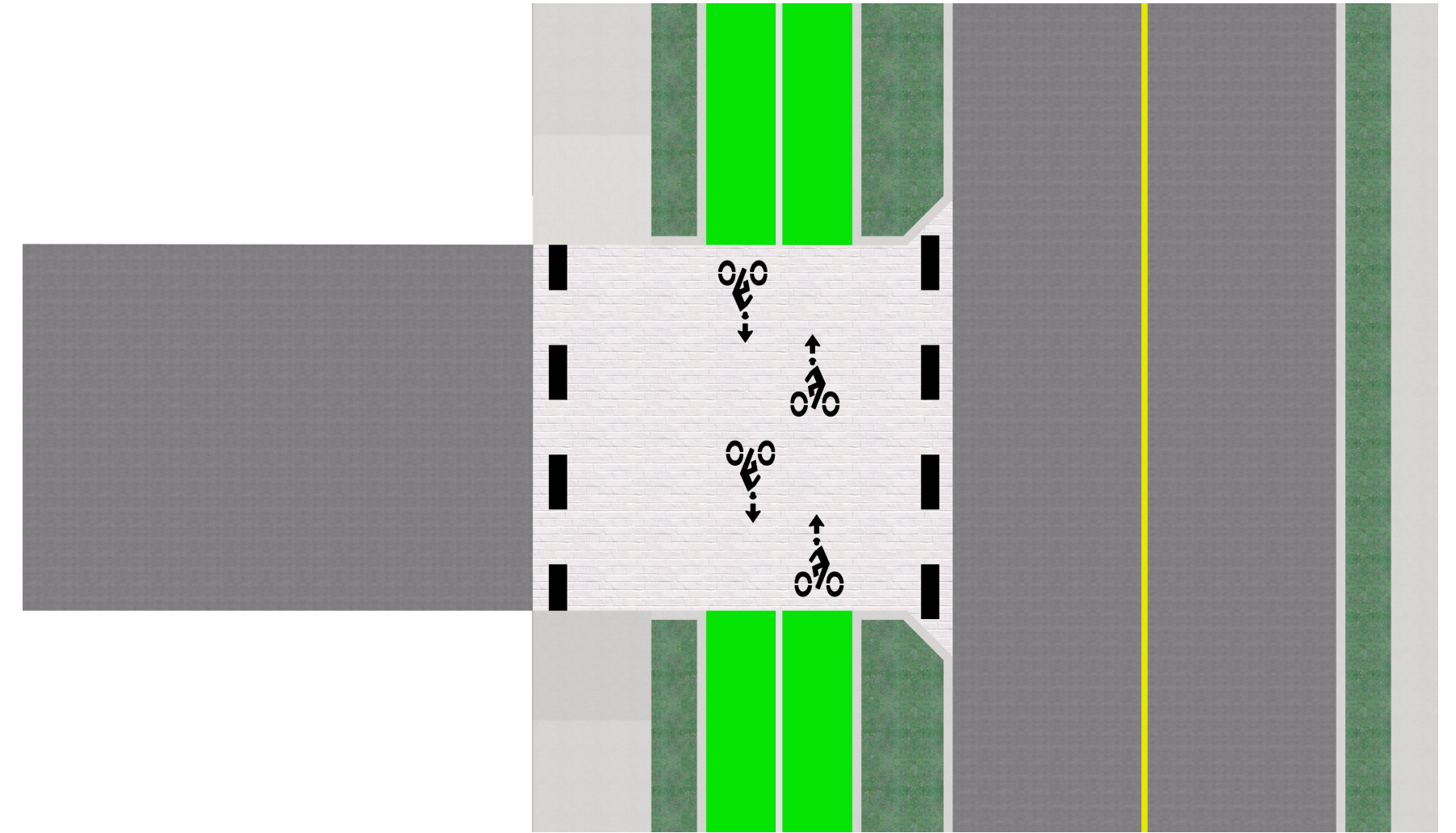
Driveway Crossings

An important aspect for making separated bike lanes feasible is the treatment given at driveway crossings. The three main strategies are: pavement marking treatments, signage, and grade change or raised intersections. This project proposes two types of treatments. The first is for residential driveways. The materiality of the pavement is consistent across the “conflict zone” but pavement markings and different colors are used to increase visibility and awareness of the “conflict zone”.



RESIDENTIAL

The second treatment is for mixed-use areas and parking lot access driveways. Once again there are color difference cues, but the materiality in the “conflict zone” also changes to brick. This material change provides texture and sound differences that cue more alertness and recognition that one is in a different type of space.



MIXED-USE and PARKING LOT ACCESS



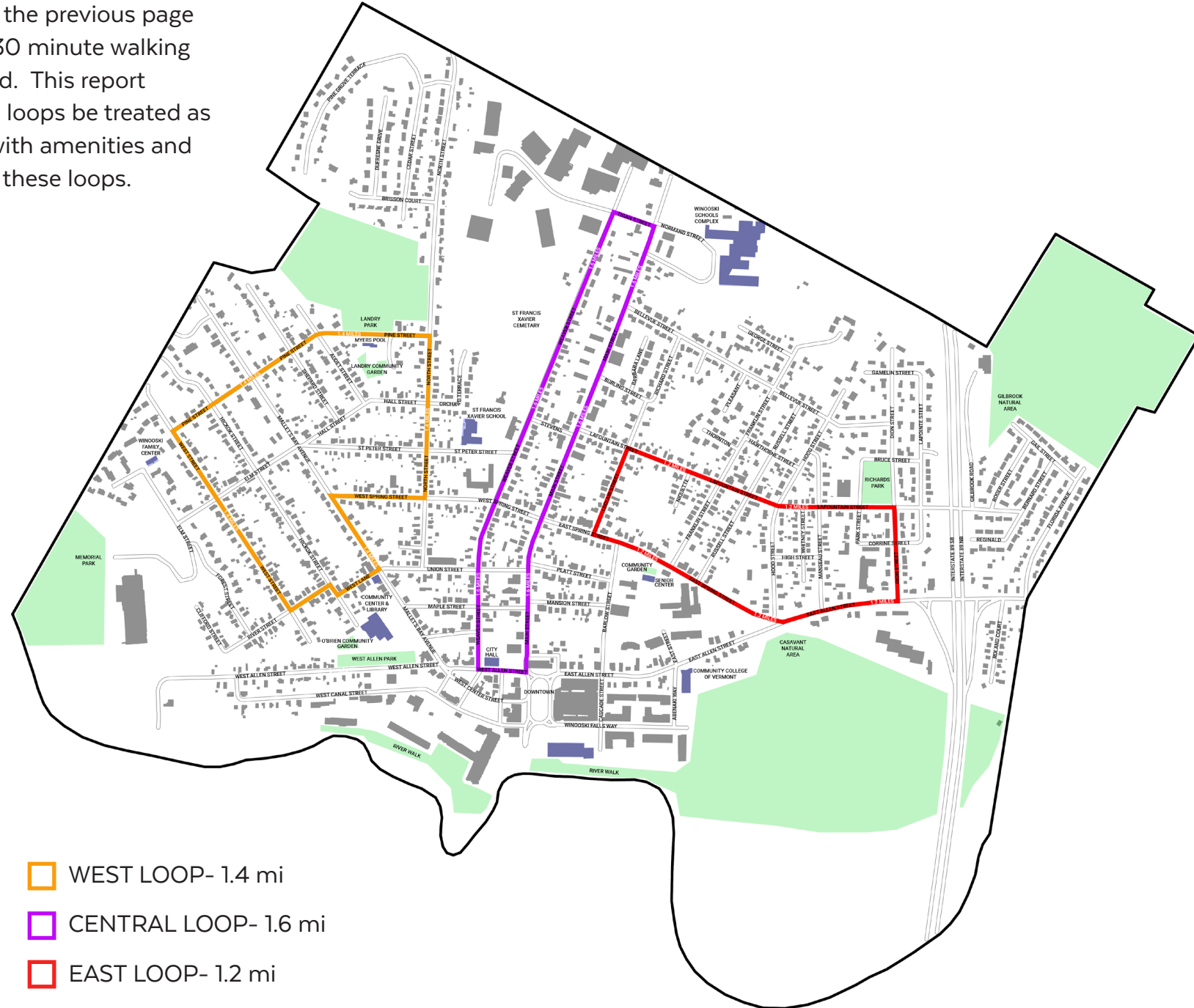
Walking Routes
pages 60-66

First, important pedestrian routes connecting green spaces, civic spaces, and social spaces with one another were mapped.



Walking Routes

From the routes on the previous page three different 20-30 minute walking loops were extracted. This report suggests that these loops be treated as linear park spaces with amenities and maintenance along these loops.



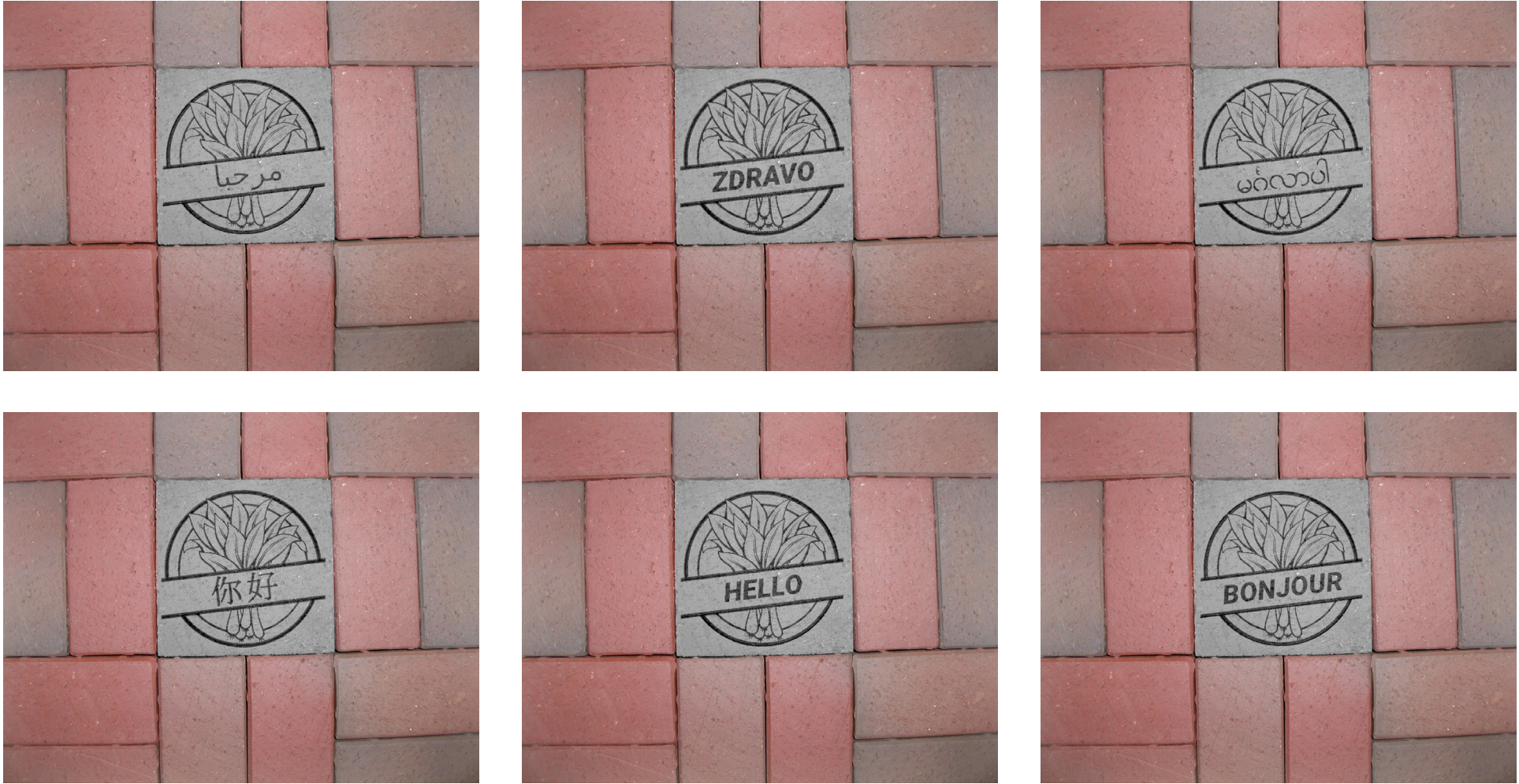
Walking Loops

In addition to basic wayfinding features such as maps that display these routes this report proposes design features that bring these routes to life. To accomplish this aspects of Winooski's culture could be layered on these routes. This report took design inspiration from three of these aspects. First, 'winooski' is the Abenaki word for onion. Winooski is known as the "Onion City" because of the wild ramps that grow along the banks of the Winooski River. Secondly, the Winooski falls and old mill buildings, especially the Champlain Mill, are also part of Winooski's iconography. Lastly, another interesting and distinguishing feature of Winooski is that almost 30 languages are spoken in the city. Some of these elements are already present in the city's branding. You can see the onions on the town seal on the left. And the falls and the Champlain Mill building are used on the city's 100th anniversary graphic on the right.



Adding a Cultural Layer

Pavers with word “hello” in the different languages spoken in Winooski are embedded within the town seal for a ground plane feature. A brick sidewalk is recommended to tie these loops to downtown’s paving and distinguish the walking loops from other streets. But these pavers could also be embedded in concrete as seen on the opposite page.



Cultural Layer- Ground Plane



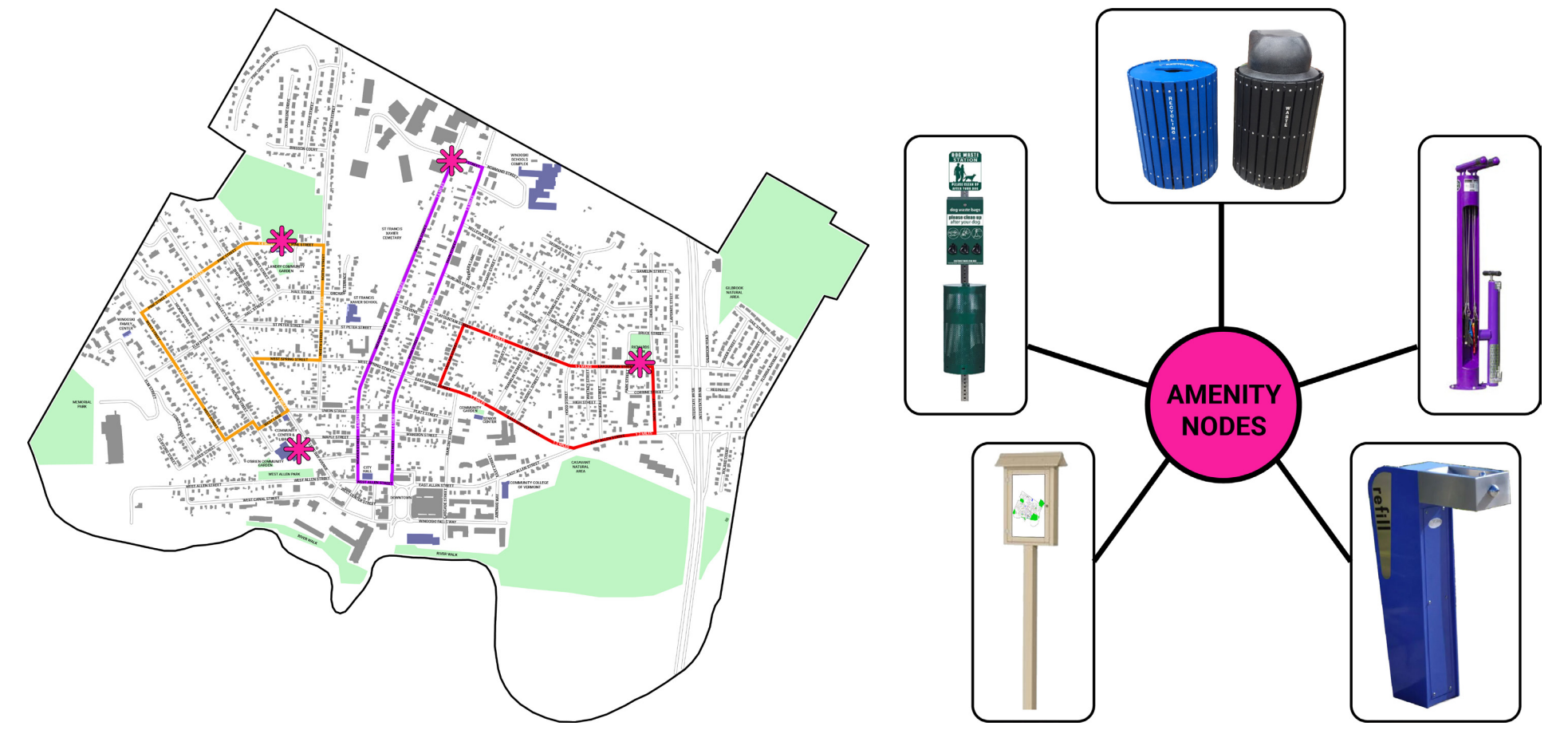
Cultural Layer- Ground Plane

Pole banners displayed along the loops are proposed as a vertical plane feature for the walking loops. The example on the right has the word “welcome” in the different languages spoken in Winooski and incorporates Winooski’s recent branding as Vermont’s “Opportunity City”.

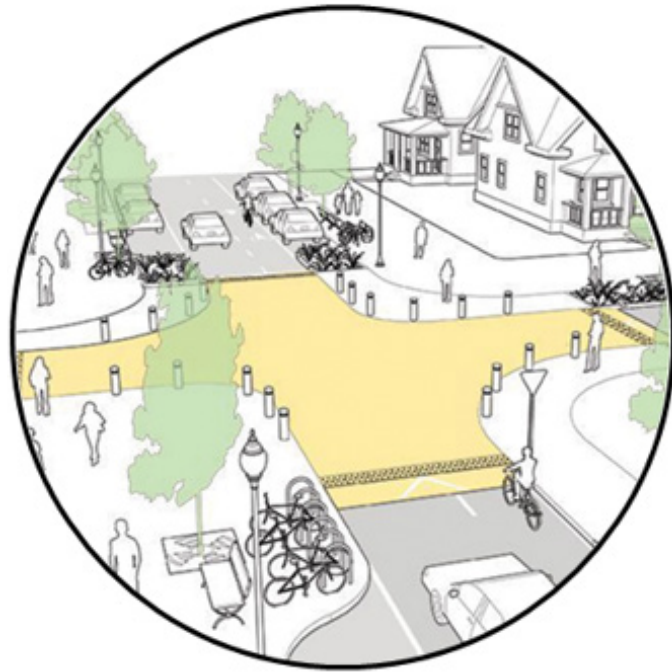


Cultural Layer- Vertical Plane

For these loops to be successful this report also proposes the installation of amenities in four key locations: at the north end of Weaver Street close to the schools; LaFountain Street at Richards Park; Pine Street at Landry Park; and outside of the Winooski Community Center. These amenity nodes would include these features: trash and recycling, a dog waste station, a map kiosk, a bicycle repair station, and a water refill station. Although not mapped this report also proposes adding benches along these loops every quarter mile as space allows, but especially on the street at Richards Park and Landry Park. These two parks need more of an interface with their respective streets with seating and amenities for those who are using the streets but not entering the parks.



Amenity Nodes



Intersection Design

pages 68-77

To promote more active living, recreation, and safe routes to school there are some key intersections in Winooski in need of redesign. This report includes ideas for three of these intersections, but recognizes that intersection design could be a great opportunity for community input and collective creativity. Of the different features that may be included in intersection design this report focuses on these five characteristics: crossings raised to sidewalk height; different textures; different colors; tight corner radii; and signalization.



Kids cross over this intersection daily to get to and from school. For southbound cars this intersection is also a gateway to the city of Winooski. On that side of the intersection the word 'Winooski' is included over the Winooski Falls. Facing the other side is the onion iconography. The raised intersection not only makes people more visible but acts as a speed table.



Main Street and Tigan Street (school complex)

Halfway between the school intersection and downtown, this is an important intersection for people crossing over Main Street. Currently, there is faded zebra striping but this report recommends a crossing that is raised, colorful, and signalized. Once again the raised intersection doubles as a speed table. A ground-level view is included on the following page.



Main Street, LaFountain Street, and Stevens Street



Main Street, LaFountain Street, and Stevens Street

This is an important intersection for people crossing over Mallet's Bay Avenue. The Winooski Falls were used as design inspiration and they mimic zebra striping. Once again the intersection is raised and signalized. A ground-level view is included on the following page.



Mallet's Bay Avenue and West Spring Street

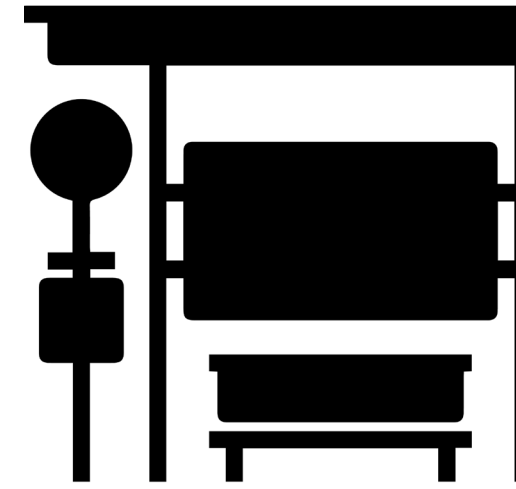


Mallet's Bay Avenue and West Spring Street

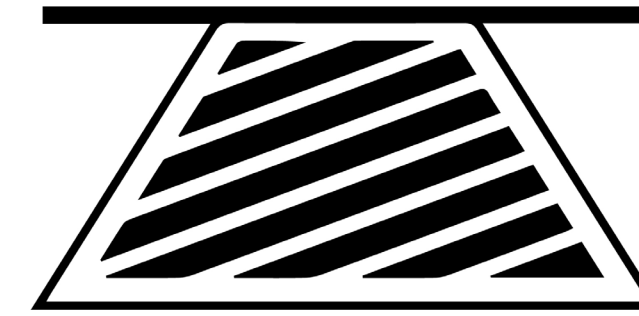
The last design intervention this report proposes is the installation of permanent parklets to add to the number of accessible social spaces available in the neighborhoods of Winooski. There are three main opportunities for incorporating these parklets- at bus stops, traditional parking spots, and sidewalk bump-outs.



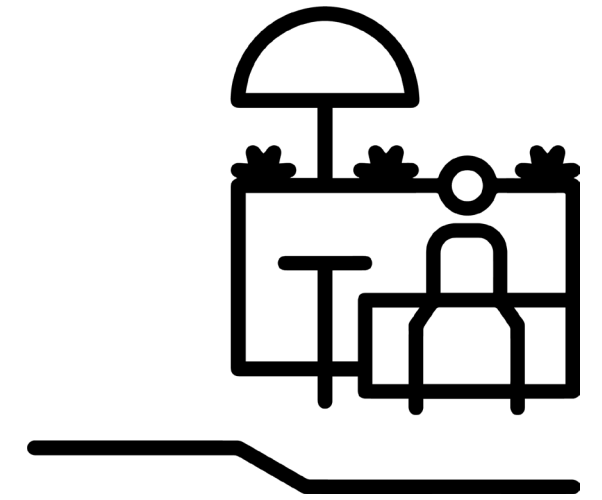
Parklets
pages 80-96



Bus Stops

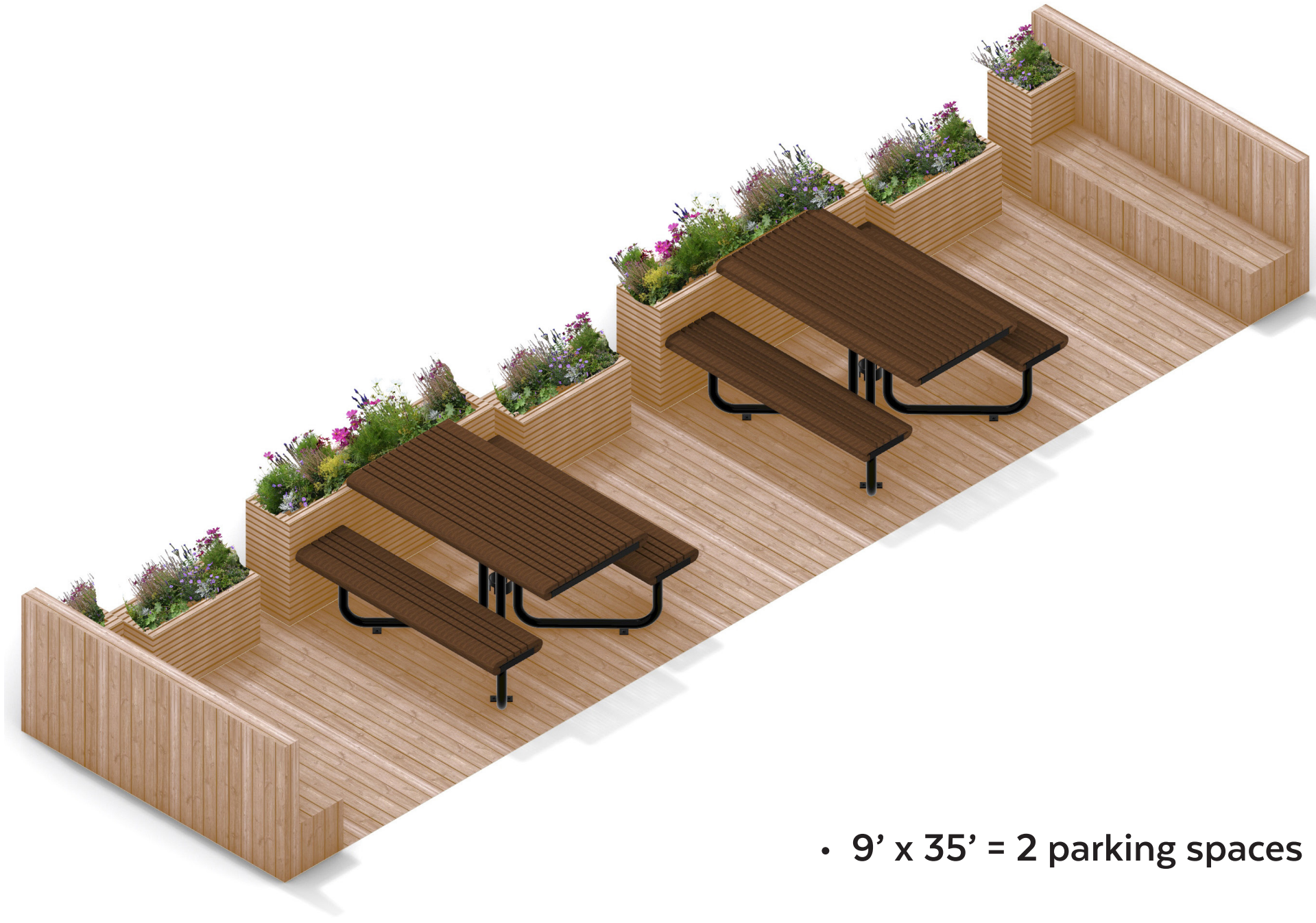


Parking Spots



Sidewalk Bump-outs

A simple parklet could be accomplished with a platform at sidewalk height, a couple picnic tables, and some planters.



• 9' x 35' = 2 parking spaces

Another example includes a pergola structure to provide shade and two "rooms" separated by a planter.





Another view of this type of parklet.

A view of a parklet in the landscape, seen here on Mallet's Bay Avenue.



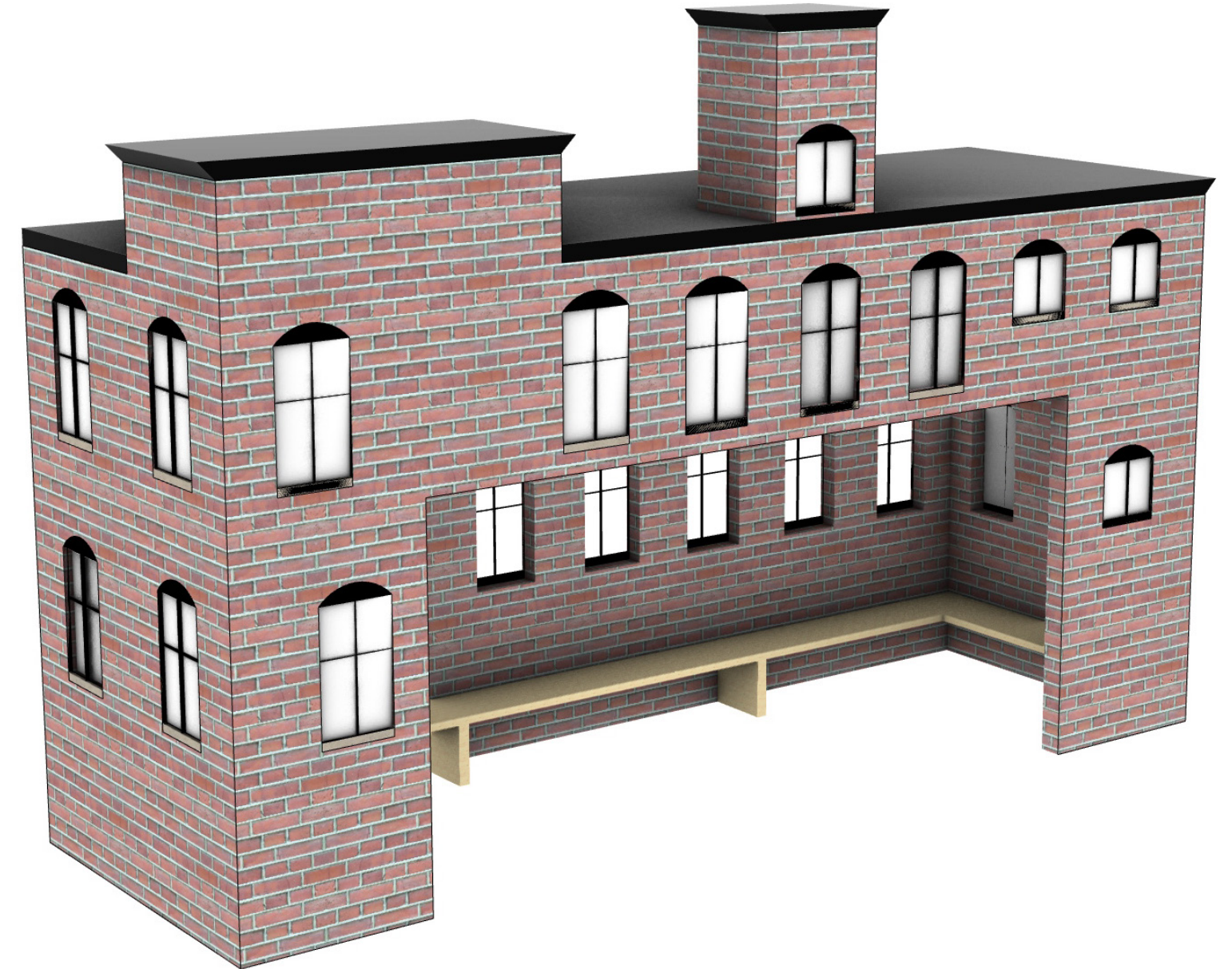
A view of a parklet in the landscape, seen here on LaFountain Street at Richards Park.



In addition to parklets that are easily replicable, there is opportunity to create parklets that are bolder or more fanciful; structures that could be iconic in their own right. Here is a bus stop parklet taking inspiration from the Champlain Mill.



Champlain Mill Building



Champlain Mill Parklet

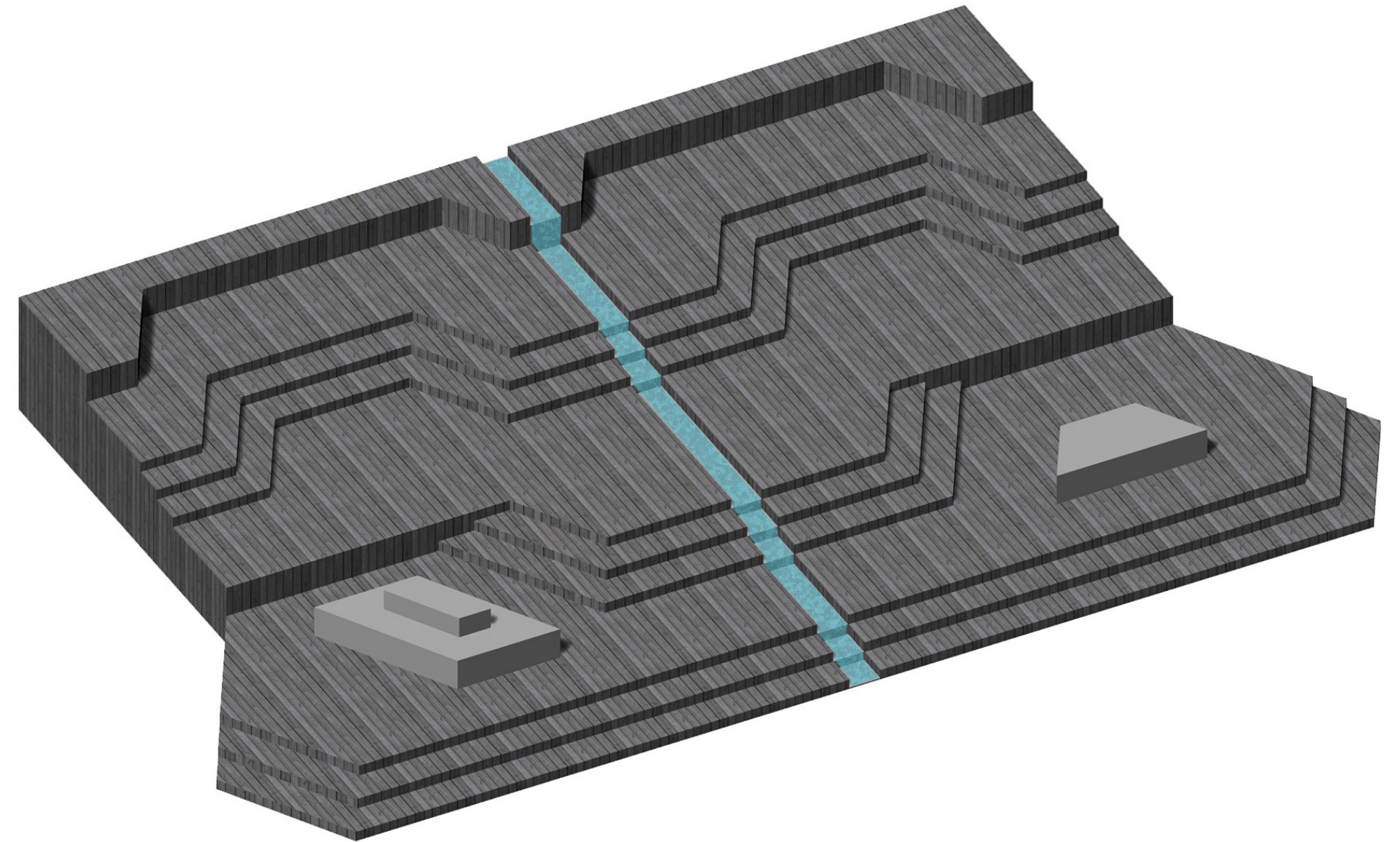
Here is a view of the Champlain Mill parklet in the landscape, seen here at the top of Weaver Street.





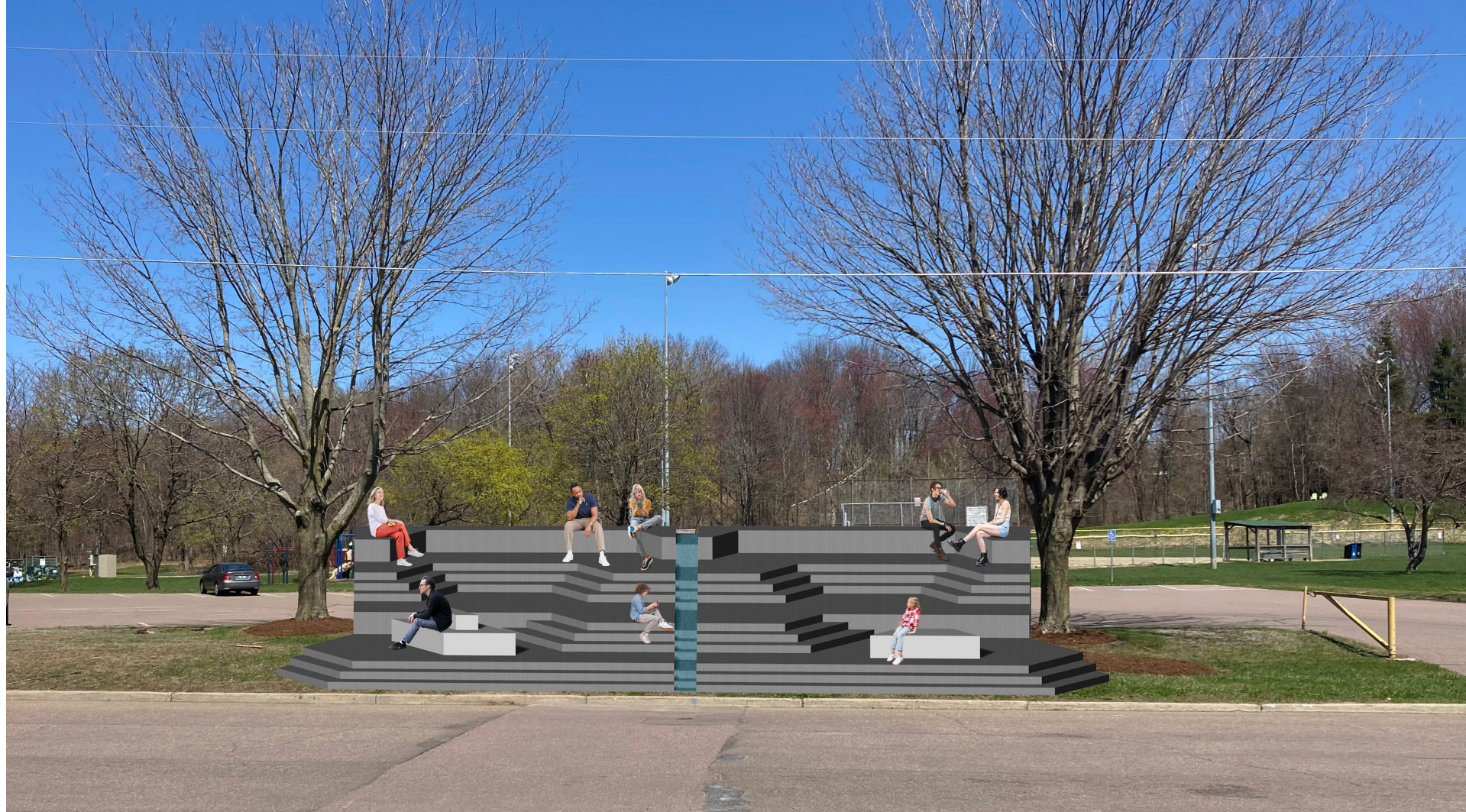
Winooski Falls

Taking inspiration from the Winooski Falls here is a seating structure that mimics the descending river bed ledges of the falls and has a water fountain feature flowing through a runnel in the center.

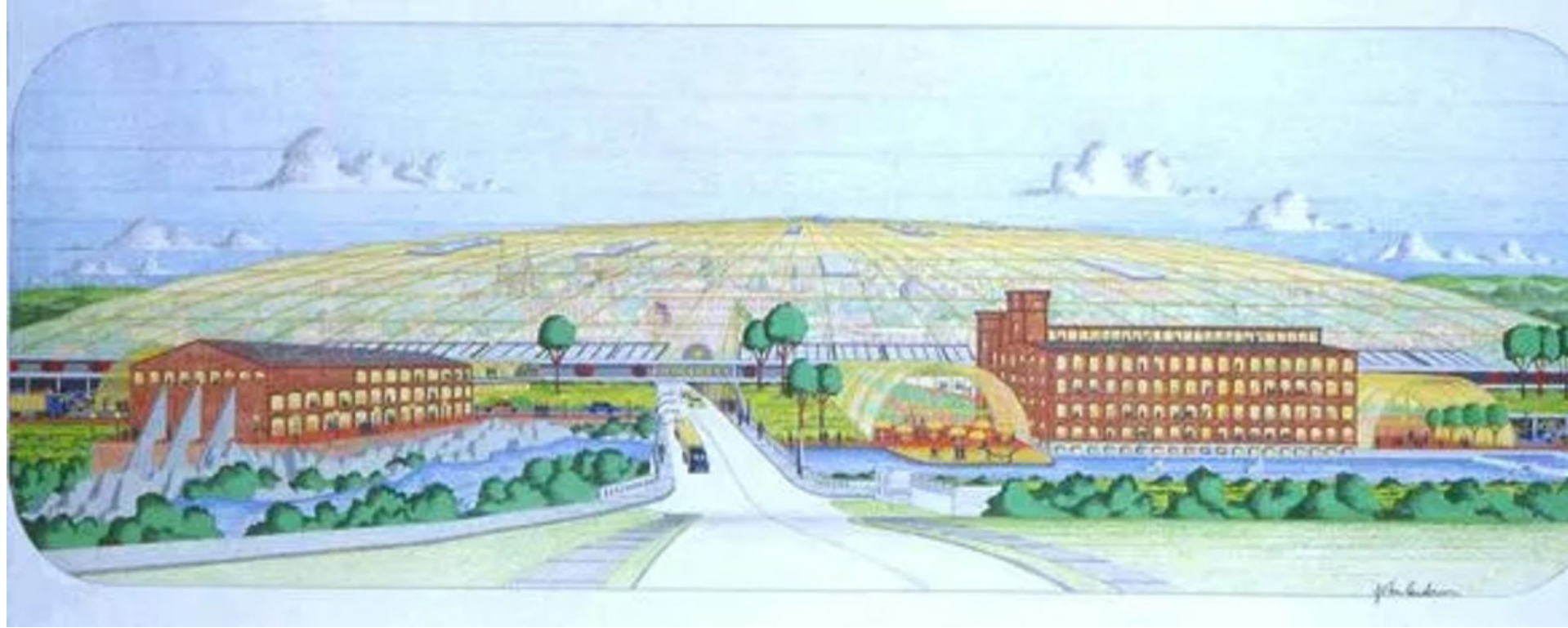


Winooski Falls Parklet

The Winooski Falls parklet in the landscape, seen here on Pine Street at Landry Park.



The Winooski Dome was a proposal in the late 1970s to cover the city of Winooski in a dome to cut down on energy costs. Below is a rendering of the dome by architect John Anderson.



Winooski Dome

This parklet takes inspiration from the proposal of the Winooski Dome. It is seen here on Pine Street at Landry Park.



Winooski Dome Parklet

Conclusion

This project evaluated the role that urban landscape design and planning have in the field of mental health. The literature review suggests both that the built environment is an important determinant of mental health and that there are at least four strategies for developing the built environment in ways that promote positive mental health outcomes. Therefore, designers and planners have a clear role in the field of mental health given their professional responsibilities in developing the built environment. Most interest and research to date has been on how to improve physical health through community design but an emerging body of research has shown ways that mental health can be improved through access to quality green spaces, active living spaces, pro-social spaces, and community safety and security. Not only can implementation of these strategies improve the symptom severity of specific mental disorders, but they can also be protective factors that strengthen a given population's mental

health resilience for good mental health and mental illness prevention and recovery.

Despite evidence demonstrating how urban design and planning can affect mental health there is a lack of proposed or completed projects that specifically address promotion of positive mental health outcomes in a community. This project is meant to fill that gap by demonstrating implementation of these strategies into a fully developed design proposal that could be used for a specific community but also studied as an example for future projects in other communities. The city of Winooski was chosen because of its risk factors for poor mental health. It is thought that designing for a community with higher mental health needs would serve as a better case study example for future projects.

The four design strategies proposed potentially offer ecological and economic benefits in addition to positive mental health promotion. Regardless, a limitation of design interventions is the upfront cost. That is why this project focused on microscale interventions which are not only lower cost but can be implemented in a shorter time-frame. In the literature review streetscapes

emerged as an important element of the urban fabric for mental health promotion, and in some respects this project could be described as a streetscape improvement project. This focus should help provide a clear set of best practices to support community mental health that could be replicated in other locations. Winooski demographics are more diverse compared with the rest of Vermont, but any study of one town limits how much the results can be generalized to other areas of the country. While Winooski is a large town by Vermont standards, it is a small municipality when compared nationally. The needs of every community are unique, and as such must be considered in every design project. This project hopes to accomplish both a design and a set of design recommendations for the promotion of mental health, an important global health issue with significant human, social, and economic benefits.

References

- Alegria, Margarita, Amanda NeMoyer, Irene Falgàs Bagué, Ye Wang, and Kiara Alvarez. 2018. "Social Determinants of Mental Health: Where We Are and Where We Need to Go." *Current Psychiatry Reports* 20 (11): 95. <https://doi.org/10.1007/s11920-018-0969-9>.
- Cain, Kelli L., Rachel A. Millstein, James F. Sallis, Terry L. Conway, Kavita A. Gavand, Lawrence D. Frank, Brian E. Saelens, et al. 2014. "Contribution of Streetscape Audits to Explanation of Physical Activity in Four Age Groups Based on the Microscale Audit of Pedestrian Streetscapes (MAPS)." *Social Science & Medicine* 116 (September): 82–92. <https://doi.org/10.1016/j.socscimed.2014.06.042>.
- Clark, Charlotte, Myron Rowan, Stephen A. Stansfeld, and Bridget Candy. 2007. "A Systematic Review of the Evidence on the Effect of the Built and Physical Environment on Mental Health." *Journal of Public Mental Health* 6 (2): 14–27. <http://dx.doi.org.silk.library.umass.edu/10.1108/17465729200700011>.
- "Depression and Other Common Mental Disorders: Global Health Estimates." 2017. Geneva: World Health Organization.
- Edwards, Peggy, and Agis Tsouros. 2006. "Promoting Physical Activity and Active Living in Urban Environments," 66.
- "Environmental Barriers to Activity." 2012. Obesity Prevention Source. October 21, 2012. <https://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/physical-activity-environment/>.
- Evans, Gary W. 2003. "The Built Environment and Mental Health." *Journal of Urban Health : Bulletin of the New York Academy of Medicine* 80 (4): 536–55. <https://doi.org/10.1093/jurban/jtg063>.
- Firdaus, Ghuncha. 2017. "Built Environment and Health Outcomes: Identification of Contextual Risk Factors for Mental Well-Being of Older Adults." *Ageing International* 42 (1): 62–77. <https://doi.org/10.1007/s12126-016-9276-0>.
- Francis, Jacinta, Lisa J. Wood, Matthew Knuiaman, and Billie Giles-Corti. 2012. "Quality or Quantity? Exploring the Relationship between Public Open Space Attributes and Mental Health in Perth, Western Australia." *Social Science & Medicine* 74 (10): 1570–77. <https://doi.org/10.1016/j.socscimed.2012.01.032>.
- Gehl Institute. 2017. "Crime Prevention Through Environmental Design: A Public Life Approach." <https://gehl.institute.org/wp-content/uploads/2017/02/CPTED-Public-Life-Approach.pdf>.
- Gruebner, Oliver, Michael A. Rapp, Mazda Adli, Ulrike Kluge, Sandro Galea, and Andreas Heinz. 2017. "Cities and Mental Health." *Deutsches Aertzteblatt Online*, February. <https://doi.org/10.3238/arztebl.2017.0121>.
- Hare Duke, Laurie. 2017. "The Importance of Social Ties in Mental Health." *Mental Health and Social Inclusion* 21 (5): 264–70.
- Heath, Gregory W., Ross C. Brownson, Judy Kruger, Rebecca Miles, Kenneth E. Powell, and Leigh T. Ramsey. 2006. "The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review." *Journal of Physical Activity & Health* 3 (January): S55–76.
- Houle, Janie, Simon Coulombe, Stephanie Radziszewski, Xavier Leloup, Thomas Saïas, Juan Torres, and Paul Morin. 2017. "An Intervention Strategy for Improving Residential Environment and Positive Mental Health among Public Housing Tenants: Rationale, Design and Methods of Flash on My Neighborhood!" *BMC Public Health* 17 (1): 737. <https://doi.org/10.1186/s12889-017-4730-9>.
- "How the City Affects Mental Health." n.d. Centre for Urban Design and Mental Health. Accessed March 22, 2021. <https://www.urbandesignmentalhealth.com/how-the-city-affects-mental-health.html>.
- "How Urban Design Can Impact Mental Health." n.d. Centre for Urban Design and Mental Health. Accessed March 23, 2021. <https://www.urbandesignmentalhealth.com/how-urban-design-can-impact-mental-health.html>.
- Kawachi, I. 2001. "Social Ties and Mental Health." *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 78 (3): 458–67. <https://doi.org/10.1093/jurban/78.3.458>.
- Leyden, Kevin M., Abraham Goldberg, and Philip Michelbach. 2011. "Understanding the Pursuit of Happiness in Ten Major Cities." *Urban Affairs Review* 47 (6): 861–88. <https://doi.org/10.1177/1078087411403120>.
- Litman, Todd. 2021. "Urban Sanity: Understanding Urban Mental Health Impacts and

How to Create Safer, Happier Cities.” Victoria Transport Policy Institute, 61.

Liu, Qingnan, Ben Welle, Wei Li, Robin King, Claudia Adriaola-Steil, Claudio Sarmiento, and Marta Obelheiro. 2015. “Cities Safer By Design: Guidance and Examples to Promote Traffic Safety through Urban and Street Design.” I.O. World Resources Institute.

Mair, C, A V Diez Roux, and S Galea. 2008. “Are Neighbourhood Characteristics Associated with Depressive Symptoms? A Review of Evidence.” *Journal of Epidemiology and Community Health* (1979-) 62 (11): 940–46.

“Mental Disorders.” n.d. World Health Organization. Accessed March 22, 2021. <https://www.who.int/news-room/fact-sheets/detail/mental-disorders>.

“Mental Health.” n.d. World Health Organization. Accessed March 22, 2021. https://www.who.int/health-topics/mental-health#tab=tab_2.

“Mental Health | Healthy People 2020.” n.d. Office of Disease Prevention and Health Promotion. Accessed March 22, 2021. <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Mental-Health/determinants>.

“Mental Health: Strengthening Our Response.” n.d. World Health Organization. Accessed March 22, 2021. <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>.

Mouratidis, Kostas. 2018. “Built Environment and Social Well-Being: How Does Urban Form Affect Social Life and Personal Relationships?” *Cities* 74 (April): 7–20. <https://doi.org/10.1016/j.cities.2017.10.020>.

Nunes, Belina, Ricardo D. Silva, Vitor T. Cruz, Jose M. Roriz, Joana Pais, and Maria C. Silva. 2010. “Prevalence and Pattern of Cognitive Impairment in Rural and Urban Populations from Northern Portugal.” *BMC Neurology* 10 (June). <https://doi.org/10.1186/1471-2377-10-42>.

Peen, J., R. A. Schoevers, A. T. Beekman, and J. Dekker. 2010. “The Current Status of Urban–Rural Differences in Psychiatric Disorders.” *Acta Psychiatrica Scandinavica* 121 (2): 84–93. <https://doi.org/10.1111/j.1600-0447.2009.01438.x>.

“QuickStats: Age-Adjusted Rates for Suicide,* by Urbanization of County of Residence† – United States, 2004 and 2013.” 2015. Centers for Disease Control and Prevention. 2015. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6414a9.htm>.

Ram, Bina, Aparna Shankar, Claire M. Nightingale, Billie Giles-Corti, Anne Ellaway, Ashley R. Cooper, Angie Page, et al. 2017. “Comparisons of Depression, Anxiety, Well-Being, and Perceptions of the Built Environment amongst Adults Seeking Social, Intermediate and Market-Rent Accommodation in the Former London Olympic Athletes’ Village.” *Health & Place* 48 (November): 31–39. <https://doi.org/10.1016/j.healthplace.2017.09.001>.

Roe, Jenny. 2016. “Cities, Green Space, and Mental Well-Being.” In *Oxford Research Encyclopedia of Environmental Science*, by Jenny Roe. Oxford University Press. <https://doi.org/10.1093/acrefore/9780199389414.013.93>.

———. 2018. “Ethnicity and Children’s Mental Health: Making the Case for Access to Urban Parks.” *The Lancet Planetary Health* 2 (6): e234–35. [https://doi.org/10.1016/S2542-5196\(18\)30122-0](https://doi.org/10.1016/S2542-5196(18)30122-0).

Roe, Jenny, and Peter Aspinall. 2011. “The Restorative Benefits of Walking in Urban and Rural Settings in Adults with Good and Poor Mental Health.” *Health & Place, Health Geographies of Voluntarism*, 17 (1): 103–13. <https://doi.org/10.1016/j.healthplace.2010.09.003>.

Russ, Tom C, G David Batty, Gena F Hearnshaw, Candida Fenton, and John M Starr. 2012. “Geographical Variation in Dementia: Systematic Review with Meta-Analysis.” *International Journal of Epidemiology* 41 (4): 1012–32. <https://doi.org/10.1093/ije/dys103>.

Saelens, Brian E., James F. Sallis, and Lawrence D. Frank. 2003. “Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures.” *Annals of Behavioral Medicine* 25 (2): 80–91. https://doi.org/10.1207/S15324796ABM2502_03.

Sallis, James F., Kelli L. Cain, Terry L. Conway, Kavita A. Gavand, Rachel A. Millstein, Carrie M. Geremia, Lawrence D. Frank, Brian E. Saelens, Karen Glanz, and Abby C. King. 2015. “Is Your Neighborhood Designed to Support Physical Activity? A Brief Streetscape Audit Tool.” *Preventing Chronic Disease* 12 (September): 150098. <https://doi.org/10.5888/pcd12.150098>.

SAMHSA. 2012. “A Comparison of Rural and Urban Substance Abuse Treatment Admissions.” *TEDS Report*, 7.

Satcher, David, Martha Okafor, and LeConté J. Dill. 2012. “Impact of the Built

- Environment on Mental and Sexual Health: Policy Implications and Recommendations.” ISRN Public Health 2012 (June): 1-7. <https://doi.org/10.5402/2012/806792>.
- Stathopoulou, Georgia, Mark B. Powers, Angela C. Berry, Jasper A.J. Smits, and Michael W. Otto. 2006. “Exercise Interventions for Mental Health: A Quantitative and Qualitative Review.” *Clinical Psychology: Science and Practice* 13 (2): 179.
- Taylor, Lucy, and Dieter F. Hochuli. 2017. “Defining Greenspace: Multiple Uses across Multiple Disciplines.” *Landscape and Urban Planning* 158 (February): 25-38. <https://doi.org/10.1016/j.landurbplan.2016.09.024>.
- Teo, Celine, and Antony Chum. 2020. “The Effect of Neighbourhood Cohesion on Mental Health across Sexual Orientations: A Longitudinal Study.” *Social Science & Medicine* 265 (November): 113499. <https://doi.org/10.1016/j.socscimed.2020.113499>.
- “Urban Green Spaces and Health.” 2016. Copenhagen: WHO Regional Office for Europe.
- “What Is Mental Health?” n.d. Centre for Urban Design and Mental Health. Accessed March 22, 2021. <https://www.urbandesignmentalhealth.com/what-is-mental-health.html>.
- World Health Organization, and Gehl Institute. 2017. “Towards More Physical Activity in Cities.” https://www.euro.who.int/__data/assets/pdf_file/0018/353043/2017_WHO_Report_FINAL_WEB.pdf.

